AT VENUS OBSCURO GRADIENTES
ÆRE SAEPSIT,
ET MULTO NEBULAE
CIRCUM
DEA FUDIT AMICTU,
CERNERE NE QUIS EOS
NEU QUIS CONTINGERE
POSSET

O SAISONS, O
CHATEAUX
QUELLE AME EST
SANS DEFAUTS?
O SAISONS, O
CHATEAUX

NOT MARBLE,
NOR THE GILDED
MONUMENTS
OF PRINCES, SHALL
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LANGUAGE

BY

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TO

A. S. B.
PREFACE

This book is a revised version of the author's Introduction to the Study of Language, which appeared in 1914 (New York, Henry Holt and Company). The new version is much larger than the old, because the science of language has in the interval made progress, and because both men of science and the educated public now attribute greater value to an understanding of human speech.

Like its predecessor, this book is intended for the general reader and for the student who is entering upon linguistic work. Without such an introduction, specialized treatises are unintelligible. For the general reader an orderly survey is probably more interesting than a discussion of selected topics, for these, after all, cannot be understood without their background. No one will ask for an anecdotal treatment who has once opened his eyes to the strangeness, beauty, and import of human speech.

The deep-rooted things about language, which mean most to all of us, are usually ignored in all but very advanced studies; this book tries to tell about them in simple terms and to show their bearing on human affairs. In 1914 I based this phase of the exposition on the psychologic system of Wilhelm Wundt, which was then widely accepted. Since that time there has been much upheaval in psychology; we have learned, at any rate, what one of our masters suspected thirty years ago, namely, that we can pursue the study of language without reference to any one psychological doctrine, and that to do so safeguards our results and makes them more significant to workers in related fields. In the present book I have tried to avoid such dependence; only by way of elucidation I have told, at a few points, how the two main present-day trends of psychology differ in their interpretation. The mentalists would supplement the facts of language by a version in terms of mind, — a version which will differ in the various schools of mentalistic psychology. The mechanists demand that the facts be presented without any assumption of such auxiliary factors. I have tried to meet this demand not merely because I believe that mechanism is the necessary form of scientific discourse, but also because an exposition which stands on its own
feet is more solid and more easily surveyed than one which is propped at various points by another and changeable doctrine.

I have tried everywhere to present the accepted views, not even avoiding well-used standard examples; on disputed matters I have tried to state the point at issue; and in both cases I have given references, in the Notes and Bibliography, which will enable the reader to look into things, and, if he chooses, to arrive at an opinion of his own.

Thanks are due to many scholars who contributed help and information, and to the publisher, the printer, and the very able typesetter, all of whom devoted great care to the making of this book.

L. B.

Chicago, January 1933.

PREFACE TO THE BRITISH EDITION

This edition differs from the American form of this book (New York, 1933) in two respects: the phonetic symbols conform to the usage of the International Phonetic Association, and the transcriptions of English forms represent a polite type of British ('Received' or 'Public School') pronunciation. Moreover, a few corrections have been embodied in the text. All these changes were subject to a limitation imposed by the method of manufacturing the book: the paging and alignment of the American edition had to be kept. Accordingly, the reader will find some American features (such as the spelling -or for -our) and some passages where the point of view (e.g., as to topography) is American. However, in all cases where corrections or additions seemed to have material bearing, these have been either incorporated into the text, or, where this could not be done, added in a list at the end of the book. For most of these improvements I am indebted to Professors R. G. Kent and D. Jones; the criticism and the published works of Professor Jones have aided me especially as to British pronunciation.

L. B.

Chicago, August, 1934.
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LANGUAGE
CHAPTER 1

THE STUDY OF LANGUAGE

1.1. Language plays a great part in our life. Perhaps because of its familiarity, we rarely observe it, taking it rather for granted, as we do breathing or walking. The effects of language are remarkable, and include much of what distinguishes man from the animals, but language has no place in our educational program or in the speculations of our philosophers.

There are some circumstances, however, in which the conventionally educated person discusses linguistic matters. Occasionally he debates questions of "correctness" — whether it is "better," for instance, to say it's I or it's me. His discussion of such things follows a fairly rigid pattern. If possible, he looks to the conventions of writing for an answer — as, say, for the question whether a t is to be pronounced in words like often or soften. Otherwise he appeals to authority: one way of speaking, he believes, is inherently right, the other inherently wrong, and certain learned men, especially the authors of grammars and dictionaries, can tell us which is which. Mostly, however, he neglects to consult these authorities, and tries, instead, to settle the matter by a kind of philosophical reasoning, which operates with terms such as "subject," "object," "predicate," and so on. This is the common-sense way of dealing with linguistic matters. Like much else that masquerades as common sense, it is in fact highly sophisticated, and derives, at no great distance, from the speculations of ancient and medieval philosophers.

It is only within the last century or so that language has been studied in a scientific way, by careful and comprehensive observation; the few exceptions will occupy us in a moment. Linguistics, the study of language, is only in its beginnings. The knowledge it has gained has not yet become part of our traditional education; the "grammar" and other linguistic instruction in our schools confines itself to handing on the traditional notions. Many people have difficulty at the beginning of language study, not in grasping the methods or results (which are simple enough), but in stripping
off the preconceptions which are forced on us by our popular-

1. 2. The ancient Greeks had the gift of wondering at things
that other people take for granted. They speculated boldly and
persistently about the origin, history, and structure of language.
Our traditional lore about language is due largely to them.

Herodotus, writing in the fifth century B.C., tells us that King
Psammetichus of Egypt, in order to find out which was the oldest
nation of mankind (whatever this may mean), isolated two new-
born infants in a park; when they began to speak, they uttered
the word bekos, which turned out to be Phrygian for 'bread.'

In his dialogue Cratylus, Plato (427-347 B.C.) discusses the
origin of words, and particularly the question whether the relation
between things and the words which name them is a natural and
necessary relation or merely the result of a human convention.
This dialogue gives us a first glimpse into a century-long contro-
versy between the Analogists, who believed that language was
natural and therefore at bottom regular and logical, and the
Anomalists, who denied these things and pointed out the irregular-
ities of linguistic structure.

The Analogists believed that the origin and the true meaning of
words could be traced in their shape; the investigation of this they
called etymology. We may illustrate their theory by English ex-
amples. The word blackbird obviously consists of black and bird:
the species was named for its color, and, indeed, blackbirds are
birds and are black. In the same way, the Greeks would have con-
cluded that there was some deep-seated connection between a
gooseberry and a goose: it was the etymologist's task to find this
connection. The word mushroom would have presented a more
difficult problem. The components are often altered; thus, break-
fast, in spite of the difference in sound, is evidently the meal by
which we break our fast, and manly a shorter form of man-like.

In Greek, as in English, however, most words resist this kind of
analysis. Thus, early ends like manly, but the rest of the word is
obscure; woman resembles man, but what is the first syllable?
Then there is a residue of short, simple words that do not resemble
others — words such as man, boy, good, bad, eat, run. In such cases
the Greeks and their pupils, the Romans, resorted to guesswork.
For instance, they explained the Greek word lithos 'stone' as
derived from the phrase lian theein 'to run too much,' because this
is what a stone does not do. A Latin example of this sort has become proverbial: *lucus a non lucendo* ‘a grove (*lucus*) is so named on account of its not being light (*lucendo*).’

These etymologies show us, at any rate, that the Greeks realized that speech-forms change in the course of time. In the systematic study of this change modern students have found the key to most linguistic problems. The ancients never settled down to any careful study of linguistic change.

The ancient Greeks studied no language but their own; they took it for granted that the structure of their language embodied the universal forms of human thought or, perhaps, of the cosmic order. Accordingly, they made grammatical observations, but confined these to one language and stated them in philosophical form. They discovered the parts of speech of their language, its syntactic constructions, such as, especially, that of subject and predicate, and its chief inflectional categories: genders, numbers, cases, persons, tenses, and modes. They defined these not in terms of recognizable linguistic forms, but in abstract terms which were to tell the meaning of the linguistic class. These teachings appear most fully in the grammars of Dionysius Thrax (second century B.C.) and of Apollonius Dyscolus (second century A.D.).

The Greeks made also some observations of detail, but this phase of their work, unfortunately, had less effect upon posterity. Their great epic poems, the *Iliad* and the *Odyssey*, which they viewed somewhat as sacred scriptures, were composed in an ancient and otherwise unknown kind of Greek. In order to understand these texts and to make correct copies, one had to study their language. Most famous in this work was Aristarchus (about 216-144 B.C.). Other works of Greek literature were composed in conventionalized forms of various regional dialects: the Greeks had the opportunity of comparing several divergent forms of their language. When the language of the great Athenian writers of the fourth century had become antiquated, it was made a special subject of study, since it represented the ideal form of written discourse. All this work demanded careful observation of details. Some of the later grammarians, notably Herodian, the son of Apollonius Dyscolus, assembled valuable information on such topics as the inflection and accent of ancient Greek.

1.3. The Greek generalizations about language were not improved upon until the eighteenth century, when scholars ceased
to view language as a direct gift of God, and put forth various theories as to its origin. Language was an invention of ancient heroes, or else the product of a mystical Spirit of the Folk. It began in man's attempts to imitate noises (the "bow-wow" theory), or in his natural sound-producing responses (the "ding-dong" theory), or in violent outcries and exclamations (the "pooh-pooh" theory).

In the etymological explanation of speech-forms there was no improvement. Voltaire is reported to have said that etymology is a science in which the vowels count for nothing and the consonants for very little.

The Romans constructed Latin grammars on the Greek model; the most famous of these, the work of Donatus (fourth century A.D.) and of Priscian (sixth century A.D.), remained in use as text-books through the Middle Ages. In the Middle Ages, when Latin was changing from its ancient shape into the forms which we know today as the Romance languages (French, Italian, Spanish, and so on), the convention remained of writing, as well as one could, in the ancient classical form of Latin. The medieval scholar, accordingly, in both the Latin countries and others, studied only classical Latin. The scholastic philosophers discovered some features of Latin grammar, such as the distinction between nouns and adjectives and the differences between concord, government, and apposition. They contributed much less than the ancients, who had, at any rate, a first-hand knowledge of the languages they studied. The medieval scholar saw in classical Latin the logically normal form of human speech. In more modern times this doctrine led to the writing of general grammars, which were to demonstrate that the structure of various languages, and especially of Latin, embodies universally valid canons of logic. The most famous of these treatises is the Grammaire générale et raisonnée of the Convent of Port-Royal, which appeared in 1660. This doctrine persisted into the nineteenth century; it appears, for instance, in the classical scholar, Gottfried Hermann's work De emendanda ratione Graecae grammaticae (1801). It is still embodied in our school tradition, which seeks to apply logical standards to language. Philosophers, to this day, sometimes look for truths about the universe in what are really nothing but formal features of one or another language.

An unfortunate outgrowth of the general-grammar idea was
the belief that the grammarian or lexicographer, fortified by his powers of reasoning, can ascertain the logical basis of language and prescribe how people ought to speak. In the eighteenth century, the spread of education led many dialect-speakers to learn the upper-class forms of speech. This gave the authoritarians their chance: they wrote normative grammars, in which they often ignored actual usage in favor of speculative notions. Both the belief in “authority” and some of the fanciful rules (as, for instance, about the use of shall and will) still prevail in our schools.

For the medieval scholar, language meant classical Latin, as it appears in books; we find few traces of interest in any other form of speech. The horizon widened at the time of the Renaissance. At the end of the Middle Ages, the study of Greek came back into fashion; soon afterward, Hebrew and Arabic were added. What was more important, some scholars in various countries began to take an interest in the language of their own time.

The era of exploration brought a superficial knowledge of many languages. Travelers brought back vocabularies, and missionaries translated religious books into the tongues of newly-discovered countries. Some even compiled grammars and dictionaries of exotic languages. Spanish priests began this work as early as in the sixteenth century; to them we owe a number of treatises on American and Philippine languages. These works can be used only with caution, for the authors, untrained in the recognition of foreign speech-sounds, could make no accurate record, and, knowing only the terminology of Latin grammar, distorted their exposition by fitting it into this frame. Down to our own time, persons without linguistic training have produced work of this sort; aside from the waste of labor, much information has in this way been lost.

The increase of commerce and travel led also to the compilation of grammars and dictionaries for languages closer at hand. The linguistic horizon at the end of the eighteenth century can be surveyed in the glossary of 285 words in two hundred languages of Europe and Asia which P. S. Pallas (1741–1811) edited at the behest of Empress Catharine of Russia in 1786. A second edition of this, in 1791, added eighty more languages, including some African and American. In the years 1806 to 1817 there appeared a four-volume treatise under the title Mithridates, by J. C. Adelung
8 THE STUDY OF LANGUAGE

and J. S. Vater, which contained the Lord’s Prayer in nearly five hundred languages.

The Renaissance turned the interest of a few scholars to the older records of their own languages. Franciscus Junius (1589–1677) accomplished an enormous amount of work in the study of the ancient documents of English and of the closely related languages, Frisian, Dutch, German, Scandinavian, and Gothic. This last—a language no longer spoken today—Junius knew from the famous Silver Codex, then recently discovered, a manuscript of the sixth century A.D. containing fragments of a Gospel translation; Junius published its text, together with that of the Anglo-Saxon Gospels. George Hickes (1642–1715) continued this work, publishing a Gothic and Anglo-Saxon grammar and a Thesaurus of miscellaneous information about the older stages of English and the sister tongues.

1.4. The development so far outlined shows us what eighteenth-century scholars knew about language. They stated the grammatical features of language in philosophical terms and took no account of the structural difference between languages, but obscured it by forcing their descriptions into the scheme of Latin grammar. They had not observed the sounds of speech, and confused them with the written symbols of the alphabet. This failure to distinguish between actual speech and the use of writing distorted also their notions about the history of language. They saw that in medieval and modern times highly cultivated persons wrote (and even spoke) good Latin, while less educated or careless scribes made many mistakes: failing to see that this Latin-writing was an artificial and academic exercise, they concluded that languages are preserved by the usage of educated and careful people and changed by the corruptions of the vulgar. In the case of modern languages like English, they believed, accordingly, that the speech-forms of books and of upper-class conversation represented an older and purer level, from which the “vulgarisms” of the common people had branched off as “corruptions” by a process of “linguistic decay.” The grammarians felt free, therefore, to prescribe fanciful rules which they derived from considerations of logic.

These misconceptions prevented scholars from making use of the data that were at hand: the modern languages and dialects, the records of ancient languages, the reports about exotic lan-
guages, and, above all, the documents which show us successive stages of one and the same language, as for instance of Anglo-Saxon (Old English) and modern English, or of Latin and the modern Romance languages. One knew that some languages resembled each other, but the doctrine of linguistic decay discouraged systematic study of this relation, since the changes which led, say, from Latin to modern French, were viewed as haphazard corruptions.

The illusion that Latin had lived on, unchanged, beside the Romance languages, led scholars to derive contemporary languages one from the other. Mostly they took Hebrew to be the language from which all others had sprung, but some thought otherwise, as, for example, Goropius Becanus of Antwerp, who patriotically derived all languages from Dutch.

It was plain that the more familiar languages of Europe fell into three groups by virtue of close resemblances within each group, resemblances such as appear in the following words:

<table>
<thead>
<tr>
<th>Germanic group</th>
<th>Romance group</th>
<th>Slavic group</th>
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<tbody>
<tr>
<td>'hand'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English hand</td>
<td>French main</td>
<td>Russian ruka</td>
</tr>
<tr>
<td>Dutch hand</td>
<td>Italian mano</td>
<td>Polish ręka</td>
</tr>
<tr>
<td>German Hand</td>
<td>Spanish mano</td>
<td>Bohemian ruka</td>
</tr>
<tr>
<td>Danish haand</td>
<td></td>
<td>Serbian ruka</td>
</tr>
<tr>
<td>Swedish hand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 'foot'         |               |              |
| English foot   | French pied    | Russian noga |
| Dutch voet     | Italian piede  | Polish noga  |
| German Fusz    | Spanish pie    | Bohemian noha|
| Danish fod      |               | Serbian noga |
| Swedish fot     |               |              |

| 'winter'        |               |              |
| English winter  | French hiver   | Russian zima |
| Dutch winter    | Italian inverno| Polish zima  |
| German Winter   | Spanish invierno| Bohemian zima|
| Danish winter   |               | Serbian zima |
| Swedish vinter  |               |              |
There was apparent also a less striking resemblance between these groups; this wider resemblance extended to some other languages, such as, notably, Greek:

‘mother’: Greek μήτηρ, Latin māter (with its modern forms in the Romance languages), Russian мать (genitive case матери — with similar forms in the other Slavic languages), English mother (with similar forms in the other Germanic languages);

‘two’: Greek δύο, Latin duo, Russian два, English two;

‘three’: Greek τρεις, Latin trois, Russian три, English three;

‘is’: Greek ἔστι, Latin est, Russian jest’, English is (German ist).

1.5. Outside the tradition of Europe, several nations had developed linguistic doctrines, chiefly on an antiquarian basis. The Arabs had worked out a grammar of the classical form of their language, as it appears in the Koran; on the model of this, the Jews in Mohammedan countries constructed a Hebrew grammar. At the Renaissance, European scholars became acquainted with this tradition; the term root, for instance, as a designation for the central part of a word, comes from Hebrew grammar. In the Far East, the Chinese had gained a great deal of antiquarian linguistic knowledge, especially in the way of lexicography. A Japanese grammar seems to have grown up independently.

It was in India, however, that there arose a body of knowledge which was destined to revolutionize European ideas about language. The Brahmin religion guarded, as sacred texts, some very ancient collections of hymns; the oldest of these collections, the Rig-Veda, dates in part, at a conservative estimate, from about 1200 B.C. As the language of these texts grew antiquated, the proper way of pronouncing them, and their correct interpretation, became the task of a special class of learned men. The antiquarian interest in language which arose in this way, was carried over into a more practical sphere. Among the Hindus, as among us, different classes of society differed in speech. Apparently there
were forces at work which led upper-class speakers to adopt lower-class forms of speech. We find the Hindu grammarians extending their interest from the Scriptures to the upper-caste language, and making rules and lists of forms descriptive of the correct type of speech, which they called Sanskrit. In time they worked out a systematic arrangement of grammar and lexicon. Generations of such labor must have preceded the writing of the oldest treatise that has come down to us, the grammar of Pāṇini. This grammar, which dates from somewhere round 350 to 250 B.C., is one of the greatest monuments of human intelligence. It describes, with the minutest detail, every inflection, derivation, and composition, and every syntactic usage of its author's speech. No other language, to this day, has been so perfectly described. It may have been due, in part, to this excellent codification that Sanskrit became, in time, the official and literary language of all of Brahmin India. Long after it had ceased to be spoken as anyone's native language, it remained (as classical Latin remained in Europe) the artificial medium for all writing on learned or religious topics.

Some knowledge of Sanskrit and of the Hindu grammar had reached Europe, through missionaries, in the sixteenth and seventeenth centuries. In the eighteenth century, Englishmen in India transmitted more exact reports; round the beginning of the nineteenth century, the knowledge of Sanskrit became part of the equipment of European scholars.

1. 6. The Indian grammar presented to European eyes, for the first time, a complete and accurate description of a language, based not upon theory but upon observation. Moreover, the discovery of Sanskrit disclosed the possibility of a comparative study of languages.

To begin with, the concept of related languages was strikingly confirmed by the existence, in far-off India, of a sister of the familiar languages of Europe; witness, for example, the Sanskrit equivalents of the words above cited:

- mātā 'mother,' accusative case mātāram;
- dvāu 'two';
- trayah 'three';
- asti 'he is.'

Even more important was the insight into linguistic structure which one got from the accurate and systematic Hindu grammar. Until now, one had been able to see only vague and fluid similar-
ities, for the current grammars, built on the Greek model, did not clearly set off the features of each language. The Hindu grammar taught Europeans to analyze speech-forms; when one compared the constituent parts, the resemblances, which hitherto had been vaguely recognized, could be set forth with certainty and precision.

The old confused notions of linguistic relationship lived on for a brief time in the opinion that the European languages were derived from Sanskrit, but this opinion soon gave way to the obviously correct explanation, namely, that Sanskrit, Latin, Greek, and so on, were divergent later forms of some one prehistoric language. This explanation seems to have been first stated by Sir William Jones (1746–1794), the first great European Sanskrit scholar, in an address delivered in 1786: Sanskrit bears a resemblance to Greek and Latin which is too close to be due to chance, but shows, rather, that all three “have sprung from some common source which, perhaps, no longer exists,” and Gothic (that is, Germanic) and Celtic probably had the same origin.

In order to work out the comparison of these languages, one needed, of course, descriptive data for each one of them. The prospect of comparison, however, with all that it revealed about ancient speech-forms and tribal migrations and the origin of peoples and customs, proved so alluring that no one undertook the humdrum task of analyzing the other languages on the model of Sanskrit. European scholars had a sound knowledge of Latin and Greek; most of them spoke some Germanic language as their mother-tongue. Confronting a precise statement of Sanskrit grammar or a carefully analyzed lexical form, they could usually recall a similar feature from some of the more familiar languages. In reality, of course, this was a makeshift; often enough the comparer had to make a preliminary investigation to establish the facts, and sometimes he went astray for lack of methodically arranged data. If European scholars had possessed descriptions of the sister languages comparable to the Hindus' description of Sanskrit, the comparative study of the Indo-European languages (as they are now called) would have progressed far more speedily and accurately. Yet, in spite of poor equipment, and thanks to the energy of its workers, the historical and comparative study of the Indo-European languages became one of the principal enterprises, and one of the most successful, of European science in the nineteenth century.
The languages of Persia (the so-called Iranian languages) so closely resembled Sanskrit that their kinship was certain from the start. A similar relation, though less close, was found to exist between the Baltic languages (Lithuanian, Lettish, and Old Prussian) and the Slavic. Jones' surmise that the Germanic languages were related to Latin, Greek, and Sanskrit, at once proved true, as did later his surmise about Celtic (Irish, Welsh, Cornish, Breton, and the ancient language of Gaul). Later, Armenian and Albanese, and a few ancient languages known to us only from scant written records, proved also to belong to the Indo-European family.

Although there was some dispute as to details, the general presuppositions of historical and comparative language-study soon became clear. Languages change in the course of time. Apparent exceptions, such as the medieval and modern use of Latin (or, in India, of Sanskrit), amount only to this, that by long schooling people can be trained to imitate the language of ancient writings. This antiquarian feat is utterly different from the normal transmission of speech from parents to children. All writing, in fact, is a relatively recent invention, and has remained, almost to our day, the property of only a chosen few: the effect of writing upon the forms and the development of actual speech is very slight.

If a language is spoken over a large area, or thanks to migration, in several separate areas, then it will change differently in different places, and the result will be a set of related languages, like Italian, French, Spanish, Portuguese, Roumanian, and the other Romance dialects. We infer that other groups of related languages, such as the Germanic (or the Slavic or the Celtic), which show a similar resemblance, have arisen in the same way; it is only an accident of history that for these groups we have no written records of the earlier state of the language, as it was spoken before the differentiation set in. To these unrecorded parent languages we give names like *Primitive Germanic* (*Primitive Slavic, Primitive Celtic*, and so on).¹ In the same way, finding that all these languages and groups (Sanskrit, Iranian, Armenian, Greek, Albanese, Latin, Celtic, Germanic, Baltic, Slavic) resemble each other beyond the possibility of mere chance, we call them the *Indo-European family*.

¹ The word *primitive* is here poorly chosen, since it is intended to mean only that we happen to have no written records of the language. German scholars have a better device in their prefix *ur-* 'primeval,' with which they form, for this purpose, names like *urgermanisch, urslavisch, urkeltisch.*
of languages, and conclude, with Jones, that they are divergent forms of a single prehistoric language, to which we give the name Primitive Indo-European.

The method of comparison, too, was clear from the start. In general, any feature that is common to all or to several of the related languages, must have been present in their common antecedent stage, in the "parent language." Thus, from the above cited forms of the word for 'mother,' it is clear that in Primitive Indo-European this word must have begun with the sound which we indicate in writing by means of the letter \( m \). Where the related languages do not agree, some or all of them must have made some change. Thus, it is clear that the second consonant in the word for 'mother' was in Primitive Indo-European a \( t \)-sound, and that the \( th \)-sound in English (as well as the earlier \( d \)-sound in the Old English form, \( mōdor \)) must be due to change.

1.7. The beginning of a systematic comparison of the Indo-European languages was a treatise on the inflectional endings of verbs in Sanskrit, Greek, Latin, Persian, and Germanic, published in 1816 by Franz Bopp (1791–1867). In 1818 Rasmus Kristian Rask (1787–1832) showed that the words of the Germanic languages bear a regular formal relation in matters of sound, to the words of the other Indo-European languages. For instance, where the others have \( p \), the Germanic languages have \( f \), as in father: Latin \( pater \), foot: Latin \( pēs \), five: Greek \( pente \), few: Latin \( paucl \).

In 1819 Jakob Grimm (1787–1863) published the first volume of his Deutsche Grammatik, which was not, as the title nowadays would indicate, a German grammar, but a comparative grammar of the Germanic languages (Gothic, Scandinavian, English, Frisian, Dutch, and German). In the second edition, in 1822, of this volume, Grimm presented a systematic exposition of the correspondences of consonants between Germanic and the other Indo-European languages; since then, these correspondences have been known to English-speaking scholars as Grimm's Law. These correspondences are a matter of historical detail, but their significance was overwhelming, since they showed that human action, in the mass, is not altogether haphazard, but may proceed with regularity even in so unimportant a matter as the manner of pronouncing the individual sounds within the flow of speech. Grimm's comparison of the Germanic languages remains to this day unrivaled; three more volumes appeared in 1826,
In 1833 Bopp began the publication of a comprehensive treatise, a comparative grammar of the Indo-European languages. In the years 1833 to 1836 there appeared the first edition of the *Etymological Investigations* of August Friedrich Pott (1802–1887). The term *etymology*, here as in all modern discussions, has taken on a precise meaning: the etymology of a speech-form is simply its history, and is obtained by finding the older forms in the same language and the forms in related languages which are divergent variants of the same parent form. Thus, to state the etymology of the English word *mother* is to say that this form is the modern version of the ninth-century Old English *mōdor*; that this is related to Old Norse *mōdor*, Old Frisian *mōder*, Old Saxon *mōdar*, Old High German *muoter* (these are the forms in our oldest records of the respective languages), in the sense that all these are divergent variants of a single Primitive Germanic word, which we symbolize as *mōder*; and that these Germanic forms are in turn related to ("cognate with") Sanskrit *mātā*, Avestan (Old Iranian) *mātā*, Old Armenian *mair*, ancient Greek *mētēr*, Albanese *motrc* (which, however, means 'sister'), Latin *māter*, Old Irish *māthir*, Lithuanian *mōtē* (which means 'wife'), Old Bulgarian (Slavic) *māti*, and with the other corresponding forms in each of the groups of languages here illustrated, in the sense that all these are divergent later forms of a single Primitive Indo-European word, which we symbolize as *mātēr*. As this example shows, etymologies, in the modern sense, do not necessarily show us an older, more transparent meaning of words. Our modern etymologies in the Indo-European languages are due largely to the researches of Pott.

During the following decades progress was so rapid that both smaller treatises and the great handbooks rapidly became antiquated. Of the latter, Bopp's, in spite of new editions, was superseded in 1861 by the *Compendium of the Comparative Grammar of the Indo-European Languages* of August Schleicher (1823–1868). In 1886 Karl Brugmann (1849–1919) and Berthold Delbrück (1842–1922) began the publication of their *Outline of the Comparative Grammar of the Indo-European Languages*; the standard work of reference today is the second edition of this, which appeared from 1897 to 1916.
As the work went on, other, more detailed treatises were devoted to the separate branches of the Indo-European family, in the manner of Grimm's great treatise on Germanic. Friedrich Diez (1794-1876) began the serious study of the Romance languages in his Grammar of the Romance Languages (1836-1844); Johann Kaspar Zeuss (1806-1856) opened the field of the Celtic languages in his Grammatica Celtica (1853); Franz von Miklosich (1813-1891) wrote a Comparative Grammar of the Slavic Languages (1852-1875).

1.8. These studies could not fail to throw light upon many an aspect of history and archaeology, but their immediate interest lay in what they told about human speech. Although the various Indo-European languages had a common origin, their later careers were independent; the student had now a vast collection of details concerning the changes in human speech, which enabled him to generalize on the manner of this change.

To draw the conclusions as to the way in which languages change, was to replace the speculation of earlier times by the results of scientific induction. William Dwight Whitney (1827-1894), an American scholar, wrote Language and the Study of Language (1867) and The Life and Growth of Language (1874). These books were translated into several European languages; today they seem incomplete, but scarcely antiquated, and still serve as an excellent introduction to language study. In 1880 there appeared the Principles of Linguistic History by Hermann Paul (1846-1921), which, in its successive editions (the fifth appeared in 1920), became the standard work on the methods of historical linguistics.

Paul's book of Principles illustrates, with a wealth of examples, the process of linguistic change which had been revealed by Indo-European studies. Not so well written as Whitney's, but more detailed and methodical, this book exercised a great influence on linguistic studies; students of a more recent generation are neglecting it, to their disadvantage. Aside from its very dry style, Paul's Principles suffers from faults that seem obvious today, because they are significant of the limitations of nineteenth-century linguistics.

One of these faults is Paul's neglect of descriptive language study. He admitted that descriptions of languages were necessary, but confined his actual discussion to matters of linguistic change. This shortcoming he shares with his epoch. We can study
linguistic change only by comparing related languages or different historical stages of the same language. For instance, by noting the similarities and differences of English, Frisian, Dutch, German, Scandinavian, and Gothic, we can get a notion of the older language ("Primitive Germanic") from which they have differentiated in the course of time, and we can then study the changes which have occurred in each of these later languages. Or else, by comparing our records of Old English (say, in the writings of King Alfred) with modern English, we can see how English has changed in the last thousand years. Evidently our power of making this comparison depends upon our knowledge of the things to be compared. For example, our knowledge about the compounding of words (as in blackbird or footsore) in the several Germanic languages is decidedly incomplete; therefore we cannot go very far with a comparative study of this matter, which would tell us how words were compounded in Primitive Germanic, and how these habits have changed in the subsequent history of each Germanic language. The historical language students of the nineteenth century suffered under these limitations, but they seem not to have grasped the nature of the difficulty.

The other great weakness of Paul's Principles is his insistence upon "psychological" interpretation. He accompanies his statements about language with a paraphrase in terms of mental processes which the speakers are supposed to have undergone. The only evidence for these mental processes is the linguistic process; they add nothing to the discussion, but only obscure it. In Paul's book and largely to the present day, linguistics betrays its descent from the philosophical speculations of the ancient Greeks. Paul and most of his contemporaries dealt only with Indo-European languages and, what with their neglect of descriptive problems, refused to work with languages whose history was unknown. This limitation cut them off from a knowledge of foreign types of grammatical structure, which would have opened their eyes to the fact that even the fundamental features of Indo-European grammar, such as, especially, the part-of-speech system, are by no means universal in human speech. Believing these features to be universal, they resorted, whenever they dealt with fundamentals, to philosophical and psychological pseudo-explanations.

1. 9. Alongside the great stream of historical research, there ran, however, a small but accelerating current of general linguistic
study. The Hindu grammar of Sanskrit was never quite forgotten; while many pupils used its results without knowing of its existence, the masters, who knew the antecedents of their science, appreciated its value. For the less-known Indo-European languages descriptive studies could not be avoided. It is surely no accident that the best of these, in the field of the Slavic and Baltic languages, were furnished by August Leskien (1840–1916), a scholar who took a leading part in laying the foundations of historical methods of research.

For the most part, however, descriptive studies did not merge with the main stream of historical work. Some students were attracted by the structural peculiarities of languages outside the Indo-European group, even though the history of these languages was unknown. Other students examined a variety of languages in order to get a philosophical survey of human speech; in fact, much of the older descriptive work is almost unintelligible today because it is pervaded by philosophical notions that are no longer familiar to us.

The first great book on general linguistics was a treatise on the varieties of human speech by Wilhelm von Humboldt (1767–1835), which appeared in 1836. H. Steinthal (1823–1899), beside more general writings on the fundamentals of language, published in 1861 a treatise on the principal types of language structure. G. von der Gabelentz’ (1840–1893) work on the science of language (1891) is much less philosophical. This direction of study culminated in a great work on language by the philosopher and psychologist, Wilhelm Wundt (1832–1920), which appeared in 1900 as the first part of a treatise on social psychology. Wundt based his psychology of speech upon any and all accessible descriptions of languages. It is interesting today to read the Indo-Europeanist Delbrück’s critique and Wundt’s rejoinder, both of which appeared in the following year. Delbrück objects to Wundt’s use of languages whose history is unknown; for him the only aspect of language worth studying is its change in the course of time. Wundt, on the other hand, insists upon the importance of psychological interpretation in terms of his system, while Delbrück says that it does not matter what particular system of psychology a linguist may choose.

Meanwhile some students saw more and more clearly the natural relation between descriptive and historical studies. Otto Böhtlingk
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(1815-1904), who made the modern European edition of Panini, applied the descriptive technique to a language of totally different structure, the Yakut of Asiatic Russia (1851). Friedrich Müller (1834-1898) published an outline of linguistic science (1876-1888) which contained brief sketches of the languages of the world, regardless of whether a historical treatment was possible. Franz Nikolaus Finck (1867-1910), both in a theoretical essay (1905) and in a little volume (1910) in which he analyzed descriptively eight unrelated languages, insisted upon descriptive study as a basis for both historical research and philosophical generalization. Ferdinand de Saussure (1857-1913) had for years expounded this matter in his university lectures; after his death, they were published in book form (1915).

Most convincing in this respect was the historical treatment of language families other than the Indo-European. On the one hand, the need of descriptive data as a prerequisite for comparative work was here self-evident; on the other hand, the results showed that the processes of linguistic change were the same in all languages, regardless of their grammatical structure. The comparative study of the Finno-Ugrian languages (Finnish, Lappish, Hungarian, and their kin) began as early as 1799, and has been greatly elaborated. The second volume of Humboldt’s great treatise founded the comparative grammar of the Malayo-Polynesian language family. Today we have comparative studies of other families, such as the Semitic family and the Bantu family in Africa. Students of American languages could indulge in no self-deception as to the need of descriptive data: north of Mexico alone there are dozens of totally unrelated groups of languages, presenting the most varied types of structure. In the stress of recording utterly strange forms of speech one soon learned that philosophical prepossessions were only a hindrance.

The merging of these two streams of study, the historical-comparative and the philosophical-descriptive, has made clear some principles that were not apparent to the great Indo-Europeanists of the nineteenth century, as represented, say, by Hermann Paul. All historical study of language is based upon the comparison of two or more sets of descriptive data. It can be only as accurate and only as complete as these data permit it to be. In order to describe a language one needs no historical knowledge whatever; in fact, the observer who allows such knowledge to affect his
description, is bound to distort his data. Our descriptions must be unprejudiced, if they are to give a sound basis for comparative work.

The only useful generalizations about language are inductive generalizations. Features which we think ought to be universal may be absent from the very next language that becomes accessible. Some features, such as, for instance, the distinction of verb-like and noun-like words as separate parts of speech, are common to many languages, but lacking in others. The fact that some features are, at any rate, widespread, is worthy of notice and calls for an explanation; when we have adequate data about many languages, we shall have to return to the problem of general grammar and to explain these similarities and divergences, but this study, when it comes, will be not speculative but inductive.

As to change in language, we have enough data to show that the general processes of change are the same in all languages and tend in the same direction. Even very specific types of change occur in much the same way, but independently, in the most diverse languages. These things, too, will some day, when our knowledge is wider, lend themselves to a systematic survey and to fruitful generalization.
CHAPTER 2

THE USE OF LANGUAGE

2.1. The most difficult step in the study of language is the first step. Again and again, scholarship has approached the study of language without actually entering upon it. Linguistic science arose from relatively practical preoccupations, such as the use of writing, the study of literature and especially of older records, and the prescription of elegant speech, but people can spend any amount of time on these things without actually entering upon linguistic study. As the individual student is likely to repeat the delays of history, we may do well to speak of these matters, so as to distinguish them from the subject of our study.

Writing is not language, but merely a way of recording language by means of visible marks. In some countries, such as China, Egypt, and Mesopotamia, writing was practised thousands of years ago, but to most of the languages that are spoken today it has been applied either in relatively recent times or not at all. Moreover, until the days of printing, literacy was confined to a very few people. All languages were spoken through nearly all of their history by people who did not read or write; the languages of such peoples are just as stable, regular, and rich as the languages of literate nations. A language is the same no matter what system of writing may be used to record it, just as a person is the same no matter how you take his picture. The Japanese have three systems of writing and are developing a fourth. When the Turks, in 1928, adopted the Latin alphabet in place of the Arabic, they went on talking in just the same way as before. In order to study writing, we must know something about language, but the reverse is not true. To be sure, we get our information about the speech of past times largely from written records — and for this reason we shall, in another connection, study the history of writing — but we find this to be a handicap. We have to use great care in interpreting the written symbols into terms of actual speech; often we fail in this, and always we should prefer to have the audible word.

Literature, whether presented in spoken form or, as is now our
custom, in writing, consists of beautiful or otherwise notable utterances. The student of literature observes the utterances of certain persons (say, of a Shakspere) and concerns himself with the content and with the unusual features of form. The interest of the philologist is even broader, for he is concerned with the cultural significance and background of what he reads. The linguist, on the other hand, studies the language of all persons alike; the individual features in which the language of a great writer differs from the ordinary speech of his time and place, interest the linguist no more than do the individual features of any other person's speech, and much less than do the features that are common to all speakers.

The discrimination of elegant or "correct" speech is a by-product of certain social conditions. The linguist has to observe it as he observes other linguistic phenomena. The fact that speakers label a speech-form as "good" or "correct," or else as "bad" or "incorrect," is merely a part of the linguist's data concerning this speech-form. Needless to say, it does not permit him to ignore part of his material or to falsify his records: he observes all speech-forms impartially. It is part of his task to find out under what circumstances the speakers label a form in one way or the other, and, in the case of each particular form, why they label it as they do: why, for example, many people say that ain't is "bad" and am not is "good." This is only one of the problems of linguistics, and since it is not a fundamental one, it can be attacked only after many other things are known. Strangely enough, people without linguistic training devote a great deal of effort to futile discussions of this topic without progressing to the study of language, which alone could give them the key.

A student of writing, of literature or philology, or of correct speech, if he were persistent and methodical enough, might realize, after some waste of effort, that he had better first study language and then return to these problems. We can save ourselves this detour by turning at once to the observation of normal speech. We begin by observing an act of speech-utterance under very simple circumstances.

2. 2. Suppose that Jack and Jill are walking down a lane. Jill is hungry. She sees an apple in a tree. She makes a noise with her larynx, tongue, and lips. Jack vaults the fence, climbs the tree, takes the apple, brings it to Jill, and places it in her hand. Jill eats the apple.
This succession of events could be studied in many ways, but we, who are studying language, will naturally distinguish between the act of speech and the other occurrences, which we shall call practical events. Viewed in this way, the incident consists of three parts, in order of time:

A. Practical events preceding the act of speech.
B. Speech.
C. Practical events following the act of speech.

We shall examine first the practical events, A and C. The events in A concern mainly the speaker, Jill. She was hungry; that is, some of her muscles were contracting, and some fluids were being secreted, especially in her stomach. Perhaps she was also thirsty: her tongue and throat were dry. The light-waves reflected from the red apple struck her eyes. She saw Jack by her side. Her past dealings with Jack should now enter into the picture; let us suppose that they consisted in some ordinary relation, like that of brother and sister or that of husband and wife. All these events, which precede Jill’s speech and concern her, we call the speaker’s stimulus.

We turn now to C, the practical events which came after Jill’s speech. These concern mainly the hearer, Jack, and consist of his fetching the apple and giving it to Jill. The practical events which follow the speech and concern the hearer, we call the hearer’s response. The events which follow the speech concern also Jill, and this in a very important way: she gets the apple into her grasp and eats it.

It is evident at once that our whole story depends upon some of the more remote conditions connected with A and C. Not every Jack and Jill would behave like these. If Jill were bashful or if she had had bad experiences of Jack, she might be hungry and see the apple and still say nothing; if Jack were ill disposed toward her, he might not fetch her the apple, even though she asked for it. The occurrence of a speech (and, as we shall see, the wording of it) and the whole course of practical events before and after it, depend upon the entire life-history of the speaker and of the hearer. We shall assume in the present case, that all these predisposing factors were such as to produce the story as we have told it. Supposing this, we want to know what part the speech-utterance (B) played in this story.

If Jill had been alone, she might have been just as hungry and
thirsty and might have seen the same apple. If she had sufficient strength and skill to get over the fence and climb the tree, she could get hold of the apple and eat it; if not, she would have to stay hungry. The lone Jill is in much the same position as the speechless animal. If the animal is hungry and sees or smells food, it moves toward the food; whether the animal succeeds in getting the food, depends upon its strength and skill. The state of hunger and the sight or smell of the food are the stimulus (which we symbolize by S) and the movements toward the food are the reaction (which we symbolize by R). The lone Jill and the speechless animal act in only one way, namely

\[ S \rightarrow R. \]

If this works, they get the food; if it does not work — if they are not strong or skilful enough to get the food by the actions R — they must stay hungry.

Of course, it is important for Jill's welfare that she get the apple. In most instances it is not a matter of life and death, though sometimes it is; in the long run, however, the Jill (or the animal) that gets the food has far better chances of surviving and populating the earth. Therefore, any arrangement which adds to Jill's chances of getting the apple, is enormously valuable for her. The speaking Jill in our story availed herself of just such an arrangement. She had, to begin with, the same chance of getting the apple as had the lone Jill or the speechless animal. In addition to this, however, the speaking Jill had a further chance which the others did not share. Instead of struggling with the fence and the tree, she made a few small movements in her throat and mouth, which produced a little noise. At once, Jack began to make the reactions for her; he performed actions that were beyond Jill's strength, and in the end Jill got the apple. Language enables one person to make a reaction (R) when another person has the stimulus (S).

In the ideal case, within a group of people who speak to each other, each person has at his disposal the strength and skill of every person in the group. The more these persons differ as to special skills, the wider a range of power does each one person control. Only one person needs to be a good climber, since he can get fruit for all the rest; only one needs to be a good fisherman, since he can supply the others with fish. The division of labor, and, with it, the whole working of human society, is due to language.

2. 3. We have yet to examine B, the speech-event in our story.
This, of course, is the part of the story with which we, as students of language, are chiefly concerned. In all of our work we are observing B; A and C concern us only because of their connection with B. Thanks to the sciences of physiology and physics, we know enough about the speech-event to see that it consists of three parts:

(B1) The speaker, Jill, moved her vocal chords (two little muscles inside the adam's-apple), her lower jaw, her tongue, and so on, in a way which forced the air into the form of sound-waves. These movements of the speaker are a reaction to the stimulus S. Instead of performing the practical (or handling) reaction R — namely, starting realistically off to get hold of the apple — she performed these vocal movements, a speech (or substitute) reaction, which we shall symbolize by a small letter r. In sum, then, Jill, as a speaking person, has not one but two ways of reacting to a stimulus:

\[ S \xrightarrow{r} R \] (practical reaction)
\[ S \xrightarrow{r} \] (linguistic substitute reaction).

In the present case she performed the latter.

(B2) The sound-waves in the air in Jill's mouth set the surrounding air into a similar wave-motion.

(B3) These sound-waves in the air struck Jack's ear-drums and set them vibrating, with an effect on Jack's nerves: Jack heard the speech. This hearing acted as a stimulus on Jack: we saw him running and fetching the apple and placing it in Jill's grasp, much as if Jill's hunger-and-apple stimulus had been acting on him. An observer from another planet, who did not know that there was such a thing as human speech, would have to conclude that somewhere in Jack's body there was a sense-organ which told him, "Jill is hungry and sees an apple up there." In short, Jack, as a speaking person, reacts to two kinds of stimuli: practical stimuli of the type S (such as hunger and the sight of food) and speech (or substitute) stimuli, certain vibrations in his ear-drums, which we shall symbolize by a small letter s. When we seek Jack doing anything (fetching an apple, say), his action may be due not only, as are an animal's actions, to a practical stimulus (such as hunger in his stomach, or the sight of an apple), but, just as often, to a speech-stimulus. His actions, R, may be prompted not by one, but by two kinds of proddings:

(Practical stimulus) \[ S \xrightarrow{R} \]
(linguistic substitute stimulus) \[ s \xrightarrow{R} \].
It is evident that the connection between Jill's vocal movements (B1) and Jack's hearing (B3) is subject to very little uncertainty or variation, since it is merely a matter of sound-waves passing through the air (B2). If we represent this connection by a dotted line, then we can symbolize the two human ways of responding to a stimulus by these two diagrams:

speechless reaction: \[ S \rightarrow R \]

reaction mediated by speech: \[ S \rightarrow r \rightarrow s \rightarrow R. \]

The difference between the two types is evident. The speechless reaction occurs always in the same person as does the stimulus; the person who gets the stimulus is the only one who can make the response. The response, accordingly, is limited to whatever actions the receiver of the stimulus can make. In contrast with this, the reaction mediated by speech may occur in a person who did not get the practical stimulus; the person who gets a stimulus can prompt another person to make a response, and this other person may be able to do things which the speaker cannot. The arrows in our diagrams represent the sequence of events within one person's body — a sequence of events which we think is due to some property of the nervous system. Therefore the speechless reaction can take place only in the body which received the stimulus. In the reaction mediated by speech, on the other hand, there is the link, represented by a dotted line, which consists of sound-waves in the air: the reaction mediated by speech can take place in the body of any person who hears the speech; the possibilities of reaction are enormously increased, since different hearers may be capable of a tremendous variety of acts. The gap between the bodies of the speaker and the hearer — the discontinuity of the two nervous systems — is bridged by the sound-waves.

The important things, biologically, are the same in both the speechless and the speaking occurrence, namely S (the hunger and sight of the food) and R (movements which get the food or fail to get it). These are the practical phase of the affair. The speech-occurrence, s \( \ldots \ldots \ldots \rightarrow r \), is merely a means by which S and R may occur in different individuals. The normal human being is interested only in S and R; though he uses speech, and thrives by it, he pays no attention to it. Saying the word apple or hearing it said, appeases no one's hunger. It, along with the rest of speech, is only a way of getting one's fellow-men to help. As students of language, however, we are concerned precisely with the speech
event (s. . . . . . . r), worthless in itself, but a means to great ends. We distinguish between language, the subject of our study, and real or practical events, stimuli and reactions. When anything apparently unimportant turns out to be closely connected with more important things, we say that it has, after all, a "meaning"; namely, it "means" these more important things. Accordingly, we say that speech-utterance, trivial and unimportant in itself, is important because it has a meaning: the meaning consists of the important things with which the speech-utterance (B) is connected, namely the practical events (A and C).

2.4. Up to a certain point, some animals respond to each others' stimuli. Evidently the marvelous co-ordination in a group of ants or bees must be due to some form of interaction. Sounds as a means for this are common enough: crickets, for instance, call other crickets by stridulation, noisily rubbing the leg against the body. Some animals, like man, use vocal noises. Birds produce sound-waves by means of the syrinx, a pair of reed-like organs at the head of the lungs. The higher mammals have a larynx, a box of cartilage (in man called the adam's-apple) at the top of the wind-pipe. Inside the larynx, at the right and left, two shelf-like muscles run along the walls; when these muscles, the vocal chords, are stretched taut, the outgoing breath sets them into a regular vibration which produces sound. This sound we call the voice.

Human speech differs from the signal-like actions of animals, even of those which use the voice, by its great differentiation. Dogs, for instance, make only two or three kinds of noise — say, barking, growling, and whining: a dog can set another dog acting by means of only these few different signals. Parrots can make a great many kinds of noise, but apparently do not make different responses to different sounds. Man utters many kinds of vocal noise and makes use of the variety: under certain types of stimuli he produces certain vocal sounds, and his fellows, hearing these same sounds, make the appropriate response. To put it briefly, in human speech, different sounds have different meanings. To study this co-ordination of certain sounds with certain meanings is to study language.

This co-ordination makes it possible for man to interact with great precision. When we tell someone, for instance, the address of a house he has never seen, we are doing something which no animal can do. Not only has each person at his service the abilities
of many other persons, but this co-operation is very precise. The extent and accuracy of this working-together is the measure of success of our social organization. The term society or social organism is not a metaphor. A human social group is really a unit of a higher order than a single animal, just as a many-celled animal is a unit of a higher order than a single cell. The single cells in the many-celled animal co-operate by means of such arrangements as the nervous system; the individuals in a human society co-operate by means of sound-waves.

The different ways in which we profit by language are so obvious that we need mention only a few. We can relay communication. When some farmers or traders say *We want a bridge over this stream*, this news may pass through a town meeting, a state legislature, a bureau of roads, an engineering staff, and a contractor's office, running through many speakers and many relays of speech, until at last, in response to the farmers' original stimulus, a corps of workmen make the actual (practical) response movements of putting up a bridge. Closely connected with the relay character of speech is its abstraction. The relays of speech, between the practical stimulus and the practical response, have no immediate practical effect. Therefore they can be put into all kinds of forms, provided only one changes them back correctly before proceeding to the final, practical response. The engineer who plans the bridge does not have to handle the actual beams and girders; he works merely with speech-forms (such as numbers in calculation); if he makes a mistake, he does not destroy any materials; he need only replace the ill-chosen speech-form (say, a wrong figure) by a suitable one before he begins the actual building. In this lies the value of talking to oneself or thinking. As children, we talk to ourselves aloud, but, under the correction of our elders, we soon learn to suppress the sound-producing movements and replace them by very slight inaudible ones: we "think in words." The usefulness of thinking can be illustrated by the process of counting. Our ability to estimate numbers without using speech, is extremely limited, as anyone may see by glancing, say, at a row of books on a shelf. To say that two sets of objects "have the same number" means that if we take one object from the first set and place it next to one object of the second set, and keep on doing this without using any object more than once, we shall have no unpaired objects left over. Now, we cannot always do this. The objects may
be too heavy to move, or they may be in different parts of the world, or they may exist at different times (as, say, a flock of sheep before and after a storm). Here language steps in. The numerals one, two, three, four, and so on, are simply a series of words which we have learned to say in a fixed order, as substitutes for the above-described process. Using them, we can "count" any set of objects by placing them into one-to-one correspondence (as mathematicians call it) with the number-words, saying one for one of the objects, two for another, three for the next, and so on, taking care to use each object only once, until the objects of the set are exhausted. Suppose that when we had said nineteen, there were no more objects left. Thereafter, at any time or place, we can decide whether any set of objects has the same number as this first set, by merely repeating the counting process with the new set. Mathematics, the ideal use of language, consists merely of elaborations of this process. The use of numbers is the simplest and clearest case of the usefulness of talking to oneself, but there are many others. We think before we act.

2. 5. The particular speech-sounds which people utter under particular stimuli, differ among different groups of men; mankind speaks many languages. A group of people who use the same system of speech-signals is a speech-community. Obviously, the value of language depends upon people's using it in the same way. Every member of the social group must upon suitable occasion utter the proper speech-sounds and, when he hears another utter these speech-sounds, must make the proper response. He must speak intelligibly and must understand what others say. This holds good for even the least civilized communities; wherever we find man, he speaks.

Every child that is born into a group acquires these habits of speech and response in the first years of his life. This is doubtless the greatest intellectual feat any one of us is ever required to perform. Exactly how children learn to speak is not known; the process seems to be something like this:

(1) Under various stimuli the child utters and repeats vocal sounds. This seems to be an inherited trait. Suppose he makes a noise which we may represent as da, although, of course, the actual movements and the resultant sounds differ from any that are used in conventional English speech. The sound-vibrations strike the child's ear-drums while he keeps repeating the move-
ments. This results in a habit: whenever a similar sound strikes his ear, he is likely to make these same mouth-movements, repeating the sound *da*. This babbling trains him to reproduce vocal sounds which strike his ear.

(2) Some person, say the mother, utters in the child's presence a sound which resembles one of the child's babbling syllables. For instance, she says *doll*. When these sounds strike the child's ear, his habit (1) comes into play and he utters his nearest babbling syllable, *da*. We say that he is beginning to "imitate." Grown-ups seem to have observed this everywhere, for every language seems to contain certain nursery-words which resemble a child's babbling — words like *mama, dada*: doubtless these got their vogue because children easily learn to repeat them.

(3) The mother, of course, uses her words when the appropriate stimulus is present. She says *doll* when she is actually showing or giving the infant his doll. The sight and handling of the doll and the hearing and saying of the word *doll* (that is, *da*) occur repeatedly together, until the child forms a new habit: the sight and feel of the doll suffice to make him say *da*. He has now the use of a word. To the adults it may not sound like any of their words, but this is due merely to its imperfection. It is not likely that children ever invent a word.

(4) The habit of saying *da* at sight of the doll gives rise to further habits. Suppose, for instance, that day after day the child is given his doll (and says *da, da, da*) immediately after his bath. He has now a habit of saying *da, da* after his bath; that is, if one day the mother forgets to give him the doll, he may nevertheless cry *da, da* after his bath. "He is asking for his doll," says the mother, and she is right, since doubtless an adult's "asking for" or "wanting" things is only a more complicated type of the same situation. The child has now embarked upon abstract or displaced speech: he names a thing even when that thing is not present.

(5) The child's speech is perfected by its results. If he says *da, da* well enough, his elders understand him; that is, they give him his doll. When this happens, the sight and feel of the doll act as an additional stimulus, and the child repeats and practises his successful version of the word. On the other hand, if he says his *da, da* imperfectly, — that is, at great variance from the adults' conventional form *doll*, — then his elders are not stimulated to give him the doll. Instead of getting the added stimulus of seeing
and handling the doll, the child is now subject to other distracting stimuli, or perhaps, in the unaccustomed situation of having no doll after his bath, he goes into a tantrum which disorders his recent impressions. In short, his more perfect attempts at speech are likely to be fortified by repetition, and his failures to be wiped out in confusion. This process never stops. At a much later stage, if he says Daddy brought it, he merely gets a disappointing answer such as No! You must say "Daddy brought it"; but if he says Daddy brought it, he is likely to hear the form over again: Yes, Daddy brought it, and to get a favorable practical response.

At the same time and by the same process, the child learns also to act the part of a hearer. While he is handling the doll he hears himself say da, da and his mother say doll. After a time, hearing the sound may suffice to make him handle the doll. The mother will say Wave your hand to Daddy, when the child is doing this of his own accord or while she is holding up the child's arm and waving it for him. The child forms habits of acting in conventional ways when he hears speech.

This twofold character of the speech-habits becomes more and more unified, since the two phases always occur together. In each case where the child learns the connection $S \rightarrow T$ (for instance, to say doll when he sees his doll), he learns also the connection $S \rightarrow R$ (for instance, to reach for his doll or handle it when he hears the word doll). After he has learned a number of such twofold sets, he develops a habit by which one type always involves the other: as soon as he learns to speak a new word, he is also able to respond to it when he hears others speak it, and, vice versa, as soon as he learns how to respond to some new word, he is usually able, also, to speak it on proper occasion. The latter transference seems to be the more difficult of the two; in later life, we find that a speaker understands many speech-forms which he seldom or never employs in his own speech.

2. 6. The happenings which in our diagram are represented by a dotted line, are fairly well understood. The speaker's vocal chords, tongue, lips, and so on, interfere with the stream of his outgoing breath, in such a way as to produce sound-waves; these waves are propagated through the air and strike the hearer's ear-drums, which then vibrate in unison. The happenings, however, which we have represented by arrows, are very obscure. We do not understand the mechanism which makes people say
certain things in certain situations, or the mechanism which makes
them respond appropriately when these speech-sounds strike their
car-drums. Evidently these mechanisms are a phase of our gen­
eral equipment for responding to stimuli, be they speech-sounds
or others. These mechanisms are studied in physiology and, 
especially, in psychology. To study them in their special bearing
on language, is to study the psychology of speech, linguistic
psychology. In the division of scientific labor, the linguist deals
only with the speech-signal (r. . . . . s); he is not competent to
deal with problems of physiology or psychology. The findings of
the linguist, who studies the speech-signal, will be all the more
valuable for the psychologist if they are not distorted by any pre­
possessions about psychology. We have seen that many of the
older linguists ignored this; they vitiated or skimped their reports
by trying to state everything in terms of some psychological the­
ory. We shall all the more surely avoid this fault, however, if we
survey a few of the more obvious phases of the psychology of
language.

The mechanism which governs speech must be very complex
and delicate. Even if we know a great deal about a speaker and
about the immediate stimuli which are acting upon him, we usu­
ally cannot predict whether he will speak or what he will say.
We took our story of Jack and Jill as something known to us,
after the fact. Had we been present, we could not have foretold
whether Jill would say anything when she saw the apple, or, in
case she did speak, what words she would utter. Even supposing
she asked for the apple, we could not have foretold whether she would
 preface her request by saying I'm hungry or whether she would
say please or whether she would say I want that apple or Get me
that apple or I was just wishing I had an apple, and so on: the
possibilities are almost infinite. This enormous variability has led
to two theories about human conduct, including speech.

The mentalistic theory, which is by far the older, and still pre­
vails both in the popular view and among men of science, supposes
that the variability of human conduct is due to the interference of
some non-physical factor, a spirit or will or mind (Greek psyche, 
hence the term psychology) that is present in every human being.
This spirit, according to the mentalistic view, is entirely different
from material things and accordingly follows some other kind of
causation or perhaps none at all. Whether Jill will speak or what
words she will use, depends, then, upon some act of her mind or will, and, as this mind or will does not follow the patterns of succession (cause-and-effect sequences) of the material world, we cannot foretell her actions.

The materialistic (or, better, mechanistic) theory supposes that the variability of human conduct, including speech, is due only to the fact that the human body is a very complex system. Human actions, according to the materialistic view, are part of cause-and-effect sequences exactly like those which we observe, say in the study of physics or chemistry. However, the human body is so complex a structure that even a relatively simple change, such as, say, the impingement on the retina of light-waves from a red apple, may set off some very complicated chain of consequences, and a very slight difference in the state of the body may result in a great difference in its response to the light-waves. We could foretell a person's actions (for instance, whether a certain stimulus will lead him to speak, and, if so, the exact words he will utter), only if we knew the exact structure of his body at the moment, or, what comes to the same thing, if we knew the exact make-up of his organism at some early stage — say at birth or before — and then had a record of every change in that organism, including every stimulus that had ever affected the organism.

The part of the human body responsible for this delicate and variable adjustment, is the nervous system. The nervous system is a very complex conducting mechanism, which makes it possible for a change in one part of the body, (a stimulus, say, in the eye) to result in a change in some other part (a response, say, of reaching with the arm, or of moving the vocal chords and tongue). Further, it is clear that the nervous system is changed, for a time or even permanently, by this very process of conduction: our responses depend very largely upon our earlier dealings with the same or similar stimuli. Whether Jill will speak depends largely on her liking for apples and on her past experience of Jack. We remember and acquire habits and learn. The nervous system is evidently a trigger-mechanism: a very slight change may set the match to a large store of explosive material. To take the case that interests us, only so can we explain the fact that large-scale movements like Jack's fetching the apple, are set off by very slight changes, such as the minute thrumming of air-waves on his eardrum.
The working of the nervous system is not accessible to observation from without, and the person himself has no sense-organs (such as he has, for instance, for the working of the muscles in his hand) with which he himself could observe what goes on in his nerves. Therefore the psychologist must resort to indirect methods of approach.

2.7. One such method is experiment. The psychologist submits numbers of people to carefully prearranged stimuli under the simplest conditions, and records their responses. Usually he also asks these persons to "introspect," — that is, to describe as much as possible of what goes on inside them when they get the stimulus. At this point psychologists often go astray for want of linguistic knowledge. It is a mistake, for instance, to suppose that language enables a person to observe things for which he has no sense-organs, such as the workings of his own nervous system. An observer's only advantage in reporting what goes on inside him is that he can report stimulations which an outsider cannot detect — say, a pain in his eye or a tickling in his throat. Even here, we must not forget that language is a matter of training and habit; a person may be unable to report some stimulations, simply because his stock of speech-habits provides no formula; this is the case with many of our less useful adventures, such as smaller goings-on in our internal organs. Often the very structure of our body leads to a false report; we show the physician exactly the spot where we feel a pain, and he finds the injury some distance away, at a point which his experience may teach him to locate at once from our false description. In this respect many psychologists go astray by actually training their observers to use a set of technical terms for obscure stimuli and then attaching significance to the observer's use of these terms.

Abnormal conditions in which speech is disturbed, seem to reflect general maladjustments or lesions and to throw no light on the particular mechanism of language. Stuttering is probably due to imperfect specialization of the two cerebral hemispheres: in the normal speaker the left hemisphere (or, if he is left-handed, the right hemisphere) dominates more delicate actions, such as those of speech; in the stutterer this one-sided specialization is incomplete. Imperfect production of specific sounds (stammering), where it is not due to anatomical defects in the organs of speech, seems to result from similar maladjustments. Head-wounds and diseases
which injure the brain often result in *aphasia*, disturbances in the manner of making speech-responses and in responding to speech. Dr. Henry Head, who had unusually good opportunities for the study of aphasia in wounded soldiers, recognizes four types.

Type 1 reacts well to other people's speech, and in milder cases, uses words for the proper objects, but mispronounces or confuses his words; in extreme cases, the sufferer can say little more than *yes* and *no*. A patient reports, with some difficulty: "I know it's not..........the correct..........pronunciation........I don't always..........correct it..........because I shouldn't get it right ..........in five or six times.........unless someone says it for me." In a more serious case, the patient, when asked his name, answers *Honius* instead of 'Thomas,' and says *erst* for 'first' and *hend* for 'second.'

Type 2 reacts fairly well to simple speech, and pronounces appropriate words and short phrases, but not in the conventional constructions; he may talk an unintelligible jargon, although each word is correct enough. To the question "Have you played any games?" a patient answers: "Played games, yes, played one, daytime, garden." He says, "Get out, lay down, go to sleep, sometimes goes away. If sit in kitchen, moving about working, makes me getting worse on it." He comments, "Funny thing, this worse, that sort of thing," and by way of explanation, writes down the words *as* and *at*. We shall see later that the structure of normal language forces us to distinguish between lexical and grammatical habits of speech; the latter are disturbed in these patients.

Type 3 reacts with difficulty to the names of objects, and has trouble in finding the right words, especially names of things. His pronunciation and arrangement are good, but he has to use ingenious circumlocutions for the words he cannot find. For 'scissors' a patient says "what you cut with"; for 'black' he says: "people who are dead, — the other people who are not dead, have this color." He may use the wrong word, as *button* for 'scissors.' The words lost are chiefly the names of concrete objects. This state seems like an exaggeration of many normal persons' difficulty in recalling people's names and the designations of objects, especially under preoccupation, excitement, or fatigue.

Type 4 often does not respond correctly to the speech of others; he has no trouble in uttering single words, but he cannot finish a connected speech. It is significant that these patients suffer from
apraxia; they cannot find their way about and are confused by being set, say, on the opposite side of the street. One patient reports: "I don't seem to understand all you say, and then I forget what I've got to do." Another patient says: "When at table, I am very slow in picking out the object, say the milk-jug, which I want. I don't spot it at once . . . I see them all, but I don't spot them. When I want the salt or the pepper or a spoon, I suddenly tumble to its presence." The disturbance of speech appears in this answer of a patient: "Oh, yes! I know the difference between the Nurse and the Sister by the dress: Sister blue; Nurse — oh! I get muddled, just ordinary nurse's clothes, white, blue . . . ."

Ever since 1861, when Broca showed that damage to the third frontal convolution in the left hemisphere of the brain was accompanied by aphasia, there has been dispute as to whether "Broca's center" and other regions of the cortex act as specific centers for the activity of speech. Head finds some correlation between different points of lesion and each of his four types of aphasia. The demonstrable functional identifications of cortical areas always concern some specific organ: an injury in one area of the brain is accompanied by paralysis of the right foot, an injury in another area by failure to respond to stimulation in the left-hand side of the retina, and so on. Now, speech is a very complex activity, in which stimulation of every kind leads to highly specific movements of the throat and mouth; these last, moreover, are not, in a physiologic sense, "organs of speech," for they serve biologically earlier uses in man and in speechless animals. Many injuries to the nervous system, accordingly, will interfere with speech, and different injuries will result in different kinds of difficulty, but the points of the cortex are surely not correlated with specific socially significant features of speech, such as words or syntax; this appears plainly from the fluctuating and contradictory results of the search for various kinds of "speech centers." We may expect the physiologist to get better results when he looks for correlations between points of the cortex and specific physiologic activities concerned in speech, such as the movement of special muscles or the transmission of kinesthetic stimuli from the larynx and tongue. The error of seeking correlations between anatomically defined parts of the nervous system and socially defined activities appears clearly when we see some physiologists looking for a "visual word-center" which
is to control reading and writing: one might as well look for a specific brain-center for telegraphy or automobile-driving or the use of any modern invention. Physiologically, language is not a unit of function, but consists of a great many activities, whose union into a single far-reaching complex of habits results from repeated stimulations during the individual's early life.

2.8. Another way of studying human responses is to observe them in the mass. Some actions are highly variable in each person, but fairly constant in large groups of persons. We cannot predict whether any particular unmarried adult will marry during the next twelve months, or which particular persons will commit suicide, or which ones will get into prison, but, given a large enough community, and the figures for past years (and perhaps certain other data, such as those which concern economic conditions), statisticians can foretell the number of marriages, suicides, convictions for crime, and so on, which will take place. If we found it possible and worth while to register every speech-utterance in a large community, we should doubtless be able to foretell how many times any given utterance such as Good-morning or I love you or How much are oranges today? would be spoken within a fixed number of days. A detailed study of this kind would tell us a great deal, especially about the changes that are constantly going on in every language.

However, there is another and simpler way of studying human action in the mass: the study of conventional actions. When we go to a strange country, we soon learn many established modes of action, such as the system of currency and of weights and measures, the rules of the road (does one keep to the right, as in America and Germany, or to the left, as in England and Sweden?), good manners, hours for meals, and so on. The traveler does not gather statistics: a very few observations put him on the track, and these are confirmed or corrected by further experience. Here the linguist is in a fortunate position: in no other respect are the activities of a group as rigidly standardized as in the forms of language. Large groups of people make up all their utterances out of the same stock of lexical forms and grammatical constructions. A linguistic observer therefore can describe the speech-habits of a community without resorting to statistics. Needless to say, he must work conscientiously and, in particular, he must record every form he can find and not try to excuse himself from
this task by appealing to the reader's common sense or to the structure of some other language or to some psychological theory, and, above all, he must not select or distort the facts according to his views of what the speakers ought to be saying. Aside from its intrinsic value for the study of language, a relevant and unprejudiced description of this kind, serves as a document of major importance for psychology. The danger here lies in mentalistic views of psychology, which may tempt the observer to appeal to purely spiritual standards instead of reporting the facts. To say, for instance, that combinations of words which are "felt to be" compounds have only a single high stress (e.g. *blackbird* as opposed to *black bird*), is to tell exactly nothing, since we have no way of determining what the speakers may "feel": the observer's task was to tell us, by some tangible criterion, or, if he found none, by a list, which combinations of words are pronounced with a single high stress. A worker who accepts the materialistic hypothesis in psychology is under no such temptation; it may be stated as a principle that in all sciences like linguistics, which observe some specific type of human activity, the worker must proceed exactly as if he held the materialistic view. This practical effectiveness is one of the strongest considerations in favor of scientific materialism.

The observer who, by this mass-observation, gives us a statement of the speech-habits of a community, can tell us nothing about the changes which are going on in the language of this as of every community. These changes could be observed only by means of genuinely statistical observation through a considerable length of time; for want of this, we are ignorant of many matters concerning linguistic change. In this respect, too, the science of language is fortunate, however, because comparative and geographical methods of study, again through mass-observation, supply a good deal of what we should hope to get from statistics. The fortunate position of our science in these matters is due to the fact that language is the simplest and most fundamental of our social (that is, peculiarly human) activities. In another direction, however, the study of linguistic change profits by a mere accident, namely by the existence of written records of speech of the past.

2. 9. The stimulus which calls forth speech, leads also to some other reactions. Some of these are not visible from the outside; these are muscular and glandular actions which are of no immediate importance to the speaker's fellow-men. Others are impor-
tant handling responses, such as locomotion or the displacement of objects. Still other responses are visible, but not directly important; they do not change the lay-out of things, but they do, along with speech, serve as stimuli to the hearer. These actions are facial expression, mimicry, tone of voice (in so far as it is not prescribed by the conventions of the language), insignificant handling of objects (such as fiddling with a rubber band), and, above all, gesture.

Gesture accompanies all speech; in kind and in amount, it differs with the individual speaker, but to a large extent it is governed by social convention. Italians use more gesture than English-speaking people; in our civilization people of the privileged class gesticulate least. To some extent, individual gestures are conventional and differ for different communities. In saying good-by we wave the hand with palm outward; Neapolitans wave it with the back outward.

Most gestures scarcely go beyond an obvious pointing and picturing. American Indians of plains or woodland tribes will accompany a story by unobtrusive gestures, foreign to us, but quite intelligible: the hand, palm in, thumb up, is held just under the eyes to represent spying; a fist is slapped into a palm for a shot; two fingers imitate a man walking, and four the running of a horse. Even where gestures are symbolic, they go little beyond the obvious, as when one points back over one's shoulder to indicate past time.

Some communities have a gesture language which upon occasion they use instead of speech. Such gesture languages have been observed among the lower-class Neapolitans, among Trappist monks (who have made a vow of silence), among the Indians of our western plains (where tribes of different language met in commerce and war), and among groups of deaf-mutes.

It seems certain that these gesture languages are merely developments of ordinary gestures and that any and all complicated or not immediately intelligible gestures are based on the conventions of ordinary speech. Even such an obvious transference as pointing backward to indicate past time, is probably due to a linguistic habit of using the same word for 'in the rear' and 'in the past.' Whatever may be the origins of the two, gesture has so long played a secondary rôle under the dominance of language that it has lost all traces of independent character. Tales about peoples
whose language is so defective that it has to be eked out by gesture, are pure myths. Doubtless the production of vocal sound by animals, out of which language has grown, originated as a response-movement (say, contraction of the diaphragm and constriction of the throat) which happened to produce noise. It seems certain, however, that in the further development, language always ran ahead of gesture.

If one gestures by moving some object so as to leave a trace on another object, one has entered upon marking and drawing. This kind of reaction has the value of leaving a permanent mark, which may serve as a stimulus repeatedly and even after intervals of time and can be transported to stimulate persons far away. For this reason, doubtless, many peoples attribute magic power to drawings, apart from their esthetic value, which is still with us.

In some parts of the world drawing has developed into writing. The details of this process will concern us later; the point of interest here is that the action of tracing an outline becomes subordinate to language: drawing a particular set of lines becomes attached, as an accompaniment or substitute, to the utterance of a particular linguistic form.

The art of symbolizing particular forms of speech by means of particular visible marks adds a great deal to the effective uses of language. A speaker can be heard only a short ways and only for an instant or two. A written record can be carried to any place and preserved for any length of time. We can see more things at one time than we can hear, and we can deal better with visible things: charts, diagrams, written calculations, and similar devices, enable us to deal with very complex matters. The speech-stimuli of distant people, and especially of persons in the past, are available to us through writing. This makes possible an accumulation of knowledge. The man of science (but not always the amateur) surveys the results of earlier students and applies his energies at the point where they left off. Instead of always starting over again from the beginning, science progresses cumulatively and with acceleration. It has been said that, as we preserve more and more records of more and more speech-reactions of highly gifted and highly specialized individuals, we approach, as an ideal limit, a condition where all the events in the universe, past, present, and future, are reduced (in a symbolic form to which any reader may react) to the dimensions of a large library. It is no wonder that
the discovery of printing, which manifolds a written record to any desired number of copies, brought about, in all our manner of living, a revolution which has been under way for some centuries and is still in full swing.

There is no need of dilating upon the significance of other means for recording, transmitting, and multiplying speech, such as the telegraph, telephone, phonograph, and radio. Their importance for the simpler uses of language is obvious, as in the use of wireless telegraphy in cases of shipwreck.

In the long run, anything which adds to the viability of language has also an indirect but more pervasive effect. Even acts of speech that do not prompt any particular immediate response, may change the predisposition of the hearer for further responses: a beautiful poem, for instance, may make the hearer more sensitive to later stimuli. This general refinement and intensification of human response requires a great deal of linguistic interaction. Education or culture, or whatever name we choose to give it, depends upon the repetition and publication of a vast amount of speech.
3.1. A speech-community is a group of people who interact by means of speech (§ 2.5). All the so-called higher activities of man — our specifically human activities — spring from the close adjustment among individuals which we call society, and this adjustment, in turn, is based upon language; the speech-community, therefore, is the most important kind of social group. Other phases of social cohesion, such as economic, political, or cultural groupings, bear some relation to the grouping by speech-communities, but do not usually coincide with it; cultural features, especially, are almost always more widespread than any one language. Before the coming of the white man, an independent Indian tribe which spoke a language of its own, formed both a speech-community and a political and economic unit; as to religion and general culture, however, it resembled neighboring tribes. Under more complex conditions there is less correlation between language and the other groupings. The speech-community which consists of all English-speaking people is divided into two political communities: the United States and the British Empire, and each of these is in turn subdivided; economically, the United States and Canada are more closely united than politically; culturally, we are part of a great area which radiates from western Europe. On the other hand, even the narrowest of these groups, the political United States, includes persons who do not speak English: American Indians, Spanish-speakers in the Southwest, and linguistically unassimilated immigrants. Colonial occupation, as in the Philippines or India, puts a speech-community into political and economic dependence upon a foreign speech-community. In some countries the population is divided into several speech-communities that exist together without local division: a town in Poland consists of Polish-speaking and German-speaking people; by religion, the former are Catholics, the latter Jews, and, until quite recently, very few persons in either group troubled themselves to understand the other group's language.
I have said nothing about biological grouping, because this does not, like the other groupings, depend upon language for its existence. Most matings, of course, take place between persons of like speech, so that a speech-community is always something of an inbred group; the exceptions, however, are very many, both in the mating of persons of different speech, one of whom usually acquires the other's language, and, what is more important, in the assimilation into a speech-community of whole groups of foreigners, such as immigrants, conquered people, or captives. These deviations are so many that, if we had records, we should doubtless find very few persons whose ancestors of a few generations ago all spoke the same language. What concerns us most, however, is the fact that the features of a language are not inherited in the biologic sense. A child cries out at birth and would doubtless in any case after a time take to gurgling and babbling, but the particular language he learns is entirely a matter of environment. An infant that gets into a group as a foundling or by adoption, learns the language of the group exactly as does a child of native parentage; as he learns to speak, his language shows no trace of whatever language his parents may have spoken. Whatever hereditary differences there may be in the structure of the larynx, mouth, lips, and so on, of normal human beings, it is certain that these differences are not such as to affect the actions which make up language. The child learns to speak like the persons round him. The first language a human being learns to speak is his native language; he is a native speaker of this language.

3.2. Speech-communities differ greatly in size. More than one American Indian tribe of only a few hundred persons spoke a language of its own. On the other hand, even before the coming of modern communication and travel, some speech-communities were very large: in the first centuries of the Christian Era, Latin and Greek were each spoken by millions of people over large areas round the Mediterranean. Under modern conditions, some speech-communities have grown to enormous size. Jespersen estimates the number of speakers of the principal European languages, in millions, for the years 1600 and 1912 as follows:

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>German</th>
<th>Russian</th>
<th>French</th>
<th>Spanish</th>
<th>Italian</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600</td>
<td>6</td>
<td>10</td>
<td>3</td>
<td>14</td>
<td>$9\frac{1}{2}$</td>
<td>$9\frac{1}{2}$</td>
</tr>
<tr>
<td>1912</td>
<td>150</td>
<td>90</td>
<td>106</td>
<td>47</td>
<td>52</td>
<td>37</td>
</tr>
</tbody>
</table>
Figures such as these have only a very indefinite value, because one cannot always tell which local groups form a single speech-community. Tesnière, estimating the numbers round the year 1920, names Chinese as the largest speech-community, with 400 million speakers, but the term Chinese denotes a family of mutually unintelligible languages. Doubtless one of these, North Chinese, has today more native speakers than any other language, but I know no estimate of their number. Another language of this group, Cantonese, probably ranks among the largest speech-communities. In any case, English (to continue with Tesnière’s figures) ranks second, with 170 million native speakers. Russian comes third; Tesnière divides the figures between Great Russian (80 millions), Little Russian (Ukrainian, 34 millions), and White Russian (6½ millions), but these are mutually intelligible varieties, about as different as British and American English. Similarly, Tesnière splits the fourth-greatest language, German, into German (80 millions) and Judeo-German (7½ millions), although the rest of his figures do not consider dialectal differences; Jespersen’s figure of 90 millions is probably nearer right. Tesnière’s remaining figures omit Javanese, which has at least 20 millions of native speakers. With these modifications his figures are: Spanish 65, Japanese 55, Bengali 1 50, French 45, Italian 41, Turco-Tartar 39, Western Hindi 1 38, Arabic 37, Bihari 1 36, Portuguese 36, Eastern Hindi 1 25, Telugu 2 24, Polish 23, Javanese 20, Marathi 1 19, Tamil 2 19, Korean 17, Panjabi 1 16, Annamite 14, Roumanian 14, Rajasthani 1 13, Dutch 13, Bohemian-Slovak 12, Canarese 2 10, Oriya 1 10, Hungarian 10.

Another element of uncertainty in figures like these arises from the differences within speech-communities. Dutch and German actually form only one speech-community, in the sense that there is no break between local speech-forms, but the extreme types are mutually unintelligible, and the political groups (on the one side Flemish Belgium and the Netherlands, and on the other side, Germany, Austria, and German Switzerland) have adopted two mutually unintelligible speech-forms, Standard Dutch-Flemish and Standard German, as their official languages. On the other hand, Turco-Tartar and some of the languages of India in our list prob-

1 Indo-European languages spoken in India; we should perhaps add Gujerati, with some 10 million speakers.
2 Dravidian languages spoken in India.
ably include equally great differences, although the extremes may be connected by local gradations. A final and insurmountable difficulty lies in people's acquisition of foreign languages. If we could determine a degree of proficiency which makes a student a member of a foreign speech-community, English, studied all over the world, would receive a much larger figure. Tesnière estimates that Malay is native to some three million people, but is spoken as a foreign language, especially in commerce, by some thirty millions.

3.3. The difficulty or impossibility of determining in each case exactly what people belong to the same speech-community, is not accidental, but arises from the very nature of speech-communities. If we observed closely enough, we should find that no two persons—or rather, perhaps, no one person at different times—spoke exactly alike. To be sure, within a relatively homogeneous set of speakers—say, the native speakers of English in the Middle Western part of the United States—the habits of speech are far more uniform than the needs of communication would demand. We see the proof of this when an outsider—say, a Southerner or an Englishman or a foreigner who has mastered English—comes into our midst: his speech may be so much like ours as to cause not the slightest difficulty in communication, and yet strikingly noticeable on account of inessential differences, such as "accent" and "idiom." Nevertheless there are great differences even among the native members of such a relatively uniform group as Middle Western American, and, as we have just seen, even greater differences within a speech-community (e.g. English) as a whole. These differences play a very important part in the history of languages; the linguist is forced to consider them very carefully, even though in some of his work he is forced provisionally to ignore them. When he does this, he is merely employing the method of abstraction, a method essential to scientific investigation, but the results so obtained have to be corrected before they can be used in most kinds of further work.

The difference between speakers is partly a matter of bodily make-up and perhaps of purely personal habit; we recognize our friends by their voices from the next room and over the telephone. Some people are more talented for speech than others: they remember more words and turns of phrase, apply them better to the situation, and combine them in more pleasing style; the extreme
case is the literary genius. Sometimes convention assigns certain speech-forms to certain speakers, as when the soldier, the well-trained servant, and the child in certain schools, learn to say *sir* or *ma'm* to certain persons, who do not reciprocate. Some exclamations, such as *Goodness gracious!* or *Dear me!* are largely reserved for the use of women. In some communities very different speech-forms are conventional for the sexes. The classical instance is that of the Carib Indians; a recently authenticated one is the language of the Yana Indians in northern California. Examples of Yana words are:

<table>
<thead>
<tr>
<th>Men's Language</th>
<th>Women's Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>'fire'</td>
<td>'auna'</td>
</tr>
<tr>
<td>'my fire'</td>
<td>'aunija'</td>
</tr>
<tr>
<td>'deer'</td>
<td>'bana'</td>
</tr>
<tr>
<td>'grizzly-bear'</td>
<td>'t'en'na'</td>
</tr>
</tbody>
</table>

The differences between the two sets of Yana forms can be stated by means of a fairly complex set of rules.

3.4. The most important differences of speech within a community are due to differences in density of communication. The infant learns to speak like the people round him, but we must not picture this learning as coming to any particular end: there is no hour or day when we can say that a person has finished learning to speak, but, rather, to the end of his life, the speaker keeps on doing the very things which make up infantile language-learning. Our description of the latter (§ 2.5) might be taken, in many respects, as a slow-motion picture of the ordinary processes of speech. Every speaker's language, except for personal factors which we must here ignore, is a composite result of what he has heard other people say.

Imagine a huge chart with a dot for every speaker in the community, and imagine that every time any speaker uttered a sentence, an arrow were drawn into the chart pointing from his dot to the dot representing each one of his hearers. At the end of a given period of time, say seventy years, this chart would show us the density of communication within the community. Some speakers would turn out to have been in close communication: there would be many arrows from one to the other, and there would be many series of arrows connecting them by way of one, two, or three intermediate speakers. At the other extreme there would be
widely separated speakers who had never heard each other speak and were connected only by long chains of arrows through many intermediate speakers. If we wanted to explain the likeness and unlikeness between various speakers in the community, or, what comes to the same thing, to predict the degree of likeness for any two given speakers, our first step would be to count and evaluate the arrows and series of arrows connecting their dots. We shall see in a moment that this would be only the first step; the reader of this book, for instance, is more likely to repeat a speech-form which he has heard, say, from a lecturer of great fame, than one which he has heard from a street-sweeper.

The chart we have imagined is impossible of construction. An insurmountable difficulty, and the most important one, would be the factor of time: starting with persons now alive, we should be compelled to put in a dot for every speaker whose voice had ever reached anyone now living, and then a dot for every speaker whom these speakers had ever heard, and so on, back beyond the days of King Alfred the Great, and beyond earliest history, back indefinitely into the primeval dawn of mankind: our speech depends entirely upon the speech of the past.

Since we cannot construct our chart, we depend instead upon the study of indirect results and are forced to resort to hypothesis. We believe that the differences in density of communication within a speech-community are not only personal and individual, but that the community is divided into various systems of sub-groups such that the persons within a sub-group speak much more to each other than to persons outside their sub-group. Viewing the system of arrows as a network, we may say that these sub-groups are separated by lines of weakness in this net of oral communication. The lines of weakness and, accordingly, the differences of speech within a speech-community are local — due to mere geographic separation — and non-local, or as we usually say, social. In countries over which a speech-community has recently spread and settled, the local differences are relatively small, as, say, in the United States (especially the western part) or Russia; in countries that have been long settled by the same speech-community the local differences are much greater, as, say, in England, where English has been spoken for some 1500 years, or in France where Latin (now called French) has been spoken for two-thousand years.
3.5. We shall examine first the simpler case, as it appears in the United States. The most striking line of cleavage in our speech is one of social class. Children who are born into homes of privilege, in the way of wealth, tradition, or education, become native speakers of what is popularly known as “good” English; the linguist prefers to give it the non-committal name of standard English. Less fortunate children become native speakers of “bad” or “vulgar” or, as the linguist prefers to call it, non-standard English. For instance, I have none, I haven't any, I haven't got any are standard (“good”) English, but I ain't got none is non-standard (“bad”) English.

These two main types of American English are by no means treated alike. The standard forms are used in school, in church, and in all discourse that officially concerns the whole community, as in law-courts and legislative assemblies. All our writing (except by way of jest) is based on the standard forms, and these forms are registered in grammars and dictionaries and presented in text-books to foreigners who want to learn our language. Both groups of speakers, standard and non-standard, agree in calling the standard forms “good” or “correct” and non-standard forms “bad,” “incorrect,” “vulgar,” or even, “not English.” The speaker of standard English does not trouble himself to learn the non-standard forms, but very many speakers of non-standard English try to use the standard forms. A native of the less favored group who acquires prestige, say, in the way of wealth or political eminence, is almost sure to learn, as well as may be, the standard forms of speech; in fact, noticeable lapses in this respect — even a single I seen it or I done it — may endanger his newly acquired position.

Within the standard language there are minor differences. In this case again, the divergent forms are estimated as higher and lower. A Chicagoan, for instance, who uses the ah-vowel of father instead of the more common a-vowel of man in words like laugh, half, bath, dance, can’t, is said to be speaking a “higher-class” kind of English. In cases like these, however, people’s attitudes differ: many Chicagoans find these ah-forms silly and affected. Speakers of standard English often dispute as to which of two forms is “better”: it’s I or it’s me, forehead or “forrid.” Since the disputants do not trouble themselves to agree on a definition of “better,” these disputes never reach any conclusion. This is a matter which will occupy us again.
Within the standard language, further, there are differences that obviously depend upon density of communication: different economic classes, — say, the very rich and the so-called “middle class” in its various gradations, — differ in speech. Then there are differences of education, in the way both of family tradition and of schooling. These differences are crossed by less important divisions of technical occupation: different kinds of craftsmen, merchants, engineers, lawyers, physicians, scientists, artists, and so on, differ somewhat in speech. Sports and hobbies have at least their own vocabulary. The factor of age-groups will concern us later; it is a tremendous force, but works almost unseen, and scarcely appears on the level that now concerns us, except perhaps in young people’s fondness for slang.

The most stable and striking differences, even in the United States and even in our standard language, are geographic. In the United States we have three great geographic types of standard English: New England, Central-Western and Southern. Within these types there are smaller local differences: speakers of standard English from older-settled parts of the country can often tell a fellow-speaker’s home within fairly narrow limits. In matters of pronunciation, especially, the range of standard English in America is wide: greatly different pronunciations, such as those, say, of North Carolina and Chicago, are accepted equally as standard. Only from the stage do we demand a uniform pronunciation, and here our actors use a British type rather than an American. In England there are similar regional types, but they are not granted equal value. The highest social recognition is given to the “public school” English of the south. The innumerable gradations from this toward the decidedly provincial types of standard, enjoy less prestige as they depart from the most favored type. The social recognition of a speaker of standard English from Scotland or Yorkshire or Lancashire, depends in part upon how closely his pronunciation approaches the upper-class southern type. In England, but scarcely in the United States, provincial colorings of standard English are tied up with differences of social level.

3. 6. Non-standard speech shows greater variety than standard. The higher the social position of the non-standard speaker, the more nearly does he approach the standard language. At the top are the transitional speakers who use an almost standard form of speech, with only a sprinkling of non-standard forms, and perhaps
a pronunciation with too provincial a twang. At the bottom are the unmistakably rustic or proletarian speakers who make no pretense at using standard forms.

Apart from this continuous gradation, various groups of non-standard speakers have their own speech-forms. Occupational groups, such as fishermen, dairy workers, bakers, brewers, and so on, have, at any rate, their own technical language. Especially, minor groups who are in any way cut off from the great mass, use clearly-marked varieties of speech. Thus, sea-faring men used to speak their own type of non-standard English. Tramps and some kinds of law-breakers have many speech-forms of their own; so do circus people and other wandering entertainers. Among non-standard speakers of German, Christians and Jews, and in some places Catholics and Protestants, differ in many of their linguistic forms. If the special group is at odds with the rest of the community, it may use its peculiarities of speech as a secret dialect, as do the English-speaking Gipsies. Criminals in various countries have developed such secret dialects.

The greatest diversity in non-standard speech, however, is geographic. The geographic differences, which we hear even in the standard English of the United States, are more audible when we listen to non-standard speakers. In remote districts within the older-settled parts of the country these local characteristics are very pronounced, to the point where we may describe them as local dialects.

In older-settled speech-communities, the type exemplified by France, or by the British part of the English-speaking group, local dialects play a much greater part. In such communities the non-standard language can be divided, roughly, to be sure, and without a sharp demarcation, into sub-standard speech, intelligible at least, though not uniform, throughout the country, and local dialect, which differs from place to place to such an extent that speakers living some distance apart may fail to understand each other. Sub-standard speech, in such countries, belongs to the "lower middle class," — to the more ambitious small tradesfolk, mechanics, or city workmen, — and the local dialects are spoken by the peasants and the poorest people of the towns.

The local dialects are of paramount importance to the linguist, not merely because their great variety gives him work to do, but because the origin and history of the standard and sub-standard
types of speech can be understood only in the light of the local dialects. Especially during the last decades, linguists have come to see that dialect geography furnishes the key to many problems.

In a country like France, Italy, or Germany — better studied in this respect than England — every village or, at most, every group of two or three villages, has its own local dialect. The differences between neighboring local dialects are usually small, but recognizable. The villagers are ready to tell in what way their neighbors' speech differs from theirs, and often tease their neighbors about these peculiarities. The difference from place to place is small, but, as one travels in any one direction, the differences accumulate, until speakers, say from opposite ends of the country, cannot understand each other, although there is no sharp line of linguistic demarcation between the places where they live. Any such geographic area of gradual transitions is called a dialect area.

Within a dialect area, we can draw lines between places which differ as to any feature of language. Such lines are called isoglosses. If a village has some unique peculiarity of speech, the isogloss based on this peculiarity will be simply a line round this village. On the other hand, if some peculiarity extends over a large part of the dialect area, the isogloss of this feature will appear as a long line, dividing the dialect area into two sections. In Germany, for instance, the northern dialects pronounce the word *bite* with a *t*-sound, as we do in English, but the southern dialects pronounce it with an *s*-sound (as in standard German *beiszen*); the isogloss which separates these two forms is a long and very irregular line, running east and west across the whole German speech area. In the north and northeast of England one can mark off an area where the past tense of *bring* has the form *brang*. Dialect atlases, collections of maps of a speech area with isoglosses drawn in, are an important tool for the linguist.

The speakers' attitude toward local dialects differs somewhat in different countries. In England the local dialects have little prestige; the upper-class speaker does not bother with them and the native speaker of a local dialect who rises socially will try to cast it off, even if only in exchange for some form of sub-standard speech. The Germans, on the other hand, have developed, within the last century, a kind of romantic fondness for local dialects. While the middle-class speaker, who is not quite sure of his social position, will shy away from them, some upper-class Germans make
it a point to speak the local dialect of their home. In German Switzerland this goes farthest: even the upper-class Swiss, who is familiar with standard German, uses local dialect as the normal medium of communication in his family and with his neighbors.

3.7. The main types of speech in a complex speech-community can be roughly classed as follows:

1. literary standard, used in the most formal discourse and in writing (example: *I have none*);

2. colloquial standard, the speech of the privileged class (example: *I haven't any* or *I haven't got any* — in England only if spoken with the southern “public school” sounds and intonation);

3. provincial standard, in the United States probably not to be differentiated from (2), spoken by the “middle” class, very close to (2), but differing slightly from province to province (example: *I haven't any* or *I haven't got any,* spoken, in England, with sounds or intonations that deviate from the “public school” standard);

4. sub-standard, clearly different from (1), (2), and (3), spoken in European countries by the “lower middle” class, in the United States by almost all but the speakers of type (2-3), and differing topographically, without intense local difference (example: *I ain't got none*);

5. local dialect, spoken by the least privileged class; only slightly developed in the United States; in Switzerland used also, as a domestic language, by the other classes; differs almost from village to village; the varieties so great as often to be incomprehensible to each other and to speakers of (2-3-4) (Example: *a hae none*).

3.8. Our survey of differences within a speech-community has shown us that the members of a speech-community may speak so much alike that anyone can understand anyone else, or may differ so much that persons who live some distance apart may fail to understand each other. The former case is illustrated by an Indian tribe of a few hundred persons, the latter by a far-flung speech community like English, where an American and a dialect-speaking Yorkshireman, for instance, do not understand each other’s speech. Actually, however, we can draw no line between the two cases, because there are all kinds of gradations between understanding and failing to understand. Whether the American and the Yorkshireman understand each other, may depend on the intelligence of the two individuals concerned, upon their general experience with foreign dialects or languages, upon
their disposition at the moment, upon the extent to which the situation clarifies the value of the speech-utterance, and so on. Again, there are endless gradations between local and standard speech; either or both persons may make concessions which aid understanding, and these concessions will usually run in the direction of the standard language.

All this prevents our drawing a plain line round the borders of many a speech community. The clear cases are those where two mutually unintelligible languages abut on each other, as do, say, English and Spanish in our Southwest. Here each person's native language— if, for simplicity sake, we ignore the languages of Indians and recent immigrants— is either English or Spanish, and we can draw an imaginary line, a language boundary, which will separate the English-speakers from the Spanish-speakers. This language boundary will of course not appear as a simple and fixed line between two topographically solid communities. There will be English-speaking settlements thrown out, in the shape of speech-islands, into totally Spanish surroundings, and, vice versa, Spanish speech-islands surrounded by English-speaking communities. Families and individuals of either group will be found living among the other and will have to be enclosed in a separate little circle of our language boundary. Our language boundary, then, consists not only of a great irregular line, but also of many little closed curves around speech-islands, some of which contain only a single family or a single person. In spite of its geometrical complexity and of its instability from day to day, this language boundary at any rate represents a plain distinction. It is true that linguistic scholars have found enough resemblance between English and Spanish to prove beyond a doubt that these languages are related, but the resemblance and relationship are too distant to affect the question with which we are here concerned.

The same might be said, for instance, of German and Danish: across the Jutland peninsula, just north of the city of Flensburg, we could draw a boundary between the two languages, and this boundary would show, on a smaller scale, the same features as the English-Spanish boundary in our Southwest. In this case, however, the resemblance between the two languages is sufficiently close to warn us of further possibilities. The two languages are mutually unintelligible, but resemble each other so closely that it takes no linguistic research to see the relationship. If one
can compare such things at all, the difference is no greater than the difference between, say, a German local dialect spoken in Sleswick and one spoken in Switzerland. German and Danish, where they abut on each other, show a difference no greater than the differences which may exist within a single locally differentiated speech-community — only that in the latter case the intermediate gradations intervene, while between German and Danish we find no intermediate dialects.

The purely relative nature of this distinction appears more plainly in other cases. We speak of French and Italian, of Swedish and Norwegian, of Polish and Bohemian as separate languages, because these communities are politically separate and use different standard languages, but the differences of local speech-forms at the border are in all these cases relatively slight and no greater than the differences which we find within each of these speech-communities. The question comes down to this: what degree of difference between adjoining speech-forms justifies the name of a language border? Evidently, we cannot weigh differences as accurately as all this. In some cases, certainly, our habits of nomenclature will not apply to linguistic conditions. The local dialects justify no line between what we call German and what we call Dutch-Flemish: the Dutch-German speech area is linguistically a unit, and the cleavage is primarily political; it is linguistic only in the sense that the political units use different standard languages. In sum, the term speech-community has only a relative value. The possibility of communication between groups, or even between individuals, ranges all the way from zero up to the most delicate adjustment. It is evident that the intermediate degrees contribute very much to human welfare and progress.

3.9. The possibilities of communication are enhanced and the boundaries of the speech-community are further obscured by another very important factor, namely, people's use of foreign languages. This is by no means a modern accomplishment; among peoples of simpler civilization, such as some tribes of American Indians, well-bred persons often speak more than one of the languages of neighboring tribes. The factor of foreign-language speaking does not lend itself to measurement, since proficiency ranges all the way down to a smattering so slight as to be of almost no actual use. To the extent that the learner can communicate, he may be ranked as a foreign speaker of a language. We have
already seen that the usefulness of some languages, such as Eng­lish or Malay, is partly due to the adherence of foreign speakers. Often enough, as among the educated classes in India, English serves as the means of communication between foreign speakers who do not understand each other's native languages.

Some people entirely give up the use of their native language in favor of a foreign one. This happens frequently among immi­grants in the United States. If the immigrant does not stay in a settlement of others from his own country, and especially if he marries outside his original nationality, he may have no occasion at all to use his native language. Especially, it would seem, in the case of less educated persons, this may result, after a time, in wholesale forgetting: people of this kind understand their native language when they chance to hear it spoken, but can no longer speak it freely or even intelligibly. They have made a shift of language; their only medium of communication is now English, and it is for them not a native but an adopted language. Sometimes these persons have nevertheless acquired English very im­perfectly and therefore are in the position of speaking no language well.

Another, more common case of shift of language occurs in the children of immigrants. Very often the parents speak their native language at home, and make it the native language of their children, but the children, as soon as they begin to play out of doors or to attend school, refuse to speak the home language, and in time succeed in forgetting all but a smattering of it, and speak only English. For them, English has become what we may call their adult language. In general, they speak it perfectly — that is, in a manner indistinguishable from that of the surrounding native speakers — but in some cases they carry over foreign peculiarities from their native language. This latter they speak very imperfectly or not at all, but their passive understanding, when they hear it, is somewhat better. A study of similar cases in Wales, where the children of Welsh-speaking parents shift to English, seems to show that this process retards the child's development.

3.10. In the extreme case of foreign-language learning the speaker becomes so proficient as to be indistinguishable from the native speakers round him. This happens occasionally in adult shifts of language and frequently in the childhood shift just described. In the cases where this perfect foreign-language learn-
ing is not accompanied by loss of the native language, it results in bilingualism, native-like control of two languages. After early childhood few people have enough muscular and nervous freedom or enough opportunity and leisure to reach perfection in a foreign language; yet bilingualism of this kind is commoner than one might suppose, both in cases like those of our immigrants and as a result of travel, foreign study, or similar association. Of course, one cannot define a degree of perfection at which a good foreign speaker becomes a bilingual: the distinction is relative.

More commonly the bilingual acquires his second language in early childhood. This happens frequently in communities near a language border, or where a family lives as a speech-island, or where the parents are of different speech. Many well-to-do European families make their children bilingual by employing foreign nurses or governesses. The educated Swiss-German is bilingual in the sense that he speaks both the local dialect and the highly divergent standard German. In the United States, better-educated immigrants often succeed in making their children bilingual; this development contrasts with the shifting of language among less privileged groups. In all these cases, apparently, the two languages play somewhat different parts in the life of the bilingual. Ordinarily one language is the home language, while the other serves a wider range, but other dispositions also occur. The apparent frequency with which one meets bilinguals among artists and men of science may indicate a favorable effect of bilingualism on the general development of the child; on the other hand, it may mean merely that bilingualism results from generally favorable childhood surroundings.
CHAPTER 4

THE LANGUAGES OF THE WORLD

4.1. Among the languages that are spoken today, only few are even tolerably well known to science. Of many we have inadequate information, of others none at all. The older stages of some present-day languages, and some languages no longer spoken are known to us from written records; these records, however, acquaint us with only an infinitesimal part of the speech-forms of the past. Some extinct languages are known from the scantiest of records, such as a few proper names, many more only by the name of the people who spoke them, and doubtless a vastly greater number has disappeared without a trace. More than one language now spoken, especially in Africa and in South America, will pass out of existence without being recorded.

The inadequacy of our knowledge makes it impossible to determine the relationships that may exist between many languages. In general, students who deal with slightly-known languages, have a weakness for setting up relationships on insufficient evidence. By relationship of languages we mean, of course, resemblances that can be explained only on the assumption that the languages are divergent forms of a single older language. Such resemblances show themselves in phonetic correspondences like those cited in Chapter 1, correspondences which can be determined only on the basis of extensive and accurate data. The less known the languages and the less expert the student, the greater is the danger of his making false assumptions of kinship. Even the most positive announcements often turn out, upon examination, to be based upon insufficient evidence.

4.2. English is spoken by more native speakers than any other language except, presumably, North Chinese; if we count the important factor of foreign speakers, English is the most widespread of languages. The number of native speakers of English was estimated for 1920 at about 170 millions (§ 3.2). Almost all of these speakers use standard or sub-standard English; local dialects are of small extent and for the most part mutually intelligible.
English is unmistakably related to the other Germanic languages, but at the same time differs plainly from all of them. History tells us that it came to Britain as the language of invaders, the Angles, Saxons, and Jutes, who conquered the island in the fifth century of our era. The marked difference of English from the Germanic speech along the continental shore of the North Sea is explained by the millennium and a half of separation. The oldest written records of English, dating from the eighth and ninth centuries, confirm this, for their language closely resembles that of the oldest records of continental Germanic speech, which date from about the same time. The splitting off of English is a classical example of the way in which a dialect area is divided by migration.

The resemblance is closest between English and the dialects of the Frisian area, spoken by some 350,000 persons on the coast and coastal islands along the North Sea. This resemblance appears strikingly in the oldest Frisian texts, which date from the second half of the thirteenth century. We conclude that English is an offshoot of an Anglo-Frisian (or Ingweonic) dialect area, which must have been fairly extensive before the migration to Britain.

Outside of Frisian, the Germanic-speaking area of the European mainland (excluding Scandinavia) shows no sharp cleavages. The nearest thing to a break is a heavy bundle of isoglosses running east and west across Germany: north of the bundle one speaks \( p, t, k \) in words like hope, bite, make; south of it, sounds like \( f, s, kh \), as in standard German hoffen, beiszen, machen. The speech of the northern type is known as Low German, that of the southern as High German; since the various isoglosses do not coincide, the distinction can be sharply drawn only if one resorts to an arbitrary definition. This difference appears already in our oldest records, which date from about the same time as those of English. Various kinds of evidence show us that the divergence of the southern type is due to changes which took place in the south during the fifth and sixth centuries of our era. The Continental West Germanic dialects, as they are called in contrast with Anglo-Frisian, made a vigorous eastward expansion during the Middle Ages; to the east and southeast of the main area there are many speech-islands, especially of the High German type, such as Yiddish in Poland and Russia. Continental West Germanic is spoken today by over 100 millions of persons. It has developed two great
standard languages, *Dutch-Flemish*, which is used in Belgium and the Netherlands and is based on western coastal dialects of the Low-German type, and *New High German*, based on eastern central dialects of the district that was gained by medieval expansion.

Anglo-Frisian and Continental West Germanic resemble each other closely enough to be viewed as a *West Germanic* unit, in contrast with the smaller *Scandinavian* (or *North Germanic*) group. Within this group, *Icelandic* differs markedly from the rest, what with the thousand years of separation since Iceland was colonized from western Norway. Icelandic is spoken today by some 100,000 speakers. The language of the *Faroese Islands*, with about 23,000 speakers, is close to Icelandic. The rest of the area, comprising Denmark, Norway, Sweden, Gotland, and part of the Finnish coast, shows no marked cleavages; the speakers number some 15 millions. Our oldest records of North Germanic speech are inscriptions, some of which may date as early as the fourth century A.D.; the oldest manuscripts date from the twelfth century, but the wording of the texts, especially in the case of some Icelandic literature, may be several centuries older. The present-day standard languages are Icelandic, Danish, Dano-Norwegian, Norwegian Landsmaal, and Swedish.

We have some information about Germanic languages that are no longer spoken, such as the languages of the Goths, Vandals, Burgundians, and Lombards. Parts of a Bible translation in the *Gothic* language of the Visigoths, made by Bishop Ulfila in the fourth century, are preserved to us in sixth-century manuscripts, notably the Silver Codex. While the language of the Lombards seems to have been of the West Germanic type, the others, including Gothic, were closer to Scandinavian and are usually set apart as an *East Germanic* group. East Germanic settlers seem to have kept their language in the Crimea and elsewhere on the Black Sea until the eighteenth century.

All the languages so far named resemble each other closely in contrast with all others, and accordingly constitute the *Germanic* family of languages; they are divergent modern forms of a single prehistoric language to which we give the name *Primitive Germanic* (§ 1.6).

4. 3. The kinship of the Germanic family, as a whole, with certain other languages and language families of Europe and Asia, is not superficially apparent, but has been fully established
by the researches of the last century; together, all these languages make up the *Indo-European* family (§ 1.6).

To the west of the Germanic languages we find today the remnants of the *Celtic* family. *Irish* is known to us from a manuscript literature since the eighth century of our era; a few inscriptions on stone are perhaps much earlier. Irish is spoken by some 400,000 people, and its offshoot, *Scotch Gaelic*, by some 150,000; *Manx*, as a home language, alongside English, by a few hundred. Another branch of the Celtic family consists of *Welsh* and *Breton*, each with about a million speakers and known through written records since the eighth century. The latter, spoken on the northwestern coast of France, was brought there from Britain, perhaps as early as the fourth century. Another language of this branch, *Cornish*, whose earliest records date from the ninth century, died out around the year 1800. History and the evidence of place-names show that Celtic was in earlier times spoken over a large part of Europe, including what is now Bohemia, Austria, southern Germany, northern Italy, and France. It was superseded in these regions by Latin, as a result of Roman conquests, and by Germanic languages, as a result of the great migrations in the early centuries of our era. We have a few scant inscriptions, dating from round 100 B.C. in the ancient Celtic language of Gaul.

Northeast of the Germanic languages lies the *Baltic* family. The two surviving languages of this family, *Lithuanian*, spoken by some 2½ million people, and *Lettish*, spoken by some 1½ millions, have written records dating from the sixteenth century; thanks to the political independence of Lithuania and Latvia, both of these dialect-groups are now developing vigorous standard languages. A third language of this group, *Old Prussian*, is known to us from a few written documents of the fifteenth and sixteenth centuries; it ceased to be spoken in the seventeenth century.

South of the Baltic languages, and east and southeast of the Germanic, we find the great *Slavic* family. The eastward expansion of German in the Middle Ages overlaid various languages of the *West Slavic* branch. One of these, *Lusatian* (*Wendish, Sorbian*), survives as a speech-island of some 30,000 persons in Upper Saxony; another, *Polabian*, survived into the eighteenth century and has left a few written texts; the rest have died out, leaving a trace only in Germanized place-names. As a result of the struggle, the two great surviving West Slavic dialect areas show a peculiar
geographic configuration: a narrow streak of speech-islands trails off northward from the main Polish area along the Vistula toward Danzig, and Bohemian juts out westward as a kind of peninsula into the domain of German. Polish, recorded since the fourteenth century, is spoken by more than 20 million people. The Bohemian area, divided on the basis of standard languages, into Czech and Slovak, comprises perhaps 12 millions of speakers; the oldest records date from the thirteenth century. East Slavic consists of but one enormous dialect area, Russian, with at least 110 million speakers, and written records dating back to the twelfth century. The South Slavic branch is separated from the others by the intervention of Hungarian, an unrelated intruder. It consists of Bulgarian, with some 5 million speakers, Serbo-Croatian, with some 10 millions, and Slovene, with about 1½ millions. Our oldest written records of Slavic speech are Old Bulgarian records from the ninth century, preserved in manuscripts written at least a century later, and a scant tenth-century text in Old Slovene. Some students find a relatively close resemblance between the Baltic and Slavic groups, and include them together as a Balto-Slavic sub-group within the Indo-European family.

To the south of the Germanic languages, Romance languages are spoken: the Portuguese-Spanish-Catalan area (with three standard languages indicated by these names) comprising in all over 100 million speakers, the French area with 45 millions, the Italian with over 40 millions, and Ladin (Rhaeto-Romanic) in Switzerland, spoken by some 16,000 persons. A further group, the Dalmatian, is extinct: one of the dialects, Ragusan, died out in the fifteenth century; another, Veliote, survived into the nineteenth. To the east, on the Black Sea, cut off from the western areas by the intrusion of South Slavic, lies the Roumanian area, estimated as having 14 millions of speakers. All the Romance languages, of course, are modern forms of Latin, the ancient dialect of the city of Rome. Our oldest records of Latin date from somewhere round 300 B.C. In medieval and modern time, Latin has been used as an artificial medium for writing and learned discourse. Ancient inscriptions show us, in Italy, some sister languages of Latin, notably Oscan and Umbrian; these and others, which in the course of Roman expansion were superseded by Latin, belong, together with Latin, into the Italic family. Some scholars believe that Italic and Celtic are connected by special resemblances, so
as to form an Italo-Celtic sub-group within the Indo-European family.

East of the Adriatic, south of Serbo-Croatian, is the Albanese area. Albanese, known from records only since the seventeenth century, is spoken by a population of 1½ millions. Although Albanese is full of loan-words from the surrounding languages, the native nucleus of its forms shows it to be a separate branch of the Indo-European stock.

Greek is spoken today by some 7 millions of speakers, in many local dialects and in a widespread standard language. The modern dialects are almost entirely descended from the standard language (the so-called Koiné) which prevailed in the first centuries of the Christian Era, having superseded the local and provincial dialects of ancient times. These Ancient Greek dialects are known to us from many inscriptions, beginning in the seventh century B.C., from fragments of writing on papyrus, beginning in the fourth century B.C., and from a copious literature (transmitted, to be sure, in much later manuscripts), whose oldest compositions, the Homeric poems, are at least as old as 800 B.C.

In Asia Minor we find one branch of the Indo-European stock, Armenian, spoken today by 3 or 4 million people; our oldest written records of Armenian date from the fifth century A.D.

The great Asiatic offshoot of the Indo-European family is the Indo-Iranian group. This consists of two sub-groups, Iranian and Indic (or Indo-Aryan), very different today, but in the forms of our earliest records so similar that we can with certainty view them as descendants of a Primitive Indo-Iranian parent language.

The principal dialect areas of modern Iranian are Persian (with a standard language of high prestige, spoken by perhaps 7 or 8 millions of people), the Caspian group, and Kurdish; then, eastward, the Pamir dialects, Afghan (Pushto), with some 4 million speakers, and Baluchi; an isolated offshoot, far to the west is Ossete, in the Caucasus, spoken by some 225,000 persons. Our oldest records of Iranian are the rock inscriptions, in Old Persian, of King Darius the Great and his successors (from the sixth to the fourth centuries B.C.), and the sacred texts, in Avestan, of the Zoroastrian (Parsi) religion, whose oldest portions may have been composed as early as 600 B.C., though our manuscripts are quite modern and contain a text which has undergone serious orthographic revision. Intermediate stages, except for Persian (Pehlevi),
are less well known, but early in the present century discoveries of manuscript fragments in Chinese Turkestan gave us knowledge of other medieval Iranian languages, which have been identified as Parthian, Sogdian, and Sakian.

The other sub-branch of Indo-Iranian, Indic, comprises a total of more than 230 millions of speakers, distributed among a number of dialect areas which cover the larger part of India and include such great languages as Marathi (19 millions), Gujarati (10 millions), Panjabi (16 millions), Rajasthani (13 millions), Western Hindi (38 millions), Eastern Hindi (25 millions), Oriya (10 millions), Bihari (36 millions), Bengali (50 millions). The language of the Gipsies (Romani) is an emigrant offshoot of the Pāičachi area in northwestern India. Our oldest written records of Indic speech, the inscriptions of King Açoka, dating from the third century B.C., show us a number of Indic dialects in what is called the Prakrit (or Middle Indic) stage; Indic languages in the Prakrit stage are known to us also from later inscriptions and from manuscript texts; among these last is Pali, the language of the Buddhist scriptures. An even older stage of Indic speech, the Sanskritic (or Old Indic) stage, is known to us, strangely enough, from somewhat later documents. Our oldest texts in this stage are the Vedic collections of hymns; the original composition of the oldest parts of the oldest collection, the Rig-Veda, is placed conservatively at 1200 B.C. These hymns form the basic part of the scriptures of the Brahmin religion. A second, slightly divergent type of Old Indic speech is known to us from the Brahmana's, the prose texts of the Brahmin religion, and from the grammar of Pāṇini (§ 1.5) and its ancillary works. This language, known as Sanskrit, was spoken round the fourth century B.C. by the upper class somewhere in northwestern India. As a standard dialect and later as a literary and scholastic language, it gradually came into official use all over Brahmin India; in the inscriptions it appears first round 150 B.C. and a few centuries later entirely supersedes the dialects of the Prakrit type; from that time to the present, written according to the rules of Pāṇini's grammar, it has served as the medium of an enormous body of artistic and scholarly literature.

Beside the branches so far named, all of which are represented by languages spoken today, there must have existed at different times many other offshoots of Primitive Indoeuropean, some closely related to surviving branches, others intermediate between
them, and perhaps still others quite apart. Of some such languages we have a slight knowledge. Round the Adriatic, the Illyrian languages were spoken in ancient times: Illyrian, in which we have only a few proper names, Venetic, known from inscriptions that date from the fourth to the second centuries B.C., and Messapian in southern Italy, with inscriptions dating from 450 to 150 B.C. Of Thracian, in the western part of the Balkan peninsula, we have only a few names and words and a single inscription (round 400 B.C.); it seems to have been closely related to Phrygian, in Asia Minor, which is known to us from a set of inscriptions dating as early as the eighth century B.C. and another set from the first centuries of our era. Macedonian seems to have been closely related to Greek. Ligurian (round the present Riviera) and Sicilian in Sicily, may have been close to Italic. Tocharian, in Central Asia, is known to us from manuscript fragments of the sixth century A.D., found in Chinese Turkestan.

Primitive Indo-European, in its turn, must have been related to other languages; with one exception, however, these have either died out or else changed so much as to obscure the kinship. The one exception is Hittite, an ancient language of Asia Minor, known to us from cuneiform inscriptions that begin round 1400 B.C. This relationship, though distant, enables us to reconstruct some of the pre-history of Primitive Indo-European and some features of a presumable Primitive Indo-Hittite parent language.

4.4. As the various languages of the Indo-European stock spread over their present vast territory, they must have obliterated many unrelated forms of speech. A remnant of such a language is Basque, spoken today by some half-million people in the western Pyrenees. Our oldest texts in Basque date from the sixteenth century. It is the only surviving form of ancient Iberian, once spoken over southern France and Spain, and known to us from inscriptions and place-names.

Of other such languages, now extinct, we have only scant information. In Italy, Etruscan, a totally unrelated neighbor that exerted a powerful influence on the Latin people, has left us copious inscriptions, which begin as early as the sixth century B.C. They are in the Greek alphabet and can be read, but not understood. The inscriptions in ancient Rhaetian show this language to have been an offshoot of Etruscan. An inscription of about 600 B.C. on the island of Lemnos and a series of inscriptions of the
fourth and third centuries B.C., mostly from Sardis in Asia Minor, show that Etruscan was related to Lemnian and Lydian; the texts of only the last-named have been interpreted.

From ancient Crete we have several inscriptions in the Greek alphabet but in an unknown language, two from the fourth century B.C. and one (from the town of Praissos) somewhat older. From a much earlier period, round 1500 B.C. we have Cretan inscriptions partly in picture-writing and partly in a simplified system derived from this.

From Asia Minor we have copious inscriptions in Lycian, from the fifth and fourth centuries B.C., and less extensive ones in Carian, from the seventh century B.C. The former are in a Greek alphabet and have been partly interpreted; the writing of the latter may be of the same provenience, but is undeciphered. In Syria and the adjacent part of Asia Minor copious inscriptions in picture-writing from about 1000 B.C. to about 550 B.C. have been attributed to the Hittites, but there is no reason for believing that these undeciphered inscriptions were made by the same people as our Hittite cuneiform records (§ 4.3).

Cuneiform inscriptions on rock and clay from the Near East acquaint us with extinct languages of an older time: Sumerian in Mesopotamia, from 4000 B.C., Elamitic, in Persia, from 2000 B.C.; scant records of Cossean, east of Mesopotamia, from 1600 B.C., Mitanni, east of Mesopotamia, from round 1400 B.C.; the language of Van (near Lake Van) from the ninth and eighth centuries B.C.; and several uninterpreted languages within the Hittite empire in Asia Minor. Of the other languages represented in records of this type, we have already mentioned Old Persian and Hittite (§ 4.3), and shall immediately speak of Babylonian-Assyrian, a Semitic language.

4. 5. Of the present-day families which border upon Indo-European, one or more may be distantly akin; the Semitic-Hamitic and the Finno-Ugrian families seem to show some resemblance to Indo-European, but, in spite of much effort, no conclusive evidence has been found.

The Semitic-Hamitic family consists of four branches which resemble each other but distantly: Semitic, Egyptian, Berber, and Cushite.

The Semitic branch appears in two offshoots. The eastern, now extinct, consists of Babylonian-Assyrian, known to us from in-
scriptions on stone and clay in cuneiform writing, from about 2500 B.C. onward; this language was superseded by Aramaic before the beginning of the Christian Era. The western branch of Semitic is divided, again, into two main offshoots, a northern and a southern. The former appears in the Canaanite glosses in cuneiform tablets found at Tel-el-Amarna, dating round 1400 B.C., and in the Moabite of the famous inscription of King Mesha, ninth century B.C. Phoenician, known first from inscriptions of the ninth century B.C., was spoken not only in Phoenicia, where it died out before the Christian Era, but also in the Phoenician colony of Carthage, where it lived some centuries longer. Hebrew is known from inscriptions of equal age and from the manuscript tradition of the Old Testament, whose earliest portion may have been composed by 1000 B.C. It was superseded by Aramaic in the second century B.C., but remained in written use through the Middle Ages; of late, there have been attempts to restore it, artificially, to the status of a spoken language. Aramaic, finally, consists of a group of dialects, first known from inscriptions of the eighth century B.C. In a tremendous wave of expansion, Aramaic, in the centuries just before the Christian Era, spread over Syria and large tracts of Asia, vying with Greek, and replacing many languages, among them Hebrew and Assyrian. For a millennium (from round 300 B.C. to round 650 A.D.) it served as the leading official and written language of the Near East; in the latter capacity it exercised a great effect upon Asiatic systems of writing. It was superseded, in its turn, by the spread of Arabic, and is spoken today in isolated patches by some 200,000 people. The southern branch of West Semitic is represented by several still flourishing languages. South Arabic, known from inscriptions ranging from about 800 B.C. to the sixth century A.D., is still spoken, in several dialects, along the southern coast of Arabia and on the island of Sokotra. Arabic, whose earliest record is an inscription from 328 A.D., owes its expansion, since the seventh century of our era, to the conquests of the Mohammedan Arabs. It is spoken today by some 37 millions of people and, beyond this, has served for centuries as the sacred, literary, and official language of Islam. Ethiopian, on the east coast of Africa (Abyssinia), is first known to us from inscriptions beginning with the fourth century A.D.; the present-day languages of this group are Tigre, Tigriña, and Amharic.
The Egyptian, Berber, and Cushite branches of Semitic-Hamitic are usually included under the name of Hamitic languages.

Egyptian is recorded for us in hieroglyphic inscriptions from 4000 B.C.; the later form of the language, known as Coptic, appears in a manuscript literature of Christian times. Egyptian died out, superseded by Arabic, in the seventeenth century.

The Berber branch of Semitic-Hamitic, is known from ancient times through inscriptions in the Libyan language, from the fourth century B.C.; it is represented today by various languages, such as Tuareg and Kabyle, which have maintained themselves against Arabic in northern Africa and are said to total some 6 or 7 million speakers.

The fourth branch of Semitic-Hamitic is Cushite, south of Egypt; it includes a number of languages, among them Somali and Galla, the latter with some 8 million speakers.

4. 6. South of the Arab and Berber areas of northern Africa, a broad belt of many languages stretches across the continent from the Ethiopian and Cushite areas in the east to the Gulf of Guinea in the west. The languages of this vast belt, spoken by a population of presumably some 50 millions, are little known. Some scholars, upon very scant evidence, believe them all to be related; others connect some of these languages with Hamitic, or some with Bantu. Among the languages of this region that are more often named, we may mention Wolof and Ful in Senegal; Grebo, Ewe, and Yoruba along the Guinea coast; Hausa in the central region; and in the east, Nuba in a large territory round Khartoum, south of this, Dinka, and still further south, Masai.

South of this Guinean and Soudanese belt we come upon the vast Bantu family of languages, which before the European invasion covered all the rest of Africa except only a southwestern district. The languages of the Bantu family, totaling some 50 millions of speakers, are very numerous; among the better known are Luganda, Swaheli, Kaffir, Zulu, Tebele, Subiya, Herero.

The portion of southwestern Africa that was not Bantu-speaking, belonged, before the coming of the European, to two unrelated linguistic areas: the Bushman, with some 50,000 speakers, and the Hottentot, with some 250,000.

4. 7. Returning to the continent of Eurasia, we find, to the east of the Indo-European languages and in topographic alternation with them, the great Finno-Ugrian family. This family
consists of six major branches. The first is the Finnish-Lapponic. In
the northerly parts of Norway, Sweden, and Finland, some 30-
000 people speak Lappish. The other languages of the Finnish-
Lapponic branch form a closer group, the Finnish (or Baltic-
Finnish). The largest language of this type is Finnish, recorded
in a fragmentary way as early as the thirteenth century and in
printed books since 1544; Finnish is native to some 3 million
speakers. Esthonian, with earliest records of about the same dates,
is spoken by about a million people. Both Finnish and Esthonian
have standard languages which are official in the republics of
Finland and Esthonia. The other languages of the Baltic branch,
Carelian, Olonetsian, Ludian, Vepsian, Livonian, Ingrian, and
Votian, are far smaller, and some of them are near extinction.
Four further branches of the Finno-Ugrian stock lie in patches
across the extent of European and Asiatic Russia; they are Mord-
vine (a million speakers); Cheremiss (375,000); Permian, consist­
ing of Votyak (420,000) and Zyrian (258,000), the latter with
written records from the fourteenth century; Ob-Ugrian, consist­
ing of Ostyak (18,000) and Vogule (5000). The sixth branch of
Finno-Ugrian is Hungarian, brought by invaders at the end of
the ninth century into central Europe. Aside from scattered
words in Latin documents, the oldest written record of Hungarian
dates from the thirteenth century. In a flourishing standard
language and in a number of local dialects Hungarian is spoken
by some 10 million persons.

To the east of the Ostyak area, along the Yenisei River, some
18,000 persons speak languages of the Samoyede family. These
languages are dispersed over a wide area and show great local
diversity. Some investigators believe that Samoyede and Finno-
Ugrian are related.

4. 8. The Turkish (Turco-Tartar or Altaic) family of languages
covers a vast main area, from Asia Minor, conquered, at the end
of the Middle Ages, by the Ottoman Turks, all the way to the
upper reaches of the Yenisei. These languages, with little dif­
erentiation, are spoken by some 39 millions of people; Turkish,
Tartar, Kirgiz, Uzbeg, Azerbaijani are the more familiar language­
names. Our oldest texts are some Siberian inscriptions, dating
from the eighth century A.D., a Turkish-Arabic vocabulary from
the eleventh century, and a Latin-Persian-Turkish vocabulary
from the fourteenth. Separated from the other languages of the
group, but not very different from them, is Yakut, spoken by over 200,000 people in northernmost Siberia. Some students believe that Turco-Tartar is related to the Mongol and Manchu families; others, on even slighter grounds, claim a relationship of all these with Finno-Ugrian and Samoyede (in what they call a Ural-Altaic family).

The Mongol languages lie for the most part east of the Turco-Tartar, in Mongolia, but, in consequence of the former wandering and predatory habits of these tribes, scattered communities are found in various parts of Asia, and even in European Russia. The total number of speakers is estimated at 3 millions. The oldest known written record is an inscription from the time of Gengis Khan, in the thirteenth century.

The Tunguse-Manchu family lies to the north of the Mongol, dividing Yakut from the rest of the Turco-Tartar area. Tunguse is spoken by some 70,000 persons dwelling over a relatively large tract in Siberia. The number of actual speakers of Manchu is uncertain, since most of the so-called Manchus in China speak only Chinese; Deny estimates it at well under a million. As a literary and official language, Manchu has been printed since 1647; the manuscript tradition goes back to an even earlier date.

The great Indo-Chinese (or Sino-Tibetan) family consists of three branches. One of these is Chinese, spoken by some 400 millions of people; it forms really a vast dialect area containing many, in part mutually unintelligible, dialects or languages. These have been classified into four main groups: the Mandarin group (North Chinese, including the language of Peking; Middle Chinese, including Nanking; West Chinese, in Szechuen), the Central Coastal group (Shanghai, Ningpo, Hangkow), the Kiangsi group, and the South Chinese group (Foochow; Amoy-Swatow; Cantonese-Hakka). Our oldest texts are inscriptions, some of which may date as far back as 2000 B.C., but since Chinese writing uses a separate symbol for each word, with little indication of sounds, even an intelligible document may tell us little or nothing of the language: our knowledge of Chinese speech, therefore, does not set in before about 600 A.D. The second branch of Indo-Chinese is the Tai family, which includes Siamese, spoken by some 7 millions of people; the oldest record is an inscription from 1293 A.D. The third branch is Tibeto-Burman, consisting of four groups: in the Tibetan group, the language of the same name, with rec-
ords reaching back to the ninth century A.D., is the most impor­tant; in the Burmese group, Burmese, with some 8 million speakers, holds a similar position; the other two groups, Bodo-Nuga-Kachin and Lo-lo, consist of lesser dialects.

The Hyperborean family, in the extreme northeastern corner of Asia, consists of Chukchee, spoken by some 10,000 persons, Koryak, with almost as many speakers, and Kamchadal, with 1000.

Along the Yenisei River, Yenisei-Ostyak, with some 1000 speakers, and Cottian, probably by this time extinct, form an independent family.

No relationship has been found for several other languages of eastern Asia. Gilyak is spoken in the northern part of Sakhalin Island and round the mouth of the Amur River. Ainu is spoken by some 20,000 persons in Japan. Japanese has 56 million speakers; the written records begin in the eighth century. Korean has 17 millions of speakers.

4. 9. Turning southeastward from Europe, we find in the Caucasus region a great variety of languages. Apart from Ossete, an Iranian language (§ 4.3), these are generally classed into two families, North Caucasian and South Caucasian, with between 1 and 2 million speakers in each. The best known of these languages, Georgian, belongs to the latter group; the written records begin as early as the tenth century A.D.

In India, south of the Indo-Aryan languages, lies the great Dravidian family, including, beside many lesser languages, the great speech-areas (and standard literary languages) of Tamil (18 millions), Malayalam (6 millions), Canarese (10 millions; oldest inscriptions from the fifth century A.D.), Telugu (24 millions). A single Dravidian language, Brahui (with 174,000 speakers) is spoken, far off from the rest, in the mountains of Baluchistan; it seems to be a relic of a time when Dravidian occupied a much wider territory, before the invasion of Indo-Aryan and Iranian speech.

The languages of the Munda family are spoken by 3 millions of persons in two separate parts of India, namely, on the southern slope of the Himalayas and round the plateau of Chota Nagpur in central India.

The Mon-Khmer family lies in patches over southeastern Asia, including the Nicobar Islands and some districts in the Malay
Peninsula. Our oldest records are inscriptions in Cambogian, dating from the seventh century A.D. This family includes at present one great cultural language, Annamite, spoken by 14 millions of people. Some scholars believe both the Munda and the Mon-Khmer families to be related to the Malayo-Polynesian family (forming the so-called Austric family of languages).

The Malayo-Polynesian (or Austronesian) family extends from the Malay Peninsula across the Pacific to Easter Island. It consists of four branches. The Malayan (or Indonesian) branch includes Malay, with some 3 million native speakers and wide use as a language of commerce and civilization; further, it embraces the languages of the great islands of the East, such as Formosan, Javanese (20 millions), Sundanese (6½ millions), Maduran (3 millions), Balinese (1 million), and the many Philippine languages, among them Bisaya (2½ millions) and Tagalog (1½ millions); a distant offshoot is Malagasy, the language of Madagascar, spoken by some 3 million people. The second, Melanesian, branch of Malayo-Polynesian includes many languages of smaller island groups, such as the languages of the Solomon Islands and Fijian. The Micronesian branch contains the languages of a smaller tract, the Gilbert, Marshall, Caroline, and Marianne archipelagos and the Island of Yap. The fourth, Polynesian branch includes Maori, the native language of New Zealand, and the languages of the more easterly Pacific islands, such as Samoan, Tahitian, Hawaiian, and the language of Easter Island.

The other families of this part of the earth have been little studied; the Papuan family, on New Guinea and adjacent islands, and the Australian languages.

4. 10. There remains the American continent.

It is estimated that the territory north of Mexico was inhabited, before the coming of the white man, by nearly 1,500,000 Indians; in this same territory the number of speakers of American languages today cannot be much over a quarter of a million, with English making ever more rapid encroachment. As the languages have been insufficiently studied, they can be but tentatively grouped into families: estimates vary between twenty-five and fifty entirely unrelated families of languages for the region north of Mexico. Most of this region is covered by great linguistic stocks, but some areas, notably the region round Puget Sound and the coastal district of California, were closely packed with
small unrelated speech-communities. At least half a dozen linguistic stocks are known to have died out. Of those that still exist, we may name a few of the largest. In the far north, the Eskimo family, ranging from Greenland over Baffinland and Alaska to the Aleutian Islands, forms a fairly close-knit dialect-group. The Aigonguan family covers the northeastern part of the continent and includes the languages of eastern and central Canada (Micmac, Montagnais, Cree), of New England (Penobscot, Massachusetts, Natick, Narraganset, Mohican, and so on, with Delaware to the south), and of the Great Lakes region (Ojibwa, Potawatomi, Menomini, Sauk, Fox, Kickapoo, Peoria, Illinois, Miami, and so on), as well as a few detached languages in the west: Blackfoot, Cheyenne, and Arapaho. The Athabascan family covers all but the coastal fringe of northwestern Canada (Chipewyan, Beaver, Dogrib, Sarsi, etc.), a number of isolated groups in California (such as Hupa and Matole), and a third, large area in the south, the Apache and Navajo languages. The Iroquoian family was spoken in a district surrounded by Algonquian; it includes, among others, the Huron (or Wyandot) language, and the languages of the Iroquois type (Mohawk, Oneida, Onondaga, Cayuga, Seneca, Tuscarora); in a detached region to the south Cherokee was spoken. The Muskogean family includes, among other languages, Choctaw, Chickasaw, Creek, and Seminole. The Siouan family includes many languages, such as Dakota, Teton, Oglala, Assiniboine, Kansa, Omaha, Osage, Iowa, Missouria, Winnebago, Mandan, Crow. A Uto-Aztecan family has been proposed, on the basis of a probable relationship, to include, as three branches, the Piman family (east of the Gulf of California), the Shoshonean family (in southern California and eastward, including Ute, Paiute, Shoshone, Comanche, and Hopi), and the great Nahuatlan family in Mexico, including Aztec, the language of an ancient civilization.

The number of speakers of American languages in the rest of America is uncertain: a recent estimate places the figure for Mexico alone at 4½ millions and for Peru and Brazil at over 3 millions each, with a total of over 6 millions for Mexico and Central America and of over 8½ millions for South America. The number of languages and their relationships are quite unknown; some twenty or so independent families have been set up for Mexico and Central America, and round eighty for South America. In the former region, beside Nahuatlan, we may mention the Mayan
family in Yucatan as the bearer of an ancient civilization. In South America, we note, in the northwest, the *Arawak* and *Carib* families, which once prevailed in the West Indies; the *Tupi-Guarani*, stretched along the coast of Brazil, the *Araucanian* in Chile, and *Kechuan*, the language of the Inca civilization. Both the Aztec and the Maya had developed systems of writing; as both the systems were largely hieroglyphic and have been only in part deciphered, these records do not give us information about the older forms of speech.
5.1. In Chapter 2 we distinguished three successive events in an act of speech: A, the speaker's situation; B, his utterance of speech-sound and its impingement on the hearer's ear-drums; and C, the hearer's response. Of these three types of events, A and C include all the situations that may prompt a person to speak and all the actions which a hearer may perform in response; in sum, A and C make up the world in which we live. On the other hand, B, the speech-sound, is merely a means which enables us to respond to situations that would otherwise leave us unaffected, or to respond more accurately to situations that otherwise might prompt less useful responses. In principle, the student of language is concerned only with the actual speech (B); the study of speakers' situations and hearers' responses (A and C) is equivalent to the sum total of human knowledge. If we had an accurate knowledge of every speaker's situation and of every hearer's response — and this would make us little short of omniscient — we could simply register these two facts as the meaning (A–C) of any given speech-utterance (B), and neatly separate our study from all other domains of knowledge. The fact that speech-utterances themselves often play a part in the situation of a speaker and in the response of a hearer, might complicate things, but this difficulty would not be serious. Linguistics, on this ideal plane, would consist of two main investigations: phonetics, in which we studied the speech-event without reference to its meaning, investigating only the sound-producing movements of the speaker, the sound-waves, and the action of the hearer's ear-drum, and semantics, in which we studied the relation of these features to the features of meaning, showing that a certain type of speech-sound was uttered in certain types of situations and led the hearer to perform certain types of response.

Actually, however, our knowledge of the world in which we live is so imperfect that we can rarely make accurate statements about the meaning of a speech-form. The situations (A) which lead to
an utterance, and the hearer's responses (C), include many things that have not been mastered by science. Even if we knew much more than we do about the external world, we should still have to reckon with the predispositions of the speaker and the hearer. We cannot foretell whether, in a given situation, a person will speak, or if so, what words he will use, and we cannot foretell how he will respond to a given speech.

It is true that we are concerned not so much with each individual as with the whole community. We do not inquire into the minute nervous processes of a person who utters, say, the word *apple*, but content ourselves rather with determining that, by and large, for all the members of the community, the word *apple* means a certain kind of fruit. However, as soon as we try to deal accurately with this matter, we find that the agreement of the community is far from perfect, and that every person uses speech-forms in a unique way.

5.2. The study of language can be conducted without special assumptions only so long as we pay no attention to the meaning of what is spoken. This phase of language study is known as phonetics (experimental phonetics, laboratory phonetics). The phonetician can study either the sound-producing movements of the speaker (physiological phonetics) or the resulting sound-waves (physical or acoustic phonetics); we have as yet no means for studying the action of the hearer's ear-drum.

Physiological phonetics begins with inspection. The *laryngoscope*, for instance, is a mirror-device which enables an observer to see another person's (or his own) vocal chords. Like other devices of the sort, it interferes with normal speech and can serve only for very limited phases of observation. The x-ray does good service where its limitations can be overcome; tongue-positions can be photographed, for instance, if one lays a thin metal strip or chain along the upper surface of the tongue. Other devices give a transferred record. For instance, a false palate covered with coloring-matter is put into the mouth; after the speaker utters a sound, the places where the tongue has touched the palate are recognizable by the removal of the coloring-matter. In most devices of this sort a bulb is attached to some part of the speaker's vocal organs, say to the adam's-apple; the mechanism transforms the movement into up-and-down movements of a pen-point which touches a strip of paper. The strip of paper is kept moving at an
even rate of speed, so that the up-and-down movement of the pen-point appears on the paper as a wavy line. This recording device is called a kymograph. In acoustic phonetics one secures imprints of the sound-waves. Records of this kind are familiar to us in the form of phonograph-disks; phoneticians have not yet succeeded in analyzing most features of such records.

A considerable part of our information about speech-sounds is due to the methods we have just outlined. However, laboratory phonetics does not enable us to connect speech-sounds with meanings; it studies speech-sounds only as muscular movements or as disturbances in the air, without regard to their use in communication. On this plane we find that speech-sounds are infinitely complex and infinitely varied.

Even a short speech is continuous: it consists of an unbroken succession of movements and sound-waves. No matter into how many successive parts we break up our record for purposes of minute study, an even finer analysis is always conceivable. A speech-utterance is what mathematicians call a continuum; it can be viewed as consisting of any desired number of successive parts.

Speech-utterances are infinitely varied. Everyday experience tells us that different persons speak differently, for we can recognize people by their voices. The phonetician finds that no two utterances are exactly alike.

Evidently the working of language is due to a resemblance between successive utterances. Utterances which in ordinary life we describe as consisting of "the same" speech-forms — say, successive utterances of the sentence I'm hungry — evidently contain some constant features of sound-wave, common to all utterances of this "same" speech-form. Only on this assumption can we account for our ordinary use of language. The phonetician, however, cannot make sure of these constant features, as long as he ignores the meaning of what is said. Suppose, for instance, that he had records of an utterance which we could identify as representing the syllable man, spoken on two different pitch-schemes. If the language of these utterances were English, we should say that both contained the same speech-form, namely, the word man, but if the language were Chinese, the two records might represent two different speech-forms, since in Chinese differences of pitch-scheme are connected with different meanings:
the word man with a high rising pitch, for instance means ‘deceive,’ and the word man with a falling pitch means ‘slow.’ As long as we pay no attention to meanings, we cannot decide whether two uttered forms are “the same” or “different.” The phonetician cannot tell us which features are significant for communication and which features are immaterial. A feature which is significant in some languages or dialects, may be indifferent in others.

5. 3. The fact that two utterances of the syllable man with different pitch-schemes are “the same” speech-form in English, but “different” speech-forms in Chinese, shows us that the working of language depends upon our habitually and conventionally discriminating some features of sound and ignoring all others. The features of sound in any utterance, as they might be recorded in the laboratory, are the gross acoustic features of this utterance. Part of the gross acoustic features are indifferent (non-distinctive), and only a part are connected with meanings and essential to communication (distinctive). The difference between distinctive and non-distinctive features of sound lies entirely in the habit of the speakers. A feature that is distinctive in one language, may be non-distinctive in another language.

Since we can recognize the distinctive features of an utterance only when we know the meaning, we cannot identify them on the plane of pure phonetics. We know that the difference between the English forms man and men is distinctive, because we know from ordinary life that these two forms are used under different circumstances. It is possible that some science other than linguistics may define this difference in accurate terms, providing even for the case where we use man for more than one individual (man wants but little here below). In any case, however, this difference cannot be recognized by purely phonetic observation: the difference between the vowel sounds of man and men is in some languages non-distinctive.

To recognize the distinctive features of a language, we must leave the ground of pure phonetics and act as though science had progressed far enough to identify all the situations and responses that make up the meaning of speech-forms. In the case of our own language, we trust to our everyday knowledge to tell us whether speech-forms are “the same” or “different.” Thus, we find that the word man spoken on various pitch-schemes is in English still “the same” word, with one and the same meaning,
but that man and men (or pan and pen) are "different" words, with different meanings. In the case of a strange language we have to learn such things by trial and error, or to obtain the meanings from someone that knows the language.

The study of significant speech-sounds is phonology or practical phonetics. Phonology involves the consideration of meanings. The meanings of speech-forms could be scientifically defined only if all branches of science, including, especially, psychology and physiology, were close to perfection. Until that time, phonology and, with it, all the semantic phase of language study, rests upon an assumption, the fundamental assumption of linguistics: we must assume that in every speech-community some utterances are alike in form and meaning.

5. 4. A moderate amount of experimenting will show that the significant features of a speech-form are limited in number. In this respect, the significant features contrast with the gross acoustic features, which, as we have seen, form a continuous whole and can be subdivided into any desired number of parts. In order to recognize the distinctive features of forms in our own language, we need only determine which features of sound are "different" for purposes of communication. Suppose, for instance, that we start with the word pin: a few experiments in saying words out loud soon reveal the following resemblances and differences:

(1) pin ends with the same sound as fin, sin, tin, but begins differently; this kind of resemblance is familiar to us because of our tradition of using end-rime in verse;

(2) pin contains the sound of in, but adds something at the beginning;

(3) pin ends with the same sound as man, sun, hen, but the resemblance is smaller than in (1) and (2);

(4) pin begins with the same sound as pig, pill, pil, but ends differently;

(5) pin begins with the same sound as pat, push, peg, but the resemblance is smaller than in (4);

(6) pin begins and ends like pen, pan, pun, but the middle part is different;

(7) pin begins and ends differently from dig, fish, mill, but the middle part is the same.

In this way, we can find forms which partially resemble pin, by altering any one of three parts of the word. We can alter first
one and then a second of the three parts and still have a partial resemblance: if we alter the first part and then the second, we get a series like pin-tin-tan; if we alter the first part and then the third, we get a series like pin-tin-tick; if we alter the second part and then the third, we get a series like pin-pan-pack: and if we alter all three parts, no resemblance is left, as in pin-tin-tan-tack.

Further experiment fails to reveal any more replaceable parts in the word pin: we conclude that the distinctive features of this word are three indivisible units. Each of these units occurs also in other combinations, but cannot be further analyzed by partial resemblances: each of the three is a minimum unit of distinctive sound-feature, a phoneme. Thus we say that the word pin consists of three phonemes: the first of these occurs also in pet, pack, push, and many other words; the second also in fig, hit, miss, and many other words; the third also in tan, run, hen, and many other words. In the case of pin our alphabetic writing represents the three phonemes by three letters, p, i, and n, but our conventions of writing are a poor guide; in the word thick, for instance, our writing represents the first phoneme by the two-letter group th and the third by the two-letter group ck.

A little practice will enable the observer to recognize a phoneme even when it appears in different parts of words, as pin, apple, mop. Sometimes our stock of words does not readily bring out the resemblances and differences. For instance, the word then evidently consists of three phonemes, but (especially under the influence of our way of writing) we might question whether the initial phoneme was or was not the same as in thick; once we hit upon the pair thigh and thy, or upon mouth and mouthe, we see that they are different.

5. 5. Among the gross acoustic features of any utterance, then, certain ones are distinctive, recurring in recognizable and relatively constant shape in successive utterances. These distinctive features occur in lumps or bundles, each one of which we call a phoneme. The speaker has been trained to make sound-producing movements in such a way that the phoneme-features will be present in the sound-waves, and he has been trained to respond only to these features and to ignore the rest of the gross acoustic mass that reaches his ears.

It would be useless to try to produce the distinctive features in a pure state, free from non-distinctive accompaniments. For ex-
ample, an English word, as such, has no distinctive pitch-scheme — the features of pitch which appear in any utterance of it are non-distinctive — but of course we cannot speak a word like *man* without any features of pitch: in any one utterance of it there will be some pitch-scheme — even, rising, falling, high, middle, low, and so on. The phonemes of a language are not sounds, but merely features of sound which the speakers have been trained to produce and recognize in the current of actual speech-sound — just as motorists are trained to stop before a red signal, be it an electric signal-light, a lamp, a flag, or what not, although there is no disembodied redness apart from these actual signals.

In fact, when we observe closely, especially in a language foreign to us, we often notice the wide range of non-distinctive features and the relatively slight consistency of the distinctive features. The Menomini Indian, in a word like that for 'water,' which I shall here render as *nipew*, seems to us to be speaking the middle consonant sometimes as a *p* and sometimes as a *b*. For his language, the phonemic (that is, essential) feature is merely a closure of the lips without escape of breath through the nose. Everything else, including the features by which English distinguishes between *p* and *b*, is non-distinctive. On the other hand, a slight puff of breath before the consonant, or else a slight catch in the throat — either of which will probably escape the ear of an English hearer — would produce in the Menomini language two entirely different phonemes, each of which contrasts with the plain *p*-*b* phoneme.

In the same way, a Chinese observer who had not been forewarned, would probably have some trouble before he realized that English words have the same meaning (are "the same") regardless of their pitch-scheme.

In part, the non-distinctive features receive a fairly conventional treatment. When a foreign speaker reproduces the phonemic values of our language so as to make himself understood, but does not distribute the non-distinctive features in accordance with our habit, we say that he speaks our language well enough, but with a foreign "accent." In English, for instance, we produce the initial phonemes of words like *pin, tin, kick* with a slight puff of breath (aspiration) after the opening of the closure, but when an *s* precedes, as in *spin, stick, skin*, we usually leave off this puff of breath. As this difference is not distinctive, a foreign speaker who fails to reproduce it, is still intelligible, but his speech will seem queer to
us. Frenchmen are likely to fail in this matter, because in French the phonemes which resemble our $p, t, k$ are spoken always without aspiration. On the other hand, an Englishman or American who speaks French well enough to be understood, is likely still to displease his hearers by using the aspiration after $p, t, k$.

Non-distinctive features occur in all manner of distributions. In most types of American English, the $t$-phoneme in words like *water* or *butter* is often reduced to an instantaneous touch of the tongue-tip against the ridge behind the upper gums: in our habit, the sound so produced suffices to represent the phoneme. In England this variant is unknown, and is likely to be interpreted as a variant of the phoneme $d$, — so that the American may find that he is not understood when he asks for *water*.

In the ordinary case, there is a limit to the variability of the non-distinctive features: the phoneme is kept distinct from all other phonemes of its language. Thus, we speak the vowel of a word like *pen* in a great many ways, but not in any way that belongs to the vowel of *pin*, and not in any way that belongs to the vowel of *pan*: the three types are kept rigidly apart.

5. 6. The fact that distinctions which are phonemic in one language or dialect are indifferent in others, and the fact that the borders between different phonemes differ in different languages and dialects, appears most clearly when we hear or try to speak a foreign language or dialect. We have just seen an instance of how American English may be misunderstood in England. The vowel of words like *fob*, *bomb*, *hot* is in American English much closer than in British English to the vowel of words like *far*, *balm*, *pa*; in some kinds of American English the two sets of words have in fact the same vowel. The Englishman of the south, moreover, has lost the $r$-sound in words like *far*. A London cabman did not understand me when I asked to be driven to the *Comedy Theatre*: I had forgotten myself and spoken the American form of the first vowel in *comedy*, and this the Englishman could take only as a representative of the vowel phoneme in a word like *car* — so that I was really asking for a *Carmody Theatre*, which does not exist.

When we try to speak a foreign language or dialect, we are likely to replace its phonemes by the most similar phonemes of our own language or dialect. Sometimes our native phoneme and the foreign one overlap, so that part of the time our reproduction is correct, but part of the time it falls outside the range of the foreign sound.
Thus, an American who pronounces the French word *même* (‘same’) with the vowel of the English word *ma’m*, will only part of the time produce a sound which meets the conventional requirements of the French phoneme; most of the time he will be producing a sound which differs decidedly from the vowel which the Frenchman is accustomed to hear.

What saves the situation in such cases is the native’s complementary inaccuracy. When we hear foreign speech-sounds we respond to them as if they contained the characteristics of some acoustically similar phoneme of our native language. The discrepancy disturbs us, and we say that the foreigner speaks indistinctly or with a strange “accent,” but we do not know where the difference lies. In our example, accordingly, the Frenchman will mostly understand the American’s pronunciation of *mème*, even when it contains a vowel sound that would never occur in the Frenchman’s own pronunciation. However, if our rendition deviates too far from the foreign phoneme, and especially if it comes close to some other phoneme of the foreign language, we shall be misunderstood; thus, some varieties of the American’s *ma’m* which he uses for French *mème*, will be unintelligible because the Frenchman accepts them as renditions of a different phoneme which occurs, for instance, in words like *lame* (‘blade’).

The confusion is more serious when two or three of the foreign phonemes resemble some one native phoneme of ours. Our infantile language-learning trains us to ignore differences that are not phonemic in our language. The English-speaker will not hear any difference between the Menomini forms *a’ kāh* ‘yes, indeed,’ and *ahkāh* ‘kettle,’ and the first part of the word *akāhsemen* ‘plum.’ In the first of these forms, the phoneme which resembles our *k* is preceded by a slight catch in the throat (a glottal stop) which I have designated here by an apostrophe; in the second, the *k* is preceded by a puff of breath (aspiration), which I have designated by *h*; in the third form these features are absent. The English-speaker was trained in childhood not to respond to a catch in the throat or a slight huskiness before a consonant sound: if a fellow-speaker occasionally produces such a noise, we pay no attention to it.

The Menomini, for his part, cannot distinguish differences like that of our *t* and *d*. Words like *bad* and *bat* sound alike to him. This appears, for instance, in the fact that the Menomini have
translated the word *Swede* into their language as if it were *sweet*, by the term *sayēwenet* 'one who is sweet.' There is a Menomini phoneme which resembles both our *t* and *d*, and doubtless the Menomini speaker often utters variants of this phoneme which fall within the range of our *t*-phoneme, and occasionally variants which fall within the range of our *d*-phoneme, but his infantile training taught him to ignore these differences of sound.

When we try to speak a foreign language, we reproduce, in such cases, several foreign phonemes by one single phoneme of our own. The native speaker, in turn, responds to our phoneme as if it were one of his. Thus, the German hears no difference between the initial phoneme of *tin* and that of *thin*, since both of them resemble one of his native phonemes. When he speaks English, he uses this German phoneme. Hearing him, we respond to it as though it were our *t*-phoneme; we are right, at any rate, in concluding that he does not distinguish between *tin* and *thin*. In quite the same way, when the English-speaker hears German, he will respond to two different phonemes of that language as though they were identical with the English phoneme that is initial in words like *cat*, and he will fail, in consequence, to distinguish between some words that are quite different in the habits of the German.

In other cases, the one phoneme which we substitute for several phonemes of the foreign language, is acoustically intermediate, and to the native speaker we seem to be interchanging the sounds. For instance, many Germans (such as Alsatians) have only one phoneme, of intermediate acoustic quality, in the sphere of our *p* and *b*, and in speaking our language they use this for both of our phonemes. When they do this in a word like *pie*, we are struck by the deviation in the direction of *b* and respond as though to the word *buy*; on the other hand, when they use their intermediate phoneme in a word like *buy*, we are struck by the deviation in the direction of *p*, and respond as though we had heard *pie*. Hence it seems to us (or to a Frenchman) that the German can pronounce both *p* and *b*, but perversely keeps interchanging the two.

The greatest difficulty arises where a language makes significant use of features that play no such part in our language. An English-speaker who hears Chinese (or any of quite a few other languages), will fail to understand or to speak intelligibly, until he discovers and trains himself to hear and to reproduce the dis-
tinctions of relative pitch which are significant in every syllable. He does not respond to them at first, because as an infant he was trained not to notice the different pitch-schemes which occur in successive utterances of a word like *man*; the Chinese infant, on the other hand, was trained to respond to several types of such pitch-schemes.

When the foreign language has only one phoneme in a general acoustic type where our language has more than one, it often seems to us as if the foreigner were using very different sounds without a reasonable distinction. Thus, the Menomini's or the Alsatian's one *p*-*b* phoneme will strike our ears now as *p* and now as *b*.

Some persons have an aptitude for hearing and reproducing foreign speech-sounds; we say that such persons are good imitators or have a "good ear." Most other people, if they hear enough of a foreign language, or if they are carefully instructed, will in time learn to understand and make themselves understood. Practical phoneticians sometimes acquire great virtuosity in discriminating and reproducing all manner of strange sounds. In this, to be sure, there lies some danger for linguistic work. Having learned to discriminate many kinds of sounds, the phonetician may turn to some language, new or familiar, and insist upon recording all the distinctions he has learned to discriminate, even when in this language they are non-distinctive and have no bearing whatever. Thus, having learned, say in the study of Chinese, to hear the difference between an aspirated *p*, *t*, *k*, (as we usually have it in words like *pin*, *tin*, *kick*) and a similar sound without aspiration (as a Frenchman forms it, and as we usually have it in words like *spin*, *stick*, *skin*), the phonetician may clutter up his record of English by marking the aspiration wherever he hears it, while in reality its presence or absence has nothing to do with the meaning of what is said. The chief objection to this procedure is its inconsistency. The phonetician's equipment is personal and accidental; he hears those acoustic features which are discriminated in the languages he has observed. Even his most "exact" record is bound to ignore innumerable non-distinctive features of sound; the ones that appear in it are selected by accidental and personal factors. There is no objection to a linguist's describing all the acoustic features that he can hear, provided he does not confuse these with the phonemic features. He should remember that his
hearing of non-distinctive features depends upon the accident of his personal equipment, and that his most elaborate account cannot remotely approach the value of a mechanical record.

Only two kinds of linguistic records are scientifically relevant. One is a mechanical record of the gross acoustic features, such as is produced in the phonetics laboratory. The other is a record in terms of phonemes, ignoring all features that are not distinctive in the language. Until our knowledge of acoustics has progressed far beyond its present state, only the latter kind of record can be used for any study that takes into consideration the meaning of what is spoken.

In fact, the laboratory phonetician usually knows, from other sources, the phonemic character of the speech-sounds he is studying; he usually formulates his problems not in purely acoustic terms, but rather in terms which he has borrowed from practical phonetics.

5. 7. In order to make a record of our observations, we need a system of written symbols which provides one sign for each phoneme of the language we are recording. Such a set of symbols is a phonetic alphabet, and a record of speech in the shape of these symbols is a phonetic transcription (or, simply, a transcription).

The principle of a symbol for each phoneme is approached by our traditional alphabetic writing, but our traditional writing does not carry it out sufficiently for the purposes of linguistic study. We write sun and son differently, although the phonemes are the same, but lead (noun) and lead (verb) alike, though the phonemes are different. The words oh, owe, so, sew, sow, hoe, beau, though all end with the same phoneme, variously represented in writing; the words though, bough, through, cough, tough, hiccough end with different phonemes but are all written with the letters -ough. Our letter x is superfluous because it represents the same phonemes as ks (as in tax) or gz (as in examine); our letter c is superfluous because it represents the same phoneme as k (in cat) or as s (in cent). Although we have the letter j for the initial phoneme in jam, we also use the letter g (as in gem) for this same phoneme. Standard English, as spoken in Chicago, has thirty-two simple primary phonemes: the twenty-six letters of our alphabet are too few for a phonetic record. For some phonemes we use combinations of two letters (digraphs), as th for the initial phoneme in thin, ch for that in chin, sh for that in shin, and ng for the final
phoneme in sing. This leads to further inconsistencies: in then we use th for a different phoneme, and in hothouse for the two phonemes which are normally represented by the separate letters t and h; in Thomas the th has the value of the phoneme ordinarily represented by t. In singer we use ng for a single phoneme, as in sing, but in finger the letters ng represent this phoneme plus the phoneme ordinarily represented by the letter g, as in go. Traditional alphabetic writing is accurate only in the case of a few languages, such as Spanish, Bohemian, Polish, and Finnish, where it has been shaped or revised by persons who had worked out the phonemic system of their language.

5. 3. On account of the imperfections of traditional writing and the lack of a sufficient number of characters in our (so-called "Latin") alphabet, scholars have devised many phonetic alphabets.

Some of these schemes depart entirely from our traditional habits of writing. Bell's "Visible Speech" is the best-known of these, chiefly because Henry Sweet (1845–1912) used it. The symbols of this alphabet are simplified and conventionalized diagrams of the vocal organs in position for the utterance of the various phonemes. Visible Speech is hard to write and very costly to print.

Another system which departs from the historical tradition is Jespersen's "Analphabetic Notation." Here every phoneme is represented by a whole set of symbols which consist of Greek letters and Arabic numerals, with Latin letters as exponents. Each Greek letter indicates an organ and each numeral a degree of opening; thus, α indicates the lips and 0 indicates closure, so that α0 will appear in the formula for any phoneme during whose utterance the lips are closed, such as our p, b, and m phonemes. The formula for the English m phoneme, as in man, is α0 δ2 ε1, where δ2 means that the back of the palate is lowered, and ε1 means that the vocal chords are in vibration. The advantages of this notation are evident, but of course it is not intended for the recording of whole utterances.

Most phonetic alphabets are modifications of the traditional alphabet. They supplement the ordinary letters by such devices as small capitals, letters of the Greek alphabet, distorted forms of conventional letters, and letters with little marks, diacritical signs, attached to them (e.g. ā and ā). There are many alphabets of this
type, such as that of Lepsius, used for African languages; of Lundell, used for Swedish dialects; of Bremer, used for German dialects; of the American Anthropological Association, used for American Indian languages. In this book we shall use the alphabet of the International Phonetic Association; this alphabet was developed by Ellis, Sweet, Passy, and Daniel Jones. A crude form of phonetic alphabet appears in the "keys to pronunciation" of most dictionaries. Similar devices have grown up in the traditional writing of some languages, devices such as the two dots over vowel letters in German writing (ä, ö, ü) or the diacritical marks in Bohemian writing (č for our ch, š for our sh); the Russian and Serbian alphabets supplement the Greek alphabet with a number of extra letters.

In principle, one phonetic alphabet is about as good as another, since all we need is a few dozen symbols, enough to supply one for each phoneme of whatever language we are recording. In their application, however, all phonetic alphabets suffer from serious drawbacks. When they were invented, the principle of the phoneme had not been clearly recognized. The inventors meant their alphabets to be rich and flexible enough to offer a symbol for every acoustic variety that could be heard in any language. It is evident, today, that a record of this kind would amount to nothing less than a mechanical recording of the sound-waves, which would be the same for no two utterances. In practice, the phonemic principle somehow slipped in: usually one wrote a symbol for each phoneme, but these symbols were highly differentiated and cluttered up with diacritical marks, for the purpose of indicating "exact" acoustic values. The varieties that were in this way distinguished, were merely those which phoneticians happened to have noticed. Henry Sweet devised a relatively simple system, based on the Latin alphabet, which he called Romic, for use alongside of Visible Speech. When the phonemic principle became clear to him, he realized that his Romic notation would still be sufficient if one greatly simplified it. Accordingly he used a simplified form, with a symbol for each phoneme, and called it Broad Romic; he still believed, however, that the more complex form, Narrow Romic, was somehow "more accurate" and better suited to scientific purposes.

Out of Sweet's Romic there has grown the alphabet of the International Phonetic Association, which consists, accordingly, of
the Latin symbols, supplemented by a number of artificial letters, and a few diacritical marks. In a modified form, we shall use it in this book, placing between square brackets, as is customary, everything that is printed in phonetic symbols.

5.9. The principle on which the International Alphabet is based, is to employ ordinary letters in values approximating the values they have in some of the chief European languages, and to supplement these letters by artificial signs or by the use of diacritical marks whenever the number of phonemes of a type exceeds the number of ordinary letters. Thus, if a language has one phoneme of the general type of our t-sound, we symbolize this phoneme by the ordinary letter [t], regardless of whether this phoneme is acoustically quite like the English or the French t-sound, but if the language has two phonemes of this general type, we can symbolize only one of them by [t], and for the second one we must resort to the use of a capital [T], or an italic [t], or some other similar device. If a language has two phonemes of the general type of our e-sound as in pen, we use the letter [e] for one of them, and the supplementary symbol [e] for the other, as in pan [pen].

These principles, which the International Phonetic Association formulated as early as 1912, have been neglected even by its members; most students have failed to break away from the tradition of the time when the phonemic principle had not yet been recognized. Thus, we find most writers using queer symbols for English phonemes because it has been recognized that English phonemes differ from the most similar types of French phonemes. For instance, having pre-empted the symbol [o] for the phoneme of French *eau* [o] (‘water’), these authors do not use this letter for recording the English vowel in son, because this English phoneme is unlike the French phoneme. In the present edition of this book, where the examples are given in British pronunciation, I follow the customary transcription, e.g. top [top].

Where several languages or dialects are under discussion, each one must be recorded in terms of its own phonemes; the differences, so far as we are able to state them, may deserve a verbal description, but must not be allowed to interfere with our symbols. Thus, even a phonetician who thinks he can describe in accurate terms the differences between the phonemes of standard English as spoken in Chicago and as spoken in London, will add nothing to the value of his statements by using queer symbols for one or the
other of these two sets of phonemes, and he will only make things still harder if he uses outlandish symbols for both of them, because he happens to know that the ordinary letters have been used for recording the somewhat different phonemes of some other language.

The principle of a single symbol for a single phoneme may be modified without harm only where no ambiguity can result. It may be advisable, where no ambiguity can result, to depart from the strict principle when this saves the use of extra symbols that might be disturbing to the reader or costly to print. In some languages, sounds like our [p, t, k] with a slight puff of breath after them, are distinct from sounds like the French [p, t, k] without this aspiration; if the language has no phoneme designated by [h], or if it has such a phoneme but this phoneme never occurs after [p, t, k], then it is safe and economical to use the compound symbols [ph, th, kh] for the former type.

5.10. The matter of recording languages is complicated not only by the existence of several phonetic alphabets and by inconsistencies in their application, but also by the frequent use of two other devices alongside phonetic transcription.

One of these devices is the citation of forms in their traditional orthography. This is often done where the language in question uses the Latin alphabet. The author either supposes that his reader knows the pronunciation, or else, in the case of ancient languages, he may not care to guess at the pronunciation. Citation is often helpful to readers who are familiar with the ordinary orthography; it is only fair, however, to add a transcription, e.g. French *eau* [o] ‘water.’ Even in the case of ancient languages it is often useful to add a guess at the pronunciation, e.g. Old English *geoc* [jok] ‘yoke.’ Only in the case of languages like Bohemian or Finnish, whose traditional orthography is entirely phonetic, can one dispense with a transcription. In the case of Latin, a citation with a macron over long vowels is sufficient (e.g. *amāre* ‘to love’), since, so far as we know, Latin orthography was phonetic except that it failed to indicate the distinction between long and short vowels.

For languages which use alphabets other than the Latin, citation is less often employed. It is customary in the case of Greek, less often of Russian, but is in every way to be deplored. Some luxurious publications indulge even in Hebrew, Arabic, and Sanskrit type for citing these languages. The only reasonable exceptions here are
forms of writing like the Chinese and the ancient Egyptian, whose symbols, as we shall see, have meaning-values that cannot be represented in phonetic terms.

For languages which use writing of some form other than the Latin alphabet, transliteration is often employed instead of transcription. Transliteration consists in assigning some letter of the Latin alphabet (or some group of letters or some artificial symbol) to each character of the original alphabet, and thus reproducing the traditional orthography in terms of Latin letters. Unfortunately, different traditions have grown up for transliterating different languages. Thus, in transliterating Sanskrit, the Latin letter *c* is used to represent a Sanskrit letter which seems to have designated a phoneme much like our initial phoneme in words like *chin*, but in transliterating the Slavic alphabet, the letter *c* is used to represent a letter which designates a phoneme resembling our *ts* combination in *hats*. For most linguistic purposes it would be better to use a phonetic transcription.

5.11. It is not difficult (even aside from the help that is afforded by our alphabetic writing) to make up a list of the phonemes of one's language. One need only proceed with a moderate number of words as we did above with the word *pin*, to find that one has identified every phoneme. The number of simple primary phonemes in different languages runs from about fifteen to about fifty. Standard English, as spoken in Chicago, has thirty-two. Compound phonemes are combinations of simple phonemes which act as units so far as meaning and word-structure are concerned. Thus, the diphthong in a word like *buy* can be viewed as a combination of the vowel in *far* with the phoneme that is initial in *yes*. Standard English has twelve such combinations.

It is somewhat harder to identify the secondary phonemes. These are not part of any simple meaningful speech-form taken by itself, but appear only when two or more are combined into a larger form, or else when speech-forms are used in certain ways — especially as sentences. Thus, in English, when we combine several simple elements of speech into a word of two or more syllables, we always use a secondary phoneme of stress which consists in speaking one of these syllables louder than the other or others: in the word *foretell* we speak the *tell* louder than the *fore*, but in *foresight* the *fore* is louder than the *sight*. The noun *contest* has the stress on the first syllable, the verb *contest* on the second. Fea-
tures of pitch appear in English as secondary phonemes chiefly at the end of sentences, as in the contrast between a question (at four o'clock?) and an answer (at four o'clock). It is worth noticing that Chinese, as well as many other languages, uses features of pitch as primary phonemes. The secondary phonemes are harder to observe than the primary phonemes, because they occur only in combinations or in particular uses of simple forms (e.g. John? in contrast with John).

The principles we have outlined would probably enable anyone familiar with the use of writing to work out a system of transcribing his language. In this book the English examples will be transcribed, unless otherwise indicated, according to the pronunciation of educated speakers in the south of England. This requires thirty-two symbols for primary phonemes and eight for secondary phonemes; however, following the customary scheme of transcription, we shall use several additional symbols.

### Primary phonemes

| [ aː ] | half | [ həːf ] |  | [ g ] | give | [ gɪv ] |  | [ p ] | pick | [ pik ] |
| [ ʌ ] | up | [ ʌp ] |  | [ h ] | hut | [ hʌt ] |  | [ r ] | red | [ rɛd ] |
| [ b ] | big | [ bɪg ] |  | [ i ] | inn | [ ɪn ] |  | [ s ] | set | [ sɛt ] |
| [ d ] | dig | [ dɪg ] |  | [ j ] | yes | [ jes ] |  | [ ʃ ] | shop | [ ʃɒp ] |
| [ c ɪ ] | jam | [ dʒæm ] |  | [ k ] | out | [ kət ] |  | [ t ] | tip | [ tɪp ] |
| [ ð ] | then | [ ðen ] |  | [ l ] | lamb | [ læm ] |  | [ ʧ ] | chin | [ tʃɪn ] |
| [ e ] | egg | [ eg ] |  | [ m ] | met | [ mɛt ] |  | [ θ ] | thin | [ θɪn ] |
| [ ɛ ] | add | [ æd ] |  | [ n ] | net | [ net ] |  | [ u ] | put | [ pʊt ] |
| [ ə ] | better | [ 'bɛtə ] |  | [ η ] | sing | [ sɪŋ ] |  | [ v ] | van | [ væn ] |
| [ oː ] | bird | [ bəːd ] |  | [ ɔ ] | odd | [ ɔd ] |  | [ w ] | wet | [ wɛt ] |
| [ f ] | fat | [ fæt ] |  | [ ɔː ] | ought | [ ɔːt ] |  | [ z ] | zip | [ zɪp ] |

### Compound primary phonemes

| [ ɪæ ] | buy | [ baɪ ] |  | [ əu ] | cow | [ kɔw ] |  | [ ɛə ] | care | [ kɛə ] |
| [ ɛj ] | bay | [ bej ] |  | [ əʊ ] | low | [ ləʊ ] |  | [ iə ] | fear | [ fiə ] |
| [ ɪj ] | bee | [ bɪj ] |  | [ əʊ ] | do | [ dəʊ ] |  | [ ɔə ] | door | [ doə ] |
| [ əj ] | boy | [ bɔj ] |  | [ juː ] | few | [ fjuː ] |  | [ uə ] | sure | [ juə ] |

### Secondary phonemes

[ ˈtʃɪt æ ˈtʃɪtʃɪn ɪ ].
[',] placed before primary symbols, ordinary stress: examine [ɪɡˈzɛmɪn], I've seen it [əj v ɪˈsɪn it].

[1], placed before primary symbols, less loud stress: milkman [ˈmɪlkmen], Keep it up [kɪjp ɪt ʌp].

[1], placed under one of the primary symbols [l, n], a slight stress which makes this primary phoneme louder than what precedes and what follows: brittler [ˈbritələ], buttoning [ˈbʌtnɪŋ].

[.], placed after primary symbols, the falling pitch at the end of a statement: I've seen it [əj v ɪˈsɪn it].

[?], placed after primary symbols, the rising pitch at the end of a yes-or-no question: Have you seen it? [hæv ju ɪˈsɪn it?].

[!], placed after primary symbols, the distortion of the pitch-scheme in exclamations: It's on fire! [ɪt s ɒn ɪˈfajə], Seven o'clock?! [ˈsevn əˈklɒk?!].

[,], placed between primary symbols, the pause, often preceded by rising pitch, that promises continuation of the sentence: John, the older boy, is away at school [dʒɔn, ðiˈəʊldərˈbɔɪ, ɪz əˈwej ət ˈskuːl].
CHAPTER 6

TYPES OF PHONEMES

6.1. While the general principles which we surveyed in the last chapter will enable an observer to analyze the phonetic structure of his own speech, they yield very little help, at the start, for the understanding of a strange language. The observer who hears a strange language, notices those of the gross acoustic features which represent phonemes in his own language or in other languages he has studied, but he has no way of knowing whether these features are significant in the language he is observing. Moreover, he fails to notice acoustic features which are not significant in his own language and in the other languages he has studied, but are significant in the new language. His first attempts at recording contain irrelevant distinctions, but fail to show essential ones. Even a mechanical record will not help at this stage, since it would register the gross acoustic features, but would not tell which ones were significant. Only by finding out which utterances are alike in meaning, and which ones are different, can the observer learn to recognize the phonemic distinctions. So long as the analysis of meaning remains outside the powers of science, the analysis and recording of languages will remain an art or a practical skill.

Experience shows that one acquires this skill more easily if one is forewarned as to the kinds of speech-sounds that are distinctive in various languages — although it is true that any new language may show some entirely unforeseen distinction. This information is most easily acquired if it is put into the form of a rough description of the actions of the vocal organs. This rough description is what we mean by the term practical phonetics. After the observer has found out which of the gross acoustic features are significant in a language, his description of the significant features can be illustrated by a mechanical record.

6.2. We have no special organs for speech; speech-sounds are produced by the organs that are used in breathing and eating. Most speech-sounds are produced by interference with the outgoing breath. Exceptions to this are suction-sounds or clicks. As
a non-linguistic sign of surprised commiseration (and also as a signal to urge horses), we sometimes make a click — the novelist represents it by *tut, tut!* — with the tongue against the ridge just back of the upper teeth. As speech-sounds, various clicks, formed in different parts of the mouth, are used in some African languages.

6. 3. The first interference which the outgoing breath may meet, is in the larynx. The larynx is a box of cartilage at the head of the wind-pipe, visible from the outside as the adam’s-apple. Within the larynx, at the right and left, are two shelf-like muscular protuberances, the vocal chords. The opening between them, through which the breath passes, is called the glottis. In ordinary breathing the vocal chords are relaxed and the breath passes freely through the glottis. At the rear of the larynx, the vocal chords are attached to two movable cartilaginous hinges, the arytenoids. Thanks to delicate muscular adjustments, both the vocal chords and the arytenoids can be set into a number of positions. The extreme positions are the wide-open position of ordinary breathing and the firmly closed position which occurs when one holds one’s breath with the mouth wide open. Various languages make use of various intermediate positions of the glottis.

One of these positions is the position for voicing. In voicing, the vocal chords are drawn rather tightly together, so that the breath can get through only from instant to instant. In getting through, the breath-stream sets the vocal chords into vibration; the frequency ranges from around eighty to around one-thousand vibrations per second. These vibrations, communicated to the outer air, strike our ears as a musical sound, which we call the voice. The voice does not play a part in all speech-sounds: we distinguish between voiced and unvoiced (or breathed) speech-sounds. If one places a finger on the adam’s-apple, or, better, if one presses one’s palms tightly over one’s ears, and then utters a voiced sound, such as [v] or [z], the voice will be felt as a trembling or vibration, while unvoiced sounds, such as [f] or [s] will lack this buzzing accompaniment. It seems that in every language at least a few phonemes have lack of voicing among their fixed characteristics. During the production of most unvoiced sounds the glottis is wide open, as in ordinary breathing.

Various adjustments enable us to alter the loudness and the pitch of the voice-sound as well as its quality of resonance. These last variations, such as the “head register,” “chest register,”
“muffled sound,” “metallic sound,” and the like, have not been physiologically analyzed.

Among the positions intermediate between breathing and voicing, several deserve mention. If the vocal chords are so far separated that the voice no longer sounds pure, but is accompanied by the friction-sound of the breath passing through the glottis, we get a murmur. In English, the unstressed vowels are often spoken with murmur instead of voice. As a phoneme, the murmur occurs in Bohemian, where it may be transcribed by the symbol [h], which is used in the conventional orthography of this language. If the glottis is still farther opened, the voice ceases and only a friction-sound remains; this friction-sound characterizes our phoneme [h], as in hand [hænd]. Another intermediate position is the whisper, in which only the cartilage-glottis — that is, the space between the arytenoids — is open, but the vocal chords are in contact. In what we ordinarily call “whispering,” the whisper is substituted for the voice and the unvoiced sounds are produced as in ordinary speech.

The sound-waves produced by the vibration of the vocal chords in voicing, are modified by the shape and by the elasticity of the channel through which they pass before they reach the outer air. If we compare the vocal chords to the reeds of a wind-instrument, we may view the mouth, or rather, the whole cavity from the vocal chords to the lips, including, in some cases the nasal cavity, as a resonance-chamber. By setting the mouth into various positions, by cutting off the exit either through the mouth or through the nose, and by tightening or loosening the muscles of this region, we vary the configuration of the outgoing sound-waves.

In contrast with musical sound, noises, which consist of irregular combinations of sound-waves, can be produced by means of the glottis, the tongue, and the lips. Some voiced sounds, such as [a, m, ɐ], are purely musical, that is, relatively free from noise, while others, such as [v, z], consist of a noise plus the musical sound of voicing. Unvoiced sounds consist merely of noises; examples are [p, f, s].

6.4. When the breath leaves the larynx, it passes, in normal breathing, through the nose. During most speech, however, we cut off this exit by raising the velum. The velum is the soft, movable back part of the palate; at the rear it ends in the uvula, the little lobe that can be seen hanging down in the center of the mouth.
If one stands before a mirror, breathing quietly through nose and mouth, and then speaks a clear [a], one can see the raising of the velum, especially if one watches the uvula. When the velum is raised, its edge lies against the rear wall of the breath-passage, cutting off the exit of the breath through the nose. Most sounds of speech are purely oral; the velum is completely raised and no breath escapes through the nose. If the velum is not completely raised, some of the breath escapes through the nose and the speech-sounds have a peculiar resonance; such sounds are called nasalized sounds. In English the difference between purely oral and nasalized sounds is not distinctive; we often nasalize our vowels before and after the phonemes [m, n, ñ], and we nasalize more than usual when we are tired or relaxed. In some languages, however, nasalized sounds, most commonly vowels, are separate phonemes, distinct from similar sounds without nasalization. The usual symbols for nasalization are a small hook under a letter (this is used in the traditional orthography of Polish), or a tilde over a letter (Portuguese orthography and International Phonetic Association). French has four nasalized vowels as phonemes, distinct from the corresponding purely oral vowels: bas [ba] ‘stocking,’ but banc [bâ] ‘bench’; mot [mo] ‘word,’ but mont [mô] ‘mountain.’

If the velum is not raised and the exit of the breath through the mouth is in any way cut off, then, as in ordinary breathing, all the breath escapes through the nose. Phonemes where this is the case are nasal. In English we have three nasals: [m], in which the lips are closed; [n], in which the tongue is pressed against the gums; and [ñ], as in sing [sin], in which the back of the tongue is pressed against the palate. These are purely musical sounds, characterized by the resonances which the different shapes of the oral-nasal cavity give to the musical sound of the voice. Some languages, however, have unvoiced nasals as phonemes; these are audible not so much by the very slight friction-noise of the breath-stream, as by the contrast with preceding or following sounds and by the intervening non-distinctive glide-sounds that are produced while the vocal organs change their position.

A good test of nasalization is to hold a card horizontally with one edge pressed against the upper lip and the opposite edge against a cold pane of glass; if one now produces a purely oral sound, such as [a:] the pane will be misty only under the card; if one produces
a nasalized sound, such as [ə], the moisture will appear both above and below the card; and if one produces a purely nasal sound, such as [m], the moisture on the pane appears only above the card.

6.5. We change the shape of the oral cavity by placing the lower jaw, the tongue, and the lips into various positions, and we affect the resonance also by tightening or loosening the muscles of the throat and mouth. By these means every language produces, as phonemes, a number of musical sounds, such as our [a:] in palm [pæm], our [i] in pin [pin], our [u] in put [put], our [r] in rubber ['rʌbə], and so on. In some of these the tongue actually touches the roof of the mouth, but leaves enough room at one or both sides for the breath to escape without serious friction-noise; such sounds are laterals, of the type of our [l], as in little ['lɪt]. In unvoiced laterals, which occur in Welsh and in many American languages, the friction-noise of the breath-stream is more audible than in unvoiced nasals.

We make noises in the mouth by movements of the tongue and lips. If we place these organs (or the glottis) so as to leave a very narrow passage, the outgoing breath produces a friction-noise: phonemes characterized by this noise are spirants (fricatives). They may be unvoiced, as are our [f] and [s], or voiced, like our [v] and [z]. Since the amount of friction can be varied to any degree, there is no real boundary between spirants and musical sounds such as [l] or [l]; especially the voiced varieties occur in different languages with many degrees of closure.

If we place the tongue or the lips (or the glottis) so as to leave no exit, and allow the breath to accumulate behind the closure, and then suddenly open the closure, the breath will come out with a slight pop or explosion; sounds formed in this way are stops (plosives, explosives), like our unvoiced [p, t, k] and our voiced [b, d, g]. The characteristic feature of a stop is usually the explosion, but the making of the closure (the implosion) or even the brief period of time during closure, may suffice to characterize the phoneme; thus, in English we sometimes leave off the explosion of a final [p, t, k]. These varieties are audible by contrast with what precedes or follows (as a sudden stoppage of sound or as a moment of silence), or else through the transitional sounds during the movement of tongue or lips; also, during the closure of a voiced stop one can hear the muffled sound of the voice.

Since lips, tongue, and uvula are elastic, they can be placed so
that the breath sets them into vibration, with alternate moments of contact and opening. Such trills occur in many languages; an example is the British English “rolled r,” as in red or horrid.

We shall take up the chief types of phonemes in the following order:

noise-sounds:
- stops,
- trills,
- spirants;

musical sounds:
- nasals,
- laterals,
- vowels.

6.6. Stops occur as phonemes in perhaps every language. English distinguishes three types as to position: labial (more exactly, bilabial), in which the two lips form the closure [p, b]; dental (more exactly, alveolar, or better gingival), in which the tip of the tongue makes closure against the ridge just back of the upper gums [t, d]; and velar (in older writings mis-called guttural), in which the back of the tongue is pressed against the velum [k, g].

These last two types occur in many varieties, thanks to the mobility of the tongue. Contact can be made by the tip of the tongue (apical articulation) or by a larger area, the blade, round the tip (coronal articulation); it can be made against the edges of the upper teeth (interdental position), against the backs of the upper teeth (postdental position), against the ridge back of the upper teeth (gingival position), or against points still higher up on the palate (cerebral or cacuminal or, better, inverted or domal position). Thus, apical articulation in the domal position (the tip of the tongue touching almost the highest point in the roof of the mouth) occurs as a non-distinctive variant alongside the gingival [t, d] in American English. In French the nearest sounds to our [t, d] are pronounced not gingivally but as postdentals (the tip or blade touching the back of the teeth). In Sanskrit and in many modern languages of India, postdentals [t, d] and domals (usually transcribed by a letter with a dot under it, or by italics, or, as in this book, by small capitals [t, d]) are distinct phonemes.

Similarly, different parts of the back of the tongue (dorsal
Types of Phonemes

articulation) may be raised so as to touch different parts of the palate; one distinguishes, usually, between anterior or palatal position and posterior or velar position, and, still farther back, uvular position. In English the velars [k, g] are closed farther forward before some sounds, as in *kin,* *give,* and farther backward before others, as in *cook,* *good* — both types in contrast with, say, *calm,* *guard* — but these variants are not distinctive. In some languages, such as Hungarian, there are separate phonemes of the palatal and velar types, which we distinguish in transcription by such devices as [c] for the palatal and [k] for the velar unvoiced stop. In Arabic a velar unvoiced stop [k] and a uvular unvoiced stop [q] are distinct phonemes.

A glottal or laryngeal stop is produced by bringing the vocal chords tightly together and then letting them spring apart under the pressure of the breath. We sometimes produce this sound before an initial stressed vowel when speaking under a strain, and in German this is the normal usage; as a phoneme, the glottal stop occurs in many languages, as, for instance, in Danish, where there is a distinctive difference, for example, between *hun* [hun] 'she' and *hund* [hun] 'dog.'

As to the manner of forming the closure, aside from the difference of unvoiced and voiced, the amount of breath-pressure and the vigor of action in the lips or tongue may be variously graded: pressure and action are gentle in lenes, vigorous in fortes; in solution-lenes the opening-up is relatively slow, so as to weaken the explosion. The unvoiced stops may be followed by a puff of unvoiced breath (aspiration) or preceded by one (pre-aspiration); the voiced stops, similarly, may be preceded or followed by unvoiced breath or by a murmur. The closure may be made simultaneously in two positions, as in the [gb] stops of some African languages; many languages have glottalized oral stops, with a glottal stop occurring simultaneously, or just before, or just after the opening of the [p, t, k]. In English the unvoiced stops are aspirated fortes, but other types occur as non-distinctive variants, notably the unaspirated lenis type after [s], as in *spin,* *stone,* *skin.* Our voiced stops are lenes; at the beginning or at the end of a word they are not voiced through their whole duration. In French the unvoiced stops [p, t, k] are fortes and, as a non-distinctive variant, may be accompanied by a simultaneous glottal stop, but are never aspirated; the voiced [b, d, g] are lenes, more fully voiced than in
English. In North Chinese, aspirated and unaspirated unvoiced stops are different phonemes, e.g. [pha] versus [pa], and voiced stops occur only as non-distinctive variants of the latter. Many South-German dialects distinguish unvoiced unaspirated fortes and lenes, which we may transcribe by [p, t, k] and [b, d, g]; voiced variants are not distinctive. Sanskrit had four such types of stops: unvoiced unaspirated [p], aspirated [ph], and voiced unaspirated [b], aspirated [bh].

6. 7. The commonest trill is the apical or tongue-tip trill, in which the tongue-tip vibrates in a few rapid strokes against the gums; this is the “rolled” r of British English, Italian, Russian, and many other languages. Bohemian distinguishes two phonemes of this type, the one accompanied by a strong friction sound. The uvular trill, in which the uvula vibrates against the uplifted back of the tongue, occurs in Danish, in the commoner pronunciation of French, German, and Dutch, and in varieties of English (the “Northumbrian burr”); in these languages, as well as in Norwegian and Swedish, the uvular and the tongue-tip trill are geographic variants of the same phoneme. The phonetic symbol for a trill is [r]; if a language has more than one trill phoneme, [ɾ] is a handy character.

If the tongue-tip is allowed to make only a single swing, with one rapid contact against the gums or palate, we have a tongue-flip. In the Central-Western type of American English, a voiced gingival tongue-flip occurs as a non-distinctive variant of [t] in forms like water, butter, at all; different types of tongue-flip occur in Norwegian and Swedish dialects.

6. 8. The positions in which spirants are formed in English differ from those of the stops. In one pair, the labiodentals [f, v], the breath-stream is forced to pass between the upper teeth and the lower lip. In the dentals [θ, ð], as in thin [θin], then [ðen], the blade of the tongue touches the upper teeth. Our gingival spirants [s, z] are hisses or sibilants: that is, the tongue is constricted, so as to bulge up at the sides and leave only a narrow channel along the center, through which the breath is forced sharply against the gums and teeth, giving a sonorous hiss or buzz. If we draw the tongue a little ways out of this position — in English we draw it back — the breath is directed less sharply against the gums and teeth, and seems to eddy round before finding an exit: in English these hushes or abnormal sibilants are separate phonemes
[J, 3], as in shin [ʃin], vision ['viʒn]. In each of these positions we have a pair, voiced and unvoiced. Many other varieties occur, such as bilabial spirants, in which the narrowing is made between the two lips (an unvoiced variety in Japanese, a voiced in Spanish). In French the hisses are formed postdentally; to our ears the Frenchman seems to have a slight lisp. German, which has no [3], protrudes the lips for [ʃ], so as to accentuate the eddying sound. Swedish has a [ʃ] with very wide opening, which sounds queer to English ears.

English has no dorsal spirants, but they occur in many languages, in a great variety of positions, including lateral types. German has an unvoiced palatal spirant, in which the middle of the tongue is raised against the highest part of the palate; as a non-distinctive variant of this, it uses a velar type, an unvoiced spirant in the position of our [k, g, й]. The customary transcription of German uses two symbols, [ç] for the palatal variety, as in ich [ic] ‘I’, and [x] for the velar variety, as in ach [ax] ‘oh,’ but only one symbol is needed, since the varieties depend upon the preceding phoneme. Voiced spirants [y] of the same position occur in some types of German pronunciation as variants of the stop [g]; in Dutch and in modern Greek they occur as separate phonemes. Uvular spirants occur in Danish as variants of the uvular trill, in other languages as distinct phonemes.

In English we have an unvoiced glottal spirant, [h] as in hit [hit], when [hwen], hew [hjuw], in which friction is produced by the passage of the breath through the slightly opened glottis; Bohemian has a similar sound in which the friction is accompanied by voice vibrations (murmur). A further pair of glottal spirants, unvoiced (“hoarse h”) and voiced (“ayin”), occurs in Arabic; their characteristic feature is said to be a tightening of the throat-muscles.

As to manner, spirants show perhaps less variety than stops. Among languages which distinguish two varieties of manner, French voices its [v, z, 3] more completely than does English. Some languages have glottalized spirants (preceded, accompanied, or followed by a glottal stop).

6.9. The positions of nasals are much like those of stops; in English [m, n, й] are spoken in the same three positions as the stops: [m] is bilabial, like [p, b], the [n] is gingival, like [t, d], and [й], as in sing [sin], sink [sink], singer [′sɪŋə], finger [′fɪŋə], is formed in the same way as are [k, g], the velar
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stops. On the same principle, French speaks its [n] in postdental position, like its [t, d]. On the other hand, French has no velar nasal, but has a palatal nasal, in which the closure is made by raising the middle of the tongue against the highest part of the palate, as in signe [sip] ‘sign.’ As in the stops, Sanskrit and modern Indian languages distinguish between a dental [n] and a palatal [N].

6. 10. In English the lateral [l] is apical, in gingival position; at the end of words we use a non-distinctive variety in which the middle of the tongue is excessively lowered; contrast less with well. In German and French the [l] is spoken with the surface of the tongue more raised; the acoustic impression is quite different; in French, moreover, the contact is postdental. Italian has a palatal lateral, distinct from the dental, with the back of the tongue touching the highest point of the palate but leaving free passage for the breath at one or both sides: figlio [ˈfiglio] ‘son.’ Some American languages have a whole series of laterals, with differences of position, glottalization, or nasalization. Unvoiced laterals, especially if the contact is extensive, take on a spirant character; voiced laterals, especially if the point of contact is minute, merge with vowels; thus, one of the two lateral phonemes of Polish strikes our ear almost as a [w]. On the other hand, the Central-Western American English vowel [r], as in red [red], fur [fʊr], far [far], is closely akin to a lateral: the tip of the tongue is raised to domal (inverted) position, but does not quite make a contact. In transcription we use the same symbol [r] as for the trill of other languages; this is convenient, because our sound and the British English trill in red are geographic variants of the same phoneme.

6. 11. Vowels are modifications of the voice-sound that involve no closure, friction, or contact of the tongue or lips. They are ordinarily voiced; some languages, however, distinguish different voice-qualities, such as muffled vowels, murmured vowels, with slow vibration of the vocal chords, or whispered vowels, in which friction between the arytenoids replaces vibration of the vocal chords.¹

¹ In contrast with vowels, the other sounds (stops, trills, spirants, nasals, laterals) are sometimes called consonants. Our school grammar uses the terms “vowel” and “consonant” in an inconsistent way, referring to letters rather than sounds. In the description of individual languages, it is often convenient to use these terms in other ways and to supplement them by such as sonant or semivowel, whose application we shall see in the next chapter.
Every language distinguishes at least several different vowel phonemes. The differences between these phonemes seem to be largely differences of tongue-position and to consist, acoustically, of differences in the distribution of overtones. Even these principles are disputed; in what follows I shall state the tongue-positions according to the generally accepted scheme, which has this merit, that it agrees with the relations of the vowels that are exhibited in the phonetic and grammatical systems of many languages. Other factors that enter into the distinction of vowel phonemes, are the tenseness and looseness of the tongue and other muscles, and different positions of the lips, such as protrusion and retraction.

The Central-Western type of American English distinguishes nine vowel phonemes. One of these, [r], which we have already discussed, is peculiar in its inverted tongue-position. The other eight form what we may call a two-four system. As to position, they occur in pairs; each pair consists of a front vowel, formed by raising the middle of the tongue toward the highest part of the palate, and a back vowel, formed by raising the back of the tongue toward the velum. The four pairs differ as to nearness of the tongue to the palate; thus we have four degrees of raising: high, higher mid, lower mid, and low. Instead of the terms high and low, some writers use close and open. This gives us the following scheme:

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>u</td>
</tr>
<tr>
<td>higher mid</td>
<td>e</td>
</tr>
<tr>
<td>lower mid</td>
<td>e</td>
</tr>
<tr>
<td>low</td>
<td>a</td>
</tr>
</tbody>
</table>

Examples: in, inn [in], egg [eg], add [ed], alms [amz], put [put], up [op], ought [ot], odd [ad]. These phonemes are subject to a good deal of non-distinctive variation, some of which depends upon the surrounding phonemes and will interest us later.

Southern British English has much the same system, but the distribution of the back-vowel phonemes is different, in that the degrees of closure of the vowels in words like up and odd are the reverse of ours: higher mid in odd [ɔd], low in up [ʌp]. However, there has arisen a convention of transcribing British English, not by the symbols here indicated in accord with the principles of the IPA alphabet, but by means of queer symbols which are intended
to remind the reader, irrelevantly enough, of the difference between English and French vowel phonemes:

<table>
<thead>
<tr>
<th></th>
<th>Chicago pronunciation according to IPA principles</th>
<th>British pronunciation according to IPA principles</th>
<th>British pronunciation, actual practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>inn</td>
<td>in</td>
<td>in</td>
<td>in</td>
</tr>
<tr>
<td>egg</td>
<td>eg</td>
<td>eg</td>
<td>eg</td>
</tr>
<tr>
<td>add</td>
<td>ed</td>
<td>ed</td>
<td>ed</td>
</tr>
<tr>
<td>alms</td>
<td>amz</td>
<td>amz</td>
<td>a:mz</td>
</tr>
<tr>
<td>put</td>
<td>put</td>
<td>put</td>
<td>put</td>
</tr>
<tr>
<td>odd</td>
<td>od</td>
<td>od</td>
<td>od</td>
</tr>
<tr>
<td>ought</td>
<td>ot</td>
<td>ot</td>
<td>o:t</td>
</tr>
<tr>
<td>up</td>
<td>op</td>
<td>ap</td>
<td>A p</td>
</tr>
</tbody>
</table>

The ninth vowel phoneme, which we transcribe for Central-Western American English by [r], as in bird [brd], has no uniform correspondent in Southern British English or in New-England or Southern American English. Before vowels, British English has a tongue-tip trill, which we transcribe by [r], as in red [red]; where Central-Western American has [r] after vowels, British has merely a modification (in some cases, a lengthening) of the vowel, which is indicated by a colon [:], as in part [paː:t], form [fɔːm]; where in Central-Western American the [r] is neither preceded nor followed by a vowel, British English uses a mixed vowel, intermediate between front and back positions, which is transcribed by [aː] or [ə], as in bird [bəːd] or bitter ['bitə].

6.12. Some Central-Western types of American English lack the distinction of [a] and [ə]. The low vowel of such speakers strikes my ear as an [a], both in alms and in odd; in their phonemic system, however, its position is neither "front," nor "back," but indifferent, since this pronunciation has only one low-vowel phoneme. A similar system, without the eccentric [r] vowel, occurs also in Italian. We may call this a seven-vowel system:

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Indifferent</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>i</td>
<td></td>
<td>u</td>
</tr>
<tr>
<td>higher mid</td>
<td>e</td>
<td></td>
<td>o</td>
</tr>
<tr>
<td>lower mid</td>
<td>e</td>
<td></td>
<td>o</td>
</tr>
<tr>
<td>low</td>
<td></td>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

Italian examples are: si [si] 'yes. pesca ['peska] 'fishing,' pesca ['peska] 'peach,' tu [tu] 'thou,' pollo ['pollo] 'chicken,' olla ['olla] 'pot,' ama ['ama] 'loves.'
Some languages have simpler systems, such as the five-vowel system of Spanish or Russian:

\[
\begin{array}{ccc}
\text{Front} & \text{Indifferent} & \text{Back} \\
\text{high} & \text{i} & \text{u} \\
\text{mid} & \text{e} & \text{o} \\
\text{low} & & \text{a}
\end{array}
\]

Spanish examples: \text{si} [si] 'yes,' \text{pesca} ['peska] 'fishing,' \text{tu} [tu] 'thou,' \text{pomo} ['pomo] 'apple,' \text{ama} ['ama] 'loves.'

Even simpler is the three-vowel system which appears in some languages, such as Tagalog:

\[
\begin{array}{ccc}
\text{Front} & \text{Indifferent} & \text{Back} \\
\text{high} & \text{i} & \text{u} \\
\text{low} & & \text{a}
\end{array}
\]

The fewer the phonemes in a vowel-system, the more room is there for non-distinctive variation of each phoneme. In Spanish the mid vowels, for instance, vary, to our ear, between higher and lower positions, with much the same acoustic qualities as in Italian, where these differences represent different phonemes. The Russian vowels are subject to wide variation, which depends chiefly on the preceding and following phonemes; especially one variant of the high front vowel, as in [sin] 'son,' strikes our ear very strangely, because in this variant the tongue is drawn back much farther than in any variant of the English high front vowel. The three-vowel system of Tagalog, finally, allows each phoneme a range that seems enormous to our hearing; the variants of the Tagalog phonemes symbolized above by the characters [i] and [u], range all the way from positions like those of our high vowels to positions like those of our lower mid vowels.

6.13. Different positions of the lips play no part in American English vowels, except for one minor fact which we shall take up later. In many languages, however, lip-positions accentuate the quality of different vowels: the front vowels are supported by retraction of the lips (drawing back the corners of the mouth), and the back vowels by protrusion or rounding of the lips. In general, the higher the vowel, the more pronounced is the action of the lips. These features appear in most European languages and contribute to the difference between their and our vowels. Even here we find decided differences; the Scandinavian languages,
especially Swedish, round their back vowels more than do the other European languages: a Swedish [o], as in bo [bo:] ‘to dwell,’ has about the tongue-position of a German or French [o], as in German so [zo:] ‘thus’ or French beau [bo] ‘beautiful,’ but it has the extreme lip-rounding of a German or French high vowel [u], as in German du [du:] ‘thou’ or French bout [bu] ‘end’; it strikes us as a kind of intermediate sound between an [o] and an [u].

The languages just named make use of lip-positions also for the distinction of phonemes. The commonest distinction of this kind is that between the ordinary front vowels (with retracted lip-position) and rounded front vowels, with the lip-position of the corresponding back vowels. Thus, French, beside eight vowel phonemes in a distribution like that of American English, has three rounded front vowels:

<table>
<thead>
<tr>
<th>Unrounded</th>
<th>Rounded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>Back</td>
</tr>
<tr>
<td>i</td>
<td>y</td>
</tr>
<tr>
<td>u</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>ø</td>
</tr>
<tr>
<td>o</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>ë</td>
</tr>
<tr>
<td>ò</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
</tr>
</tbody>
</table>

Examples:


To these are added four nasalized vowels (see above, § 6.4), as distinct phonemes: pain [pɛ] ‘bread,’ bon [bɔ] ‘good,’ un [œ] ‘one,’ banc [bā] ‘bench.’ Furthermore, French has a shorter variety of [œ], which is transcribed [œ], as in cheval [ʃøval] ‘horse.’

The symbols [y, ø] are taken from the traditional orthography of Danish; that of German (and of Finnish) uses the symbols ü and ö.

One can learn to produce rounded front vowels by practising lip-positions before a mirror: after learning to produce front vowels of the types [i, e, æ] with the corners of the mouth drawn back, and back vowels of the types [u, o, ø] with the lips protruded and rounded, one speaks an [i] and then tries to keep the tongue-position unchanged while rounding the lips as for an [u]; the result is an
[y]. In the same way one passes from [e] to [ø] and from [e] to [æ].

A further distinction is created by the use of unrounded back vowels, in contrast with rounded. This additional factor produces in Turkish a three-dimensional vowel system: each vowel phoneme is either front or back, high or low, rounded or unrounded:

<table>
<thead>
<tr>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrounded</td>
<td>Rounded</td>
</tr>
<tr>
<td>high</td>
<td>i</td>
</tr>
<tr>
<td>low</td>
<td>e</td>
</tr>
</tbody>
</table>

6.14. Another factor in vowel-production is the tense or loose position of the muscles: to our ears, vowels of the former type sound clearer and perhaps excessively precise, since the English vowels are all loose. Some authors use the terms narrow and wide instead of tense and loose. The most striking characteristic, to our ear, of the French vowels is their tense character. It is relative tenseness, too, which in addition to lip-action, makes the Italian vowels very different from those of English, although the two languages make the same number of distinctions.

Tenseness and looseness are utilized for distinctions of phonemes in German and Dutch. In German, and, to a lesser extent, in Dutch, the tense vowels are also of longer duration (a factor which will concern us later) than the loose. If we indicate tenseness, combined with greater length, by a colon after the symbol, we obtain for these languages the following system, with a pair of phonemes in each position:

<table>
<thead>
<tr>
<th>Front</th>
<th>Indifferent</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrounded</td>
<td>Rounded</td>
<td>(Rounded)</td>
</tr>
<tr>
<td>high</td>
<td>i: i</td>
<td>y: y</td>
</tr>
<tr>
<td>low</td>
<td>e: e</td>
<td>ø: ø</td>
</tr>
</tbody>
</table>

German examples:


The differences between the vowel phonemes of different lan-

1 Dutch lacks the short [ø].
guages are not sufficiently understood. It is likely, moreover, that one and the same phoneme may often be produced, in the same language, by very different actions of the vocal organs, but with similar, and for the native hearer identical, acoustic effects: it is supposed that in such cases the deviation of one organ (say, a different tongue-position) is compensated by different action of some other organ (such as a different action of the larynx).
CHAPTER 7
MODIFICATIONS

7.1. The typical actions of the vocal organs described in the last chapter may be viewed as a kind of basis, which may be modified in various ways. Such modifications are: the length of time through which a sound is continued; the loudness with which it is produced; the musical pitch of the voice during its production; the position of organs not immediately concerned in the characteristic action; the manner of moving the vocal organs from one characteristic position to another. This distinction between basic speech-sounds and modifications is convenient for our exposition, but it is not always recognized in the phonetic system of languages; many languages place some of the latter features quite on a par with phonemes of the former sort. We have seen, for instance, that features of pitch are utilized as primary phonemes in Chinese, and features of duration distinguish primary phonemes in German. On the other hand, most languages do recognize the distinction to this extent, that they use some of the modifying features as secondary phonemes—phonemes which are not part of the simplest linguistic forms, but merely mark combinations or particular uses of such forms.

7.2. Duration (or quantity) is the relative length of time through which the vocal organs are kept in a position. Some languages distinguish between two or more durations of speech-sounds. Thus, we have seen (§ 6.14) that in German the tense vowels are longer than the loose; this difference of length is more striking than that of tenseness. The sign for a long phoneme is a colon after the symbol for the sound, as German Beet [beːt] 'flower-bed,' in contrast with Bett [bet] 'bed.' If more degrees of length are to be indicated, a single dot or other signs can be used. Another method of indicating long quantity is to write the symbol twice; this is done in Finnish orthography, e.g. kaappi 'cupboard' with long [a] and long [p].

In American English, vowel-quantity is not distinctive. The low and lower mid vowels, as in pan, palm, pod, pawn, are longer than
the other vowels, as in *pin, pen, pun, pull*. All our vowels, moreover, are longer before voiced sounds than before unvoiced; thus, the [e] in *pan, pad* is longer than in *pat, pack* and the [i] in *pin, bid* longer than in *pit, bit*. These differences are, of course, not distinctive, since they depend upon the height of the vowel and upon the following phonemes.

In dealing with matters of quantity, it is often convenient to set up an arbitrary unit of relative duration, the *mora*. Thus, if we say that a short vowel lasts one mora, we may describe the long vowels of the same language as lasting, say, one and one-half morae or two morae.

In French, the distinction between long and short vowels works in a peculiar way. Long vowels occur only before the last consonant or consonant-group of a word: the mere presence of a long vowel in French thus indicates that the next consonant or consonant-group ends a word. In this position, moreover, the length of a vowel is for the most part determined entirely by the nature of the phonemes themselves. The nasalized vowels [ä, è, ë, ë] and the vowels [o, ø] are in this position always long: *tante* [tãt] ‘aunt,’ *faute* [fo:t] ‘fault.’ The remaining vowels are always long if the final consonant is [j, r, v, vr, z, 3], as in *cave* [ka:v] ‘cellar,’ *vert* [ve:r] ‘green.’ Only in the cases not covered by these two rules, is the vowel-quantity ever distinctive, as in *bête* [be:t] ‘beast’ versus *bette* [bet] ‘beet.’

Long consonants occur in English in phrases and compound words, such as *pen-knife* [‘pen ’najf] or *eat two* [‘ijt ‘tuw]; within a single word [nn] occurs in a variant pronunciation of forms like *meanness* [‘mjn尼斯] beside [‘mjn尼斯]. A distinction of two consonant-quantities within simple words is normal in Italian, as in *fatto* [‘fatto] ‘done,’ but *fato* [‘fato] ‘fate,’ in Finnish, and in many other languages. In Swedish and Norwegian a consonant is long always and only after a stressed short vowel; the difference of consonant-quantities, accordingly, is not distinctive. In Dutch there are no long consonants; even when like consonants meet in a phrase, only one consonant mora is spoken, so that the phrase consisting of *dat* [dat] ‘that’ and *tal* [tal] ‘number’ is pronounced [‘da ’tal].

7. 3. *Stress* — that is, intensity or loudness — consists in greater amplitude of sound-waves, and is produced by means of more energetic movements, such as pumping more breath, bringing the
vocal chords closer together for voicing, and using the muscles more vigorously for oral articulations. In English we have three secondary phonemes which consist of increased stress, in contrast with what we may call unstressed passages of phonemes. Our highest stress ['"] marks emphatic forms, usually in contrast or contradiction; our high stress or ordinary stress ['"] appears normally on one syllable of each word; our low stress or secondary stress ['i] appears on one or more syllables of compound words and long words. In phrases, the high stress of certain words is replaced by a low stress or entirely omitted. Examples:

This is my birthday present ['ði:z iz 'maj 'ba:ðe] ipreznt].
It isn't my fault, and it is your fault [it 'iz nt 'maj 'fo:lt. an it 'iz 'nj: 'fo:lt].
I'm going out [aj m 'gəwin 'awt.]
Let's go back ['let s 'gəw 'bek.]
business man ['biznis 'mən]
gentleman ['dʒentlmən]
dominating ['dəmi'neɪʃən]
domination ['dəmi'neɪʃən]

This system is paralleled in all the Germanic languages, and in many others, such as Italian, Spanish, the Slavic languages, Chinese. In stress-using languages like these, the stress characterizes combinations of linguistic forms; the typical case is the use of one high stress on each word in the phrase, with certain unstressed or low-stressed words as exceptions. However, some languages of this type contain simple linguistic forms (such as unanalyzable words) of more than one syllable, which may be differentiated, accordingly, by the place of the stress; thus Russian ['gorot] 'city' and [mo'ros] 'frost' are both simple words, containing no prefix or suffix; here, accordingly, the place of stress has the value of a primary phoneme.

Other languages use degrees of loudness as non-distinctive features. In the Menomini language a sentence sounds, as to ups and downs of stress, quite like an English sentence, but these ups and downs are determined entirely by the primary phonemes and bear no relation to the meaning. In French the distribution of stress serves only as a kind of gesture: ordinarily the end of a phrase is louder than the rest; sometimes, in emphatic speech, some other syllable is especially loud; often enough one hears a long succession of syllables with very little fluctuation of stress.
7.4. Among stress-using languages there are some differences in the manner of applying stress. In English there is a non-distinctive variation by which the vowels of unstressed words and syllables appear in a "weakened" form: they are shorter and formed with looser muscles, the voice is sometimes reduced to a murmur, and the tongue-positions tend toward a uniform placing, somewhere near higher mid position. The degree of weakening varies from utterance to utterance, and differs a great deal in different geographic and social types of English. The vowels of the least-stressed syllables are decidedly short and loose; these vowels are a very lax [i], as in landed [lændid], glasses [glæsiz], heavy [hævi]; a very lax mid vowel, resembling [œ:] but decidedly shorter, which we transcribe as [ø], as in bitter [ˌbɪtə], bottom [ˈbɒtm], parrot [ˈpærət]; and, finally, syllabic [l] and [n], as in bottle [ˈbɔtl], button [ˈbʌtn]. Where we have the same form stressed in some combinations and unstressed in others, we may get a plain contrast. Thus:

*con*- [ˈkɔn-]: convict, noun [ˈkɔnvikt]:
  [kən-]: convict, verb [kənˈvikt].

*re*- [ˈriː-]: reflex [ˈrifleks], [ˈre-]: refuse, noun [ˈrefjuws]:
  [ri-]: reflect [riˈflekt], refuse, verb [riˈfjuwz].

*pro*- [ˈprəʊ-]: protest, noun [ˈprəʊtest], [ˈprəʊ-]: progress, noun [ˈprəʊgres] beside [ˈprəʊgres].
  [prə-]: protest, verb [prəˈtest], progress, verb [prəˈgres].

*vac*- [ˈveɪk-]: vacant [ˈveɪkənt]:
  [væk-]: vacation [vəˈkejən].

*bel* [ˈbel-]: rebel, verb [riˈbel]:
  [-bl]: rebel, noun [ˈrebəl].

*tom* [ˈtɒm]: atomic [əˈtɒmɪk]:
  [-təm]: atom [ˈətəm].

*tain* [ˈteɪn]: maintain [mənˈteɪn], meintən]:
  [-tin]: maintenance [ˈmeintənəns].

In cases like these, various grades of weakening exist side by side and are used according to the speed and the mood (formal, familiar, and so on) of utterance. There are also local and social differences. American English says dictionary [ˈdɪkʃnəri], secretary [ˈsɛktrəri] (compare secretarial [ˌsɛktrəˈriəl]); British English uses weaker forms, saying [ˈdɪkʃəri, ˈsekrəri]. On the other hand, in forms like Latin [ˈletn], Martin [ˈmartn] this degree of weakening is decidedly sub-standard in England, where the standard forms are [ˈlɛtn, ˈmərtən].
Not all languages that use stress as a distinctive feature weaken their unstressed vowels. The Germanic languages other than English produce the vowels of unstressed syllables quite like those of stressed syllables. The unstressed vowels in German *Monat* ['mo:nat] 'month,' *Kleinod* ['klajno:t] 'gem,' *Armut* ['armu:t] 'poverty,' are quite like the stressed vowels in *hat* [hat] 'has,' *Not* [no:t] 'distress,' *Mut* [mu:t] 'courage.' In these languages only one vowel, the short [e], appears in a weakened variant when it is unstressed. Thus, in German *hatte* ['hate] 'had' or *gebadet* [ge'ba:det] 'bathed,' the [e]-vowel is spoken shorter and with the tongue less raised and fronted than in a form like *Bett* [bet] 'bed,' and in a form like *baden* ['ba:den] 'to bathe,' the second syllable is acoustically quite like the second syllable of an English form like *sodden* ['sɔdŋ], and very different from a German *denn* [den] 'then.' Phoneticians often indicate this weakening by using the character [a] for the unstressed form of [e], transcribing *hatte* ['hata], *baden* ['ba:dan] or ['ba:dn], but this is unnecessary, since the accent-mark suffices to indicate the weakening.

Other stress-using languages, such as Italian, Spanish, Bohemian, Polish, do not use special variants for any of the unstressed vowels; compare, for instance, our *restitution* [resti'tuwsn] with an Italian *restituzione* [restitutsi'one]. In a Bohemian word like *kozel* ['kozel] 'goat,' the [e] is just as fully formed as in *zelenec* ['zelenets] 'evergreen.'

7.5. Another difference between stress-using languages concerns the point at which the increase of loudness sets in. In English, if the first syllable of a word has a stress, the increase of loudness begins exactly at the beginning of the word. Accordingly, there is a difference between pairs like the following:

- a name [ə 'nejm] an aim [ən 'ejm]
- that sod ['sɔt 'sɔd] that's odd ['sɔt s 'ɔd]
- that stuff ['sɔt 'stʌf] that's tough ['sɔt s 'tʌf].

The same habit prevails in German and Scandinavian; German, in fact, marks the onset of stress so vigorously that it often takes the shape of a (non-distinctive) glottal stop before the initial vowel of a stressed word or element, as in *ein Arm* [aın 'arm] 'an arm,' or in *Verein* [fer-'ajn] 'association,' where the *ver-* is an unstressed prefix.

In many stress-using languages, on the other hand, the point of onset of a stress is regulated entirely by the character of the
primary phonemes. In Dutch, for instance, when there is a single consonant before the vowel of a stressed syllable, this consonant always shares in the loudness, regardless of word-division or other factors of meaning: *een aam* ‘an aam’ (measure of forty gallons) and *een naam* ‘a name’ are both [e'na:m], and a phrase like *het ander oog* ‘the other eye’ is [e'tande'ro:x]. The same habit prevails in Italian, Spanish, and the Slavic languages.

7.6. Differences of pitch, that is, frequency of vibration in the musical sound of the voice, are used in English, and perhaps in most languages, as secondary phonemes. The actual acoustic forms are highly variable; there is also some geographic variation. The Englishman’s rising pitch in *Thank you!* is striking to American ears, and his rising pitch in some statements often makes them sound to us like a yes-or-no question. Moreover, we use features of pitch very largely in the manner of gestures, as when we talk harshly, sneeringly, petulantly, caressingly, cheerfully, and so on. In English, and in the languages of Europe generally, pitch is the acoustic feature where gesture-like variations, non-distinctive but socially effective, border most closely upon genuine linguistic distinctions. The investigation of socially effective but non-distinctive patterns in speech, an investigation scarcely begun, concerns itself, accordingly, to a large extent with pitch. For the same reason, it is not easy to define the cases where features of pitch have in our language a genuine status as secondary phonemes.

It is clear that the end of a sentence (a term we shall have to define later) is always marked by some special distribution of pitch. We can speak the words *It’s ten o’clock, I have to go home*, as a single sentence, with a final-pitch only at the end, or as two sentences, with a final-pitch on *clock* and another at the end: *It’s ten o’clock. I have to go home.* After a final-pitch we may pause for any length of time, or stop talking.

Within the domain of final-pitch we can distinguish several phonemic differences. *It’s ten o’clock*, as a statement, differs from *It’s ten o’clock?* as a question; the latter ends with a rise, instead of a fall. Among questions, there is a difference of pitch-scheme between a yes-or-no question, such as *It’s ten o’clock?* or *Did you see the show?* and a supplement-question, which is to be answered by some special word or phrase, as *What time is it?* or *Who saw the show?* with a lesser rise at the end. In transcription we may indicate the latter type by placing the question-mark upside down
The distinction appears plainly in the contrast between a supplement-question and a yes-or-no question which asks whether this supplement-question is to be answered: *Who saw the show?* [ˈhuw ˈsoː ˈʃər ˈʃəʊ] asks for the person, but [ˈhuw ˈsoː ˈʃər ˈʃəʊ?] means ‘Is this what you were asking about?’

These three types of final-pitch appear side by side in the following example. If someone said *I’m the man who — who —*, his interlocutor might help him out by saying, with the final-pitch of a statement, *Who took the money* [ˈhuw ˈtuk ˈməniː]. This contrasts with the supplement-question *Who took the money?* [ˈhuw ˈtuk ˈməniː], to which an interlocutor who wanted to make sure that this was the question, or to use it as a formal starting-point, might answer by a yes-or-no question, *Who took the money?* [ˈhuw ˈtuk ˈməniː?] (I’ll tell you who took it...).

It appears, further, that sentences of all three of these types may be distorted as to pitch, and also as to stress, when the speaker is responding to a strong stimulus. We are doubtless justified in setting up a single secondary phoneme of exclamatory pitch, symbol [!], for this type, and in supposing that the varieties within this type, such as the intonations of anger, surprise, call, sneer, and the like, are non-distinctive, gesture-like variations. The exclamatory phoneme appears in conjunction with all three of the final-pitch phonemes. Contrast *John* [dʒɔːn] as an answer to a question, with *John!* [dʒɔːn!] as a call for the hearer’s (John’s) presence or attention; similarly *John?* [dʒɔːn?] as a simple question (‘Is that John?’) contrasts with the same question accompanied by exclamatory pitch: *John?!* [dʒɔːn?!] (‘It isn’t John, I hope!’); finally, *Who was watching the door* [i] contrasts with the exclamatory *Who was watching the door?!* [i] in an emergency or a calamity.

As a fifth secondary phoneme of pitch in English we must recognize pause-pitch or suspension-pitch [,], which consists of a rise of pitch before a pause within a sentence. It is used, in contrast with the final-pitches, to show that the sentence is not ending at a point where otherwise the phrasal form would make the end of a sentence possible: *I was waiting there [,] when in came the man. John [,] the idiot [,] missed us.* (Contrast: *John the Baptist was preaching.*) *The man [,] who was carrying a bag [,] came up to our door.* Only one man is in the story; contrast: *The man who was carrying a bag came up to our door,* which implies that several men are in the story.
7.7. In English both stress and pitch, then, are used only as secondary phonemes, but there are some differences between the functions of the two. The stress phonemes step in only when two or more elements of speech are joined into one form: a simple word, like John, contains no distinctive feature of stress; to hear a distinctive feature of stress we must take a phrase or a compound word or, at least, a word containing two or more parts, such as contest. The pitch phonemes, on the other hand, occur in every utterance, appearing even when a single word is uttered, as in John! John? John. On the other hand, the pitch phonemes in English are not in principle attached to any particular words or phrases, but vary, with differences of meaning, in otherwise identical forms.

Many languages differ from English in using secondary phonemes of pitch as we use those of stress, in words and phrases that consist of more than one element. In Swedish and Norwegian, a word of two syllables, for instance, has an ordinary high stress on one of them, quite as it would in English, but, in addition to this, the stressed syllables are distinguished by two different schemes of pitch. The stress may be accompanied by a rising pitch, giving much the same acoustic impression as an English high stress, as in Norwegian ['bøner] 'peasants' or ['aksel] 'shoulder,' or, with a distinctive difference, it may be accompanied by a falling pitch, as in ['bøner] 'beans' or ['aksel] 'axle.' This distinctive word-pitch is all the more remarkable because in all other respects Swedish and Norwegian closely resemble English in their use of secondary phonemes of pitch and stress.

The Japanese language is said to distinguish two relative pitches, normal and higher; thus, [hana] 'nose' has normal pitch on both syllables, ['hana] 'beginning' has higher pitch on the first syllable, and [ha'na] 'flower' on the second; there seem to be no secondary phonemes of word-stress.

In still other languages features of pitch are used as primary phonemes. North Chinese distinguishes four of these, which we may symbolize by numbers:

[1] high level: [ma¹] 'mother'
[2] high rising: [ma²] 'hemp'

Cantonese is said to have six such tones. Primary phonemes of pitch, in fact, appear in very many languages, either in a few simple
It is worth noticing that we have in American English a non-distinctive variation of pitch on our stressed vowels: before an unvoiced sound, as in map or mat, the pitch-scheme is simple, but before a voiced sound, as in mad or man, we have ordinarily, and under loud stress quite clearly, a rising-falling pitch.

7. 8. Once we have obtained some notion of how a phoneme is formed, we may observe various modifications in the way it is produced. The English phonemes [k, g], for instance, are made by closure of the back of the tongue against the velum: if we observe carefully, we find that the closure is made farther forward when the next phoneme is a front vowel, as in kin [kin], keen [kijn], give [giv], gear [gis], and farther backward before a back vowel, as in cook [kuk], coop [kuwp], good [gud], goose [guws], in contrast with what we may call the normal position, as in car [ka:], cry [kraj], guard [ga:d], gray [grej]. The English phoneme [h] is formed with the oral position of the following vowel. These variants are not distinctive, since they depend entirely upon the following phoneme. In languages where differences of this sort are distinctive, we have really no right to call them "modifications," for in these languages they are essential features of the phoneme. We might just as well use the term "modification" of the action or inaction of the voice during the production of a noise-sound, or of the presence or absence of nasalization, or of the rounding or retraction of the lips during the production of a vowel. Nevertheless, it is convenient to view in this way some less familiar features which are phonemic in certain languages.

The most important of these is palatalization: during the production of a consonant the tongue and lips take up, so far as is compatible with the main features of the phoneme, the position of a front vowel, such as [i] or [e]. Thus, we may say that in English [k] and [g] are subject to a non-distinctive palatalization before a front vowel. Palatalization occurs as a distinctive feature notably in some of the Slavic languages. In Russian, for instance, most consonant phonemes occur in pairs, with the distinctive difference of plain versus palatalized. For the transcription of the latter, various devices have been used, such as a dot, curve, or caret-sign over the symbol, or an exponent i or an accent-mark after it, or the use of italic letters. We shall adopt the last-named device, as
the most convenient for printing. In a Russian word like [pa] 'five' the corners of the mouth are retracted and the tongue is raised into front-vowel position during the formation of both consonants. In the case of the [t] this means, of course, that while the tip and edge of the tongue are making closure against the backs of the upper teeth, the blade of the tongue is raised toward the palate; similarly in words like ['dada] 'uncle' or ['nana] 'nurse.' The distinctive character of the difference appears in cases like [bi] 'way of being,' [bi] 'to be,' [bi] 'to beat.'

Some languages distinguish velarized consonants, in which the tongue is retracted as for a back vowel. If the lips are rounded during the production of a consonant, it is said to be labialized. These two modifications appear together in labiovelarized consonants.

7.9. The manner in which the vocal organs pass from inactivity to the formation of a phoneme, or from the formation of one phoneme to that of the next, or from the formation of a phoneme to inactivity, will often show varieties which we label as transitions. This term is fair enough when the differences are not distinctive, but when they are distinctive, we have really no right to describe some of the essential features of the phonemes as basic and others as transitional.

In passing from silence to a voiced stop, as in bay, day, gay, we begin the voicing gradually, and in passing from these sounds to silence, as in ebb, add, egg, we gradually lessen the voicing. This contrasts with the French manner, where the stops in these positions are fully voiced, from the very beginning to the very end. In passing from silence to a stressed vowel, we usually make a gradual onset of the voice, while the North German first closes the glottis and then suddenly begins full voicing, so as to produce a (non-distinctive) glottal stop. Occasionally, as a non-distinctive variant, we start in the German style and the German in ours. In French and in sub-standard southern English a third variety of onset is non-distinctive, in which the glottis passes through the [h]-position. In standard English and in German this variety is distinctive, as in English heart [haːt] versus art [ɑːt]. In passing from a vowel to silence, the languages so far named use a gentle off-glide, but others pass through the [h]-position or end sharply with a glottal stop, and in still others these differences are phonemic. In passing from an unvoiced stop to a voiced sound,
especially a vowel, one may begin the voicing at the very moment of explosion, or the voicing may lag for an instant; in either case it may begin gently or with a glottal stop; these differences are phonemic in some languages, and were discussed in § 6.6. Before or after palatalized consonants there may be a glide resembling a front vowel; velarized consonants, similarly, may be accompanied by a back-vowel glide.

In successions of consonants the chief transitional feature seems to be the difference between close and open transition. In English we use close transition. When we pass from one stop to another, we form the second closure before opening the first: in a word like actor [ˈɛktə], for instance, the tip of the tongue touches the gums for the [t] before the back of the tongue is removed from the velum to release the [k]. French uses open transition: in a word like acteur [aktœ:r] ‘actor,’ the [k] is opened before the tongue-tip touches the teeth for the [t]. Similarly, combinations of stop plus spirant in English have close transition, as in Betsy, cupful, it shall: before the stop is opened, the organs are already placed, as far as possible, into the position of the following spirant, so that the explosion of the stop is incomplete. This contrasts with the open transition of French, where the stop is fully exploded before the spirant begins, as in cette scène [set seːn] ‘this scene,’ étappe facile [etap fasil] ‘easy stage,’ cette chaise [set ʃɛz] ‘this chair.’ The same difference appears in so-called double consonants, combinations in which the same consonant phoneme appears twice in succession. In English, forms like grab-bag [ˈgreb ,beg], hot time ['hɒt 'tæjm], pen-knife ['pen ,najf] show only one closure for the groups [bb, tt, nn]; this closure merely lasts longer than the closure of a single consonant. The double consonant is marked also by the difference of stress between the implosion (in our examples, weak) and the explosion (in our examples, strong). In French, similar groups, as in cette table [set tabl] ‘this table,’ normally show two openings, with an implosion and an explosion for each of the two consonant units.

If both types of transition occur in a language, the difference may be utilized as a phonemic distinction. Thus, Polish has mostly open transition, like that of French, as in trzy [tʃi] ‘three,’ but the combination of [t] and [ʃ] occurs also with close transition, as a separate phoneme, which we may designate by [tʃ], as in czy [tʃi] ‘whether.’ There is also, again as a separate phoneme, a palatalized variety of this, [tʃ], as in ci [tʃi] ‘to thee.’
This last example shows us *compound phonemes*—that is, sounds resembling a succession of two or more phonemes of the same language, but in some way distinguished from such a succession, and utilized as separate phonemes. Many compound phonemes consist, like those in our example, of a stop plus a spirant or other open consonant; phonemes of this sort are called *affricates*. In English, where all consonant groups have close transition, this could not be used as a phonemic feature. Nevertheless, English has two affricate phonemes, [tʃ] as in *church* [tʃɔ:tʃ], and [dʒ] as in *judge* [dʒʌdʒ]. These affricates are always palatalized, and it is this feature which distinguishes them from combinations of [t] plus [ʃ], as in *beet-sugar* ['bitʃa:ɡə], *it shall* [it ʃeːl] and of [d] plus [ʒ], as in *did Jeanne* [dɪd ʒæn].

7. 10. The treatment of successions of vowels and predominantly musical sounds shows great variety, and many types of transition are distinctive in one or another language.

In any succession of sounds, some strike the ear more forcibly than others: differences of *sonority* play a great part in the transition effects of vowels and vowel-like sounds. Thus, other things (especially, the stress) being equal, a low vowel, such as [a], is more sonorous than a high vowel, such as [i]; any vowel is more sonorous than a consonant; a nasal, trill, or lateral more than a stop or spirant; a sibilant [s, z], with its concentration of the breath-stream into a narrow channel, more than another spirant; a spirant more than a stop; a voiced sound more than an unvoiced. In any succession of phonemes there will thus be an up-and-down of sonority. In a series like [tatata], the [a]'s will be more sonorous than the [t]'s. In the following example four degrees of sonority are distinguished by means of numbers:

*Jack caught a red bird*  
[dʒɔrk ˈkɔːt ə red bɔrd]

314 414 1 213 3 13.

Evidently some of the phonemes are more sonorous than the phonemes (or the silence) which immediately precede or follow. This is true of the phonemes marked 1 in our example, and is true, for instance, of the [e] in *egg* [eg] and of the [ɔː] in *saw* [sɔː]. Any phoneme which is louder than the phoneme (or the silence) which precedes, and at the same time louder than the phoneme (or the silence) which follows, is a *crest of sonority* or a *syllabic*; the other phonemes are *non-syllabic*. Thus the [e] in *red* and the [ɔː] in
bird are syllabics, but the [r] in red and the [d] in red and bird are non-syllabics. An utterance is said to have as many syllables (or natural syllables) as it has syllabics. The ups and downs of syllabication play an important part in the phonetic structure of all languages.

In every language, only certain ones of the phonemes ever occur as syllabics, but in principle any sound may be more sonorous than its surroundings. The interjections pst! [pst!] and sh! [ʃ!] with which we demand silence, differ from ordinary English words in using [s] and [ʃ] as syllabics. Actually, most of the phonemes in any language are used only as non-syllabics, as, in English, [p, t, k]; we call these consonants. Other phonemes, fewer in number, occur only as syllabics, as, in English, [e, æ, a]; we call these vowels. In most languages there is a third, intermediate group of sonants, phonemes which occur in both syllabic and non-syllabic positions; thus, in American English, of the Central-Western type, [r] is syllabic in bird [brd], but non-syllabic in red [red].

Whether a sonant in any word is syllabic or non-syllabic, is determined in different ways in different languages. If the syllabic or non-syllabic character of a sonant depends entirely upon the surrounding phonemes (as in bird versus red), then the difference is not distinctive, and, so far as transcription is concerned, we do not need more than one symbol. In many cases, however, the syllabic or non-syllabic character of the sonant is determined arbitrarily, and constitutes a phonemic difference. Thus, in stirring ['strin] the [r] is syllabic, but in string [strin] it is non-syllabic; in the second syllable of pattern ['petrn] the [r] is syllabic and the [n] is non-syllabic, but in the second syllable of patron ['pejtn] the [r] is non-syllabic and the [n] is syllabic. In such cases we need separate symbols for the two phonemes. Unfortunately, our habits of transcription in this regard are neither uniform nor consistent. In a few cases we use different symbols: [i, u, y] are generally used for syllabic values, and [j, w, ɥ], respectively, for the corresponding non-syllabics; many transcribers, however, use the former symbols also for certain non-syllabic occurrences. Another device is to place a little curve above or below symbols like [i, u, y, e, o, a] to indicate non-syllabic function. On the other hand, the symbols [r, l, m, n] usually have a dot, circle, or vertical line placed under them to denote syllabic function.

When the syllabic or non-syllabic function of a sonant is deter-
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mined by the surrounding phonemes (or silence), the distribution is natural. Thus, in standard German, the phonemes [i, u] are non-syllabic when they precede or follow a vowel, and in all other positions they are syllabic. Non-syllabic [u] occurs only after [a], as in Haus [haws] ‘house’; non-syllabic [i] occurs after [a], as in Ei [aj] ‘egg,’ after [o] (or [ə]), as in neu [noj, nɔj] ‘new,’ and before vowels and [u], as in ja [ja:] ‘yes,’ jung [jun] ‘young.’ The variants after a vowel are decidedly lowered, and the non-syllabic [i] before syllables is spoken with close contact, so as to give a decided friction-sound, but these differences are not distinctive; traditionally, transcribers use the symbols [i, u] for the former type, but [j] for the latter.

In many instances the syllabic or non-syllabic value of a sonant is determined in other ways than by natural distribution. Some languages use a slight increase of stress to make a sonant syllabic in cases where natural sonority does not suffice. Thus, in some English pronunciations, forms like bottling, brittler, buttoning are spoken with three syllables: a slight increase of stress on the [l] or [n] produces a moment of greater prominence. We transcribe this as bottling [bɒtlɪŋ], brittler [britlə], buttoning [bʌtəŋ]. Here the syllabic-stress acts as a secondary phoneme; it is symbolized by the mark [']. In Central-Western American English this syllabic-stress plays an important part; it produces contrasts such as stirring [ˈstrɪŋ] versus string [strɪŋ], mackerel [ˈmekrə] versus minstrel [ˈminstrəl], battery [ˈbetri] versus pantry [ˈpentri], upon [ˈajprən] versus pattern [ˈpentər]; and it makes possible such forms as bearer [ˈbejər], error [ˈərər], stirrer [ˈstɪrər]. In these forms of English, then, the syllabic-stress is a distinctive feature, a secondary phoneme.

In British and some varieties of American English we have, further, combinations of vowels with [ə], in which the prior member is syllabic, thanks to greater stress: [iə] in fear [fiə], [uə] in sure [ʃuə], [eə] in fair, fare [feə], [eə] in coarse, course [koʊs]. There is no need of a special sign for this non-syllabic use of the [r-ə:] phoneme, since the preceding vowel sign indicates its character. The prior members differ markedly from the independent forms of the vowels [i, u, e, o]; for the same reason there is no need of separate symbols. The same holds true of the greatly modified forms of vowels and diphthongs before [r] in some varieties of American pronunciation: fear [fiər], fair, fare [feər], fire [feər], sure
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[\text{j}u\text{wr}], coarse, course [kow\text{rs}], Mary [\text{\textasciitilde}mej\text{rj}], merry [\text{\textasciitilde}mer\text{rj}], marry [\text{\textasciitilde}mer\text{rj}], hoarse [how\text{rs}], horse [hors], war [w\text{r}], sorry [\text{s}\text{\textasciitilde}ri\text{rj}]. In these combinations, various types of American English show various modifications of the normal vowels and diphthongs.

By the use of syllabic-stress some languages reverse the relations of natural sonority; thus, South German dialects have the [i, u, y] syllabic and the [a] non-syllabic in forms like [liab] ‘dear,’ [guat] ‘good,’ [gryan] ‘green.’

Another type of distribution is the use of articulatory differences to set off the syllabic and non-syllabic functions of the sonants. Usually this consists in forming the non-syllabic variety with more closure than the syllabic variety. In English, the sonants [i] and [u] occur as non-syllabics before and after vowels; symbolizing these non-syllabic occurrences by [j] and [w], we have [j] in yes [jes], say [sej], buy [baj], boy [boj] and [w] in well [wel], go [gow], now [naw]. In these examples the non-syllabic function of [j, w] is sufficiently determined by natural sonority, since a more open vowel precedes or follows. Therefore the actual variations in the manner of forming the sounds are here non-distinctive: the [j, w] after vowels, especially in the types [aj, oj, aw] are very open, and the [a] also is quite different from an ordinary [a]; before a vowel, as in yes, well, the [j] has a higher and more fronted tongue-position than a syllabic [i], and the [w] has a higher tongue-position than a syllabic [u] and is formed with a slight contraction of the lips. Now, these latter differences are utilized, in English, as phonemic differences: even where the function is not determined by natural sonority, we distinguish the closer non-syllabic [j, w] as separate phonemes, from the more open syllabic [i, u]. Thus, we distinguish between [uw] in ooze [uwz] and [wu] in wood [wud], and between [ij] in ease [ijz] and a rare [ji], as in slang yip [jip] ‘to squeal,’ and we have even groups like [ijj, wuw], as in yeast [ijjst], woo [wuw]. When two different members of the set, [i, u, r] come together in a stressed syllable, the first is non-syllabic: you [juw], yean [\text{j\textasciitilde}n], win [win], work [\text{w}\text{a}:k], rid [rid], room [rum]. This is made possible by our producing [j] and [w] with more tense articulation before a syllabic sonant or vowel than before a non-syllabic sound (bit) or in final position (say). A non-syllabic sonant which, thanks to some modification, is phonemically distinct from the corresponding syllabic sonant is called a semi-vowel.
In the same way, French produces its high vowels [i, u, y] with greater closure and tensity when they are non-syllabic, as in *hier* [jiːʁ] ‘yesterday,’ *oie* [wa] ‘goose,’ *ail* [a:j] ‘garlic,’ *huile* [qil] ‘oil,’ and treats these types as separate semivowel phonemes, distinguishing, for instance, between *ouï* [wa] ‘yes’ and *houille* [uːj] ‘anthracite,’ and employing the sequence *[ij]*, as in *fille* [fiː] ‘daughter.’

7. 11. Vowels and sonants combine into compound phonemes, which are known as diphthongs, or, if there are three components, as triphthongs. Whether a succession of phonemes is to be viewed as a compound phoneme, depends entirely upon the phonetic structure of the language. In English, successions like [je] in *yes* or [we] in *well* are treated as two phonemes, like any sequence of consonant plus vowel, but combinations of vowel plus semivowel are treated as compound phonemes. We have seven such combinations, as well as one triphthong of semivowel-vowel-semivowel:

| See [sij] | Seeing ['sijin] |
| Say [sej] | Saying ['sejin] |
| Buy [baj] | Buying ['bajin] |
| Boy [boj] | Boyish ['bojif] |
| Do [duw] | Doing ['duwin] |
| Go [gow] | Going ['gowin] |
| Bow [baw] | Bowing ['bawin] |
| Hew [hjuw] | Hewing ['hjuwin] |

We shall see in the next chapter that in the phonetic structure of our speech-forms, these groups play the same part as simple vowel phonemes. The peculiar non-distinctive modifications of the components, especially of [a, j, w], which we noticed above, often appear in diphthongs, but this is of secondary importance; the essential feature is the peculiar structural treatment. Another peculiarity is the tense character of [ij] and [uw]: the muscles of the tongue and lips are more strongly contracted than in the simple vowels [i, u]. Many phoneticians class these types as tense long vowels, transcribing them as [iː] and [uː].

A further set of four diphthongs is furnished by the groups of vowel plus non-syllabic [ə]:

| Fear [fiə] | Sure [ʃuə] |
| Fair [feə] | Shore [ʃoə] |
In some pronunciations these modified varieties differ from any simple vowel, witness Central-Western American

\[\begin{align*}
\text{Mary} & \quad [\text{mejrij}] \\
\text{merry} & \quad [\text{merij}] \\
\text{marry} & \quad [\text{merij}]
\end{align*}\]

\begin{align*}
\text{wore} & \quad [\text{wowr}], \quad \text{hoarse} & \quad [\text{howrs}] \\
\text{horse} & \quad [\text{hors}] \\
\text{war} & \quad [\text{wɔr}] \\
\end{align*}

Many types of pronunciation, however, lack some or all of these differences; in these types either some of the diphthongs or some of the simple vowels do not occur before [r].

Diphthongs occur also in languages that do not treat syllabic and non-syllabic vowels as separate phonemes. In German the combinations [aj] as in \textit{Eis} [ajs] ‘ice,’ [oj] as in \textit{neu} [noj] ‘new,’ and [aw], as in \textit{Haus} [haws] ‘house,’ are treated, structurally, as unit phonemes. As in English, the constituents differ greatly from their ordinary form: the non-syllabics have mid-vowel quality rather than high, and the [oj], especially, exists in several varieties, resembling, in some pronunciations, rather a combination of rounded front vowels, say [oʊ].

Diphthongs like the English and German, where the syllabic part precedes, are called \textit{falling} diphthongs, in contrast with \textit{rising} diphthongs, in which the non-syllabic part precedes. Thus, in French, combinations like [je], as in \textit{fier} [fje:r] ‘proud,’ and [wa], as in \textit{moi} [mwa] ‘I,’ are treated structurally as unit phonemes; in Italian, the combinations [je, wo] are treated as diphthongs; the same is true of [je, we] in Spanish.

Some languages have compound phonemes of syllabic vowels and non-syllabic consonants. In Lithuanian the phonemes [l, r, m, n] are never syllabic, but combinations like [al, ar, am, an] are treated structurally and accentually as diphthongs, quite on a par with [aj] or [aw].

7. 12. Since syllabication is a matter of the relative loudness of phonemes, it can be re-enforced or opposed by adjustments of stress. The re-enforcing habit prevails probably in most languages. In French, where stress is not distinctive, every syllable is re-enforced by a slight increase of stress on its syllabic; if there is only one non-syllabic before the syllabic, the rise begins on this non-syllabic; if there are two, different groups are treated differently: \textit{pertinacité} [pɛʁ-ti-na-si-te] ‘pertinacity,’ \textit{patronnesse} [pa-trɔ-nɛs] ‘patroness.’ This distribution of minute rises and falls of stress is non-distinctive, since it is determined entirely by the
character of the primary phonemes. It gives the language, to our ears, a rapid, pattering or drumming sound. The same habit prevails also in many stress-using languages, such as Italian, Spanish, Polish, Bohemian, and even in Russian, which not only has distinctive stress, but also weakens the unstressed vowels. Thus, in Italian *pertinacia* \(\text{[per-ti-}\text{\textasciitilde}\text{na-}\text{\textasciitilde}a]\) ‘stubbornness’ or *patronessa* \(\text{[pa-tro-}\text{\textasciitilde}\text{nes-sa}\text{]}\) ‘patroness,’ the syllables are divided by ups and downs of stress, which are well-marked in the accented syllables, and slight in the others.

English and the other Germanic languages do not mark off the unstressed syllables by ups and downs of stress. In a word like *dimity* \(\text{[\text{'dimiti}\text{]}\)} or *patroness* \(\text{[\text{'pejtronis}\text{]}\)}, the stress merely drops off after its high point on the first syllable. Evidently there are three syllables, because there are three crests of natural sonority, but it would be impossible to say where one syllable ends and the next begins. In forms like *pertinacity* \(\text{[\text{'perti\text{\textasciitilde}nEsiti}\text{]}\)}, the beginnings of the stressed syllables are plainly marked by the onset of stress, but no other syllable-boundaries are in any way marked off.

The distribution of stress may create crests of sonority which are independent of the natural sonority of the phonemes. We have seen that in English the phonemes \([l, n]\) may be louder than the surrounding phonemes, and therefore syllabic, thanks to a slight increase of stress.

The distribution of stress may even overcome relations of natural sonority. In a combination like \([dzd]\), the \([z]\) is more sonorous than the \([d]\)’s, and in \([kst]\) the \([s]\) is more sonorous than the stops, but in English our single high stress on forms like *adzed* \(\text{[\text{'dzed}\text{]}\)} , *text* \(\text{[\text{tekst}\text{]}\)}, *step* \(\text{[\text{step}\text{]}\)} is so loud that it drowns out these small differences of sonority. Some stress-using languages in this way drown out even the sonority of predominantly musical sounds: thus, Russian speaks the following, thanks to stress, as one-syllable words: \([\text{lba}\text{]}\) ‘of the forehead,’ \([\text{rta}\text{]}\) ‘of the mouth’; Polish, similarly *trwa* \(\text{[\text{trva}\text{]}\)} ‘it lasts,’ *msza* \(\text{[\text{m\text{\textasciitilde}a}\text{]}\)} ‘mass.’
CHAPTER 8

PHONETIC STRUCTURE

8. 1. Descriptions of speech-sounds like those in the last two chapters, are due merely to chance observation. These descriptions are made in terms of a speaker’s movements: more refined physiological observation may show that some of them are wrong. What is more serious, the differences and varieties that are observed, such as, say, the difference between French and English unvoiced stops \([p, t, k]\), are not selected by any fixed principles (such as acoustic phonetics may some day give us), but owe their currency to the chance that some observer with a good ear had heard both of the languages concerned. Just as observation of South German dialects or of certain American Indian languages adds to the varieties of unvoiced stops that could be gathered from standard English and standard French, so the study of almost any new dialect will increase the repertoire of differences which a phonetician can hear. The extent of observation is haphazard, its accuracy doubtful, and the terms in which it is reported are vague. Practical phonetics is a skill, for the student of languages often a very useful skill, but it has little scientific value.

For this reason it is beyond our power to analyze the general acoustic effect of a language. We can explain certain superficial effects: the “pattering” run of Italian (to English ears) is due to the syllable-division; the “guttural” sound of Dutch (to our sense), to the use of a uvular trill (§ 6.7) and of velar spirants (§ 6.8). In general, however, such observations of the “basis of articulation” are bound to be vague. English (in contrast, say, with French or German) retracts the jaw; the Central and Western type of American English adds a tendency to raise the tip of the tongue. German and French (in contrast with English) advance the jaw and use the muscles more vigorously — German in large, sweeping movements, French in smaller and more precise ones, especially in the front of the mouth. Danish draws the muscles in toward the median line. Such observations are often helpful toward understanding or imitating a pronunciation, but they are
hazy and inaccurate. We must wait for laboratory phonetics to give us precise and trustworthy statements.

The important thing about language, however, is not the way it sounds. The speaker's movement, the disturbance in the air, and the hearer's ear-drum vibrations (the B of § 2.2) are, in themselves, of very little moment. The important thing about language is its service in connecting the speaker's stimulus (A in § 2.2) with the hearer's response (C in § 2.2). This connection depends, as we have seen (§ 5.4), upon only a relatively few features of the acoustic form, upon the features which we call phonemes. For the working of language, all that is necessary is that each phoneme be unmistakably different from all the others. Except for this differentiation, its range of variety and its acoustic character are irrelevant. Any language can be replaced, for all its essential values, by any system of sharply distinct signals, provided that one signal is made to replace each phoneme of the language. Such a replacement is made in a correct phonetic transcription— one which satisfies the demands of accuracy and relevancy by using one and only one symbol for each phoneme. Imperfectly and yet sufficiently well for practical purposes, such a replacement is made in traditional alphabetic writing. The importance of a phoneme, then, lies not in the actual configuration of its sound-waves, but merely in the difference between this configuration and the configurations of all the other phonemes of the same language.

For this reason even a perfected knowledge of acoustics will not, by itself, give us the phonetic structure of a language. We shall always have to know which of the gross acoustic features are, by virtue of meanings, "the same," and which "different" for the speakers. The only guide to this is the speaker's situation and the hearer's response. Any description which fails to discriminate the distinctive features from the non-distinctive, can tell us little or nothing about the structure of a language. In this respect, a mechanical record has at least the virtue of not distorting the acoustic facts. The "exact" freehand records of zealous phonetic experts are likely to insist upon irrelevant acoustic differences that owe their notation merely to the circumstance that the observer has learned to respond to them. On this basis, it is possible to find the same set of "sounds" in languages of entirely different phonemic structure. For instance, both languages might show seven similar vowel "sounds," but in Language B these might be seven
different phonemes, while in Language A [ɛ] and [ɔ] might be non-distinctive variants of [a], and [e, o] respectively of [i, u]. Both languages might seem to show two durations of vowels, but these might be phonemic in Language A (as in German), while in Language B they might be non-distinctive variants. Both might show plain and aspirated unvoiced stops, as different phonemes in Language A and as mere non-distinctive variants in Language B. Both might have a series of voiced spirants, but these might be distinctive in Language B, while in Language A they existed merely as variants of st. ps between vowels.

Only the phonemes of a language are relevant to its structure — that is, to the work it does. A description of the non-distinctive features might be of great interest, but for this it would have to be more complete and more copious than any that have so far been made.

8.2. A list or table of the phonemes of a language should therefore ignore all non-distinctive features. Such lists or tables are usually made on the basis of practical-phonetic classifications, thus:

<table>
<thead>
<tr>
<th>Standard English</th>
</tr>
</thead>
<tbody>
<tr>
<td>stops, unvoiced</td>
</tr>
<tr>
<td>voiced</td>
</tr>
<tr>
<td>affricate, unvoiced</td>
</tr>
<tr>
<td>voiced</td>
</tr>
<tr>
<td>spirants, unvoiced</td>
</tr>
<tr>
<td>voiced</td>
</tr>
<tr>
<td>nasals</td>
</tr>
<tr>
<td>lateral</td>
</tr>
<tr>
<td>trill</td>
</tr>
<tr>
<td>semivowels</td>
</tr>
<tr>
<td>vowels, high</td>
</tr>
<tr>
<td>higher mid</td>
</tr>
<tr>
<td>lower mid</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>secondary phonemes:</td>
</tr>
<tr>
<td>stress</td>
</tr>
<tr>
<td>syllabic-stress</td>
</tr>
<tr>
<td>pitch</td>
</tr>
</tbody>
</table>

Tables like these, even when they exclude non-distinctive features, are nevertheless irrelevant to the structure of the language,
because they group the phonemes according to the linguist’s notion of their physiologic character, and not according to the parts which the several phonemes play in the working of the language. Our table does not show, for instance, that [l, n] sometimes serve as syllabics in unstressed syllables ($\S\ 7.10$). It does not show which vowels are the syllabic correspondents of the semivowels [j] and [w], or the peculiarity of articulation, thanks to which these semivowels figure as separate phonemes, in contrast with the simpler distribution of [æ:] versus [r]. It does not show which vowels and semivowels combine into compound phonemes. To show these structural facts, we should need a supplementary table something like this:

I. Primary phonemes:
   
   A. Consonants, always or sometimes non-syllabic:
      
      1. Mutes, always non-syllabic: [p t k b d g ŋ dʒ f θ s j h v ə z ʒ m ŋ]
      
      2. Sonants, sometimes syllabic:
         
         a. Consonantoids, syllabicity determined partly by syllabic-stress; not diphthong-forming: [ŋ l]
         
         b. Vocaloids, diphthong-forming:
            
            (1) Semi-consonant, syllabicity determined entirely by surroundings: [r-æ:]
            
            (2) Semivowels, syllabicity determined also by manner of articulation:
               
               (a) Non-syllabic: [j w]
               
               (b) Syllabic: [i u]
   
   B. Vowels, always syllabic:
      
      1. Diphthongs and triphthong, compound phonemes: [ij uw cæ ow aɪ aw ɔj juw iɻ uǝ eǝ-ǝǝ]
      
      2. Simple vowels: [e ə ɔ ɔ: ø:]

II. Secondary phonemes:
   
   A. Syllabic-stress, applied to semi-consonants: [i]
   
   B. Form-stress, applied to meaningful forms: [" ' i]
   
   C. Pitch, relating to end of utterance:
      
      1. Medial: [i]
      
      2. Final: [i ? !]

8. 3. The parts which our phonemes play in the structure of our language are in reality much more diverse than this; in fact, we can easily show that no two of them play exactly the same part.
Since every utterance contains, by definition, at least one syllabic phoneme, the simplest way to describe the phonetic structure of a language is to state which non-syllabic phonemes or groups of non-syllabic phonemes (clusters) appear in the three possible positions: initial, before the first syllabic of an utterance; final, after the last syllabic of an utterance; and medial, between syllables.

In this respect the diphthongs and triphthong play in English the same part as do the simple vowels; it is precisely this fact that compels us to class them as compound phonemes and not as mere successions of phonemes.

For convenience, I shall place a number before each phoneme or group of phonemes that shows any peculiarity in its structural behavior.

Taking first the initial non-syllabics, we find at the outset that two phonemes never begin an utterance; they are (1) [ŋ, 3]. We ignore foreign forms, such as the French name Jeanne [ʒan].

Further, six of the non-syllabics that occur in initial position never appear as members of an initial cluster: (2) [v, ð, z, ʒ, ʃ, j].

The initial clusters all begin with one of the following non-syllabics: (3) [p, t, k, b, d, g, f, θ, s, ʃ, h]. Here we find an accord between the structural grouping and our physiologic description, since our structural group (3) embraces exactly the physiologic groups of stops and unvoiced spirants.

If the first consonant of the cluster is (4) [s], it may be followed by one of the set (5) [p, t, k, f, m, n], as in spin, stay, sky, sphere, small, snail.

All the initials of group (3) and the combinations of (4) [s] with (6) [p, t, k] may be followed by one of the set (7) [w, r, l], with the following restrictions:

(8) [w] never comes after (9) [p, b, f, j], and never after the combination of (4) [s] with (10) [t]. The actual clusters, then, are illustrated by the words twin, quick, dwell, Gwynne, thwart, swim, when [hwən], squall.

(11) [r] never comes after (12) [s, h]. The clusters, therefore, are those which begin the words pray, tray, crow, bray, dray, gray, fray, three, shrink, spray, stray, scratch.

(13) [l] never comes after (14) [t, d, θ, ʃ, h], and never after the combination of (4) [s] with (15) [k]. The clusters, accordingly, are those which appear in play, clay, blue, glue, flew, slew, split.

8. 4. We come now to the final clusters. These are subject to
the general rule that the same phoneme never occurs in two adjoining positions: there are no such final groups as [ss] or [tt]. This rule holds good also for initial clusters and is implied by our description of them, but it does not hold good, as we shall see, for medial clusters.

We have undertaken to view combinations of vowel plus [j] or [w] as compound phonemes (diphthongs) and accordingly cannot count the semivowels in these combinations as final non-syllabics or parts of clusters. If, accordingly, we eliminate these cases (e.g. say [sej], go [gow]), we find that (16) [h, j, w] do not occur as final non-syllabics or members of final clusters. All the remaining non-syllabics occur in both of these functions.

English final clusters consist of two, three, or four non-syllabics. One can describe the combinations most simply by saying that each cluster consists of a main final consonant, which may be preceded by a pre-final, which in turn may be preceded by a second pre-final; further, the main final may be followed by a post-final. This gives us six possibilities:

<table>
<thead>
<tr>
<th>Without post-final</th>
<th>With post-final</th>
</tr>
</thead>
<tbody>
<tr>
<td>main final alone:</td>
<td>bet [-t]</td>
</tr>
<tr>
<td>pre-final plus main</td>
<td>test [-st]</td>
</tr>
<tr>
<td>final:</td>
<td></td>
</tr>
<tr>
<td>second pre-final plus</td>
<td>text [-kst]</td>
</tr>
<tr>
<td>pre-final plus main</td>
<td></td>
</tr>
<tr>
<td>final:</td>
<td></td>
</tr>
<tr>
<td>POST-FINAL</td>
<td></td>
</tr>
<tr>
<td>POST-FINAL</td>
<td></td>
</tr>
</tbody>
</table>

The consonants which occur as post-finals are (17) [t, d, s, z]. In a form like test or text we call the [-t] a main final, because there exist forms like tests, texts, in which a further consonant (a post-final) is added, but in a form like wished [wiʃt] we call the [-t] a post-final because the cluster [-ft] is not paralleled by any cluster with the addition of a further consonant: we have no such final cluster as, say, [-fts].

The occurrence of the post-finals is limited by three important restrictions. The post-finals (18) [t, s] are the only ones that occur after the main finals (19) [p, t, k, tʃ, f, θ, s, ʃ]; these same post-finals never occur after any other sounds; and the post-finals (20) [t, d] are the only ones that occur after the main finals (21) [tʃ, ʤ, s, z, ʃ, ʒ]. It is worth noticing that set (19) agrees, except for the absence of [h], with the physiological class of unvoiced sounds,
and that set (21) embraces the physiological classes of affricates and sibilants. These restrictions group the main finals into six classes:

Those in (19) but not in (21) may be followed by [t, s], as [p] in *help*, *helped*, *helps*;

those in neither (19) nor (21) may be followed by [d, z], as [b] in *grab*, *grabbed*, *grabs*;

those in (19) and (21) may be followed only by [t], as [ť] in *reach*, *reached*;

those in (21) but not in (19) may be followed only by [d], as [ď] in *urge*, *urged*;

[t] in (19) but not in (21), owing to the rule of no doubling, may be followed only by [s], as in *wait*, *waits*;

[d] in neither (19) nor (21), owing to the same rule, may be followed only by [z], as in *fold*, *folds*.

We turn now to the pre-finals. The main consonants (22) [g, ġ, ʒ, j, r] are never accompanied by a pre-final, and the consonants (23) [b, g, ʧ, ď, v, ğ, r] never occur as pre-finals. The combinations that remain are subject to the following further restrictions:

The pre-finals (24) [l, r] do not occur before the main final (25) [z]. Their combinations, accordingly, are those which appear in the following examples: *harp*, *barb*, *heart*, *hard*, *hark*, *march*, *barge*, *scarf*, *carve*, *hearth*, *farce*, *harsh*, *arm*, *barn*, *help*, *bulb*, *belt*, *held*, *milk*, *filch*, *bilge*, *pelf*, *delve*, *wealth*, *else*, *Welsh*, *elm*, *kilm*.

The pre-final (25) [n] occurs only before the main finals (27) [t, d, ʧ, ď, θ, s, z], as in *ant*, *sand*, *pinch*, *range*, *month*, *once*, *bronze*.

The pre-final (28) [m] occurs only before the main finals (29) [p, t, f, θ], as in *camp*, *dreamt*, *nymph*; the combination with (30) [θ] occurs with the second pre-final (11) [r]: *warmth*.

The pre-final (31) [ŋ] occurs only before (32) [k, θ], as in *link*, *length*.

The pre-final (4) [s] occurs only before (6) [p, t, k], as in *wasp*, *test*, *ask*. Before (10) [t] it may be preceded by the second pre-final (15) [k], as in *text*.

The pre-finals (33) [ę, z] occur only before the main final (28) [m], as in *rhythm*, *chasm*.

The pre-final (10) [t] occurs only before the main finals (34) [θ, s], as in *eighth* [eɪtθ], *Ritz* (compare, with post-final [t] added, the slang *ritzed* [ritst] ‘snubbed’). The combination with the main final (4) [s] occurs also with second pre-final (11) [r] in *quartz*. 
The pre-final (35) [d] occurs only before (36) [θ, z], as in width, adze.

The pre-finals (37) [p, k] occur only before the main finals (18) [t, s], as in crypt, lapse, act, tax. Of these two, the pre-final (15) [k] before the main final (4) [s] occurs also with the second pre-final (31) [n], as in minx (compare, with a post-final [t] added, the slang jinxed [dʒɪŋkst] 'gave bad luck'); the other, [p], occurs with the second pre-final (28) [m]; glimpse, tempt.

The pre-final (38) [f] occurs only before (10) [t], as in lift.

The medial non-syllabics of English consist of all the combinations of final plus initial, ranging from hiatus, complete lack of a non-syllabic, as in saw it ['sɔ: it], to such clusters as in glimpsed strips [-mpst str-], including repetitions of the same phoneme, as in that time [-t t-] or ten nights [-n n-].

8. 5. A survey of the 38 functional sets of non-syllabics will show that this classification suffices to define every non-syllabic phoneme in our language. In the same way, most or possibly all of our syllabic phonemes could be defined by the parts they play in the structure of our language. Since different types of standard English differ in the distributions of the syllabic phonemes, I shall mention only a few of the pattern features.

The syllabic semivowel [u] does not occur initially or finally; it occurs medially only before [t, k, d, s, f, m, l], as in put, took, wood, puss, push, room, pull. Of the vowels, only [a:] and [o:] and the unstressed [a] and [i] occur at the end of a word. In Southern British and some forms of American English the vowels and diphthongs merge with a following [r] in final position and before consonants into special types of articulation (§ 6.11): [ij-r] appears as [iə]: fear, feared, [uw-r] as [uə]: cure, cured, [ej-r] as [eə]: care, cared, [ow-r] as [ɔə] or [ɔː]: bore, bored, [aː-r] as [aː]: spar, sparrow. Structurally, we may either set up these equivalences (as was done in § 8.4, where [r] was listed as a pre-final and second pre-final), or we may simply say that the syllabics [aː, iə, uə, eə, ɔə, ɔː, əː] are peculiar in adding an [r] before a syllabic [stirring, fearing, curing, caring, sparring, boring). In either case we observe that [iad, ead] with other than a post-final [d] are rare: weird, laird are structurally peculiar words; so is cairn, with [ca:n]. Although [ɪ, ɛ, ɔ, ʌ] occur before [r], as in spirit, merit, carry, sorry, curry, they do not appear before the equivalent of a final or anteconsonantal [r].
The vowel [ɔː] does not occur before [ɡ] and the vowel [ɑː] does not occur after the initial non-syllabic sonant [w]. Before pre-final [l] the only permitted diphthongs are [ij, aj, ow], and the first two occur only when [d] follows, as in field, mild, old, colt. Before pre-final [n] only [aj, aw] occur with any freedom, as in pint, mount, bind, bound; [oj, ej] occur when [t] follows, as in paint, point. The diphthongs do not occur before [ŋ].

The triphthong [juː] differs from ordinary combinations of [j] plus vowel or diphthong (yank, year, Yale) in that it occurs after initial consonants, as in pew, cue, beauty, gules, few, hew, view, muse, and after the clusters [sp, st, sk], as in spew, stew, skew. After dentals, especially [θ, s, z, l], some speakers use [juː] and others [uw]: thews, sue, presume, lute; similarly, but with a wider prevalence of the [juː] variant, after [t, d, n], as in tune, dew, new. The triphthong does not occur after initial [tʃ, çʃ, f, s, r] and consonant plus [l].

We shall find that the grammatical structure of a language implies groupings of the phonemes which supplement the groups definable on the basis of succession (§ 13.6).

8. 6. The structural pattern differs greatly in different languages, and leads us to recognize different types of compound phonemes. German, for instance, has, on the whole, a structural scheme much like that of English, but with some striking differences. The voiced stops and spirants [b, d, g, v, z] never occur in final position. The initial groups can be simply described only if one takes the affricate combinations [pf, ts] as compound phonemes, as in Pfund [pfunt] ‘pound,’ zehn [tseːn] ‘ten,’ zwei [tsvaj] ‘two.’ The only diphthongs are [aj, aw, oj]; the simplicity of structure in this respect, leads phoneticians to transcribe them rather by [ai, au, oi], since no ambiguity can arise. The French system differs not only as to the particular clusters, but also in more general respects. The diphthongs are rising, such as [je, wa]. The greatest difference is in the use of the vowel phoneme [ə], whose occurrence is governed largely by the phonetic pattern, so that it may be said to play the part of a secondary rather than of a primary phoneme. The phoneme [ə] occurs wherever without it there would arise an unpermitted cluster of consonants. Thus, it occurs in le chat [lə ʃa] ‘the cat,’ because [lʃ] is not permitted as an initial cluster, but not in l’homme [l ɔm] ‘the man,’ where no cluster arises. It ap-
pears in cheval [ʃəval] ‘horse,’ since the cluster [ʃv] is not permitted initially, but since this cluster is permitted in medial position, one says un cheval [œʃəval] ‘a horse.’ The medial clusters are limited, for the most part to two consonants; thus, [ʁt] is permitted as a final cluster, as in porte [ʁɔʁt] ‘carries,’ but if an initial consonant follows, [œ] is inserted, as in porte bien [ʁɔʁtœ bjœ] ‘carries well.’ An entirely different system appears in a language like Plains Cree. The structure groups the phonemes into five sets: (1) the vowels [a, a:, e:, i, i:, u, o:]; these are the only syllabic phonemes; (2) consonants of four types: stops [p, t, k], including the affricate [tʃ]; spirants [s, h]; nasals [m, n]; semivowels [j, w]. The initial possibilities are: no consonant; any one consonant; stop, spirant, or nasal plus semivowel. The medial possibilities are: any one consonant; stop, spirant, or nasal plus semivowel; spirant plus stop; spirant plus stop plus semivowel. The only final possibility is one consonant. The Fox language, with a somewhat similar patterning, permits of no final consonant: every utterance ends in a short vowel.

While English is especially rich in consonant clusters, it is easy to find others, such as initial [pf-, pfl-, prfr-, ts-, tsv-, fn-, fn-, kn-, gn-] in German, e.g. Pflaume [‘pflawme] ‘plum,’ schwer [ʃue:ʁ] ‘heavy,’ Knie [knœi:] ‘knee,’ or the clusters in Russian [tku] ‘I weave,’ [mnu] ‘I squeeze,’ [ʃti] ‘cabbage-soup,’ [lʃfu] ‘I flatter.’ Final clusters foreign to English appear, for example, in German Herbst [herpst] ‘autumn’ and Russian [bɔrʃʃ] ‘beet-soup.’

8.7. Once we have defined the phonemes as the smallest units which make a difference in meaning, we can usually define each individual phoneme according to the part it plays in the structural pattern of the speech-forms. We observe, especially, that the structural pattern leads us to recognize also compound phonemes, which resemble successions of other phonemes, but play the part of a simple phoneme, and that very slight acoustic differences, such as, in English, the syllabic-stress on [l, n], or the greater tension of [j, w] compared to syllabic [i, u], may give rise to separate phonemes.

The phonemes so defined are the units of signaling; the meaningful forms of a language can be described as arrangements of primary and secondary phonemes. If we take a large body of speech, we can count out the relative frequencies of phonemes and of combinations of phonemes. This task has been neglected
by linguists and very imperfectly performed by amateurs, who confuse phonemes with printed letters. Taking the total number of phonemes in the text used as 100 per cent, a recent count for English shows the following percentage frequencies for consonant phonemes:

<table>
<thead>
<tr>
<th>Phoneme</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
<td>n</td>
<td>7.24</td>
</tr>
<tr>
<td>t</td>
<td>7.13</td>
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<tr>
<td>r</td>
<td>6.88</td>
</tr>
<tr>
<td>s</td>
<td>4.55</td>
</tr>
<tr>
<td>d</td>
<td>4.31</td>
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<tr>
<td>l</td>
<td>3.74</td>
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<tr>
<td>3</td>
<td>3.43</td>
</tr>
<tr>
<td>p</td>
<td>2.04</td>
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<tr>
<td>g</td>
<td>.74</td>
</tr>
<tr>
<td>f</td>
<td>1.84</td>
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<tr>
<td>j</td>
<td>.60</td>
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<tr>
<td>b</td>
<td>1.81</td>
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<td>ṫ</td>
<td>.52</td>
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<td>k</td>
<td>2.71</td>
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<tr>
<td>h</td>
<td>1.81</td>
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<td>3̆</td>
<td>.44</td>
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<tr>
<td>v</td>
<td>2.28</td>
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<tr>
<td>η</td>
<td>.96</td>
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<tr>
<td>3</td>
<td>.37</td>
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<td>2̆</td>
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<td>.05</td>
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The figures for [r, l, m, n] include the occurrences in syllabic function; those for [j] and [w] do not include the occurrences of these phonemes as parts of diphthongs or triphthong. The count of vowel phonemes is too confused to allow of plain reading. Apparently, [e] is the most-used, with a frequency of over 8 per cent; next comes [ij], with over 6 per cent; then [e], with 3.5 per cent. The figures for groups of phonemes are unusable. From this and similar counts it is evident that the phonemes of a language perform very different roles as to frequency. Moreover, there seems to be some resemblance between languages; thus, in languages which use two types of stops, such as our [p, t, k] versus [b, d, g], the stop of the unvoiced type in each pair is more frequent than its voiced mate, — for instance, [t] more frequent than [d]. A serious study of this matter is much to be desired.

8.8. We have seen three ways of studying the sounds of speech. Phonetics in the strict sense — that is, laboratory phonetics — gives us a purely acoustic or physiological description. It reveals only the gross acoustic features. In practice, the laboratory phonetician usually singles out for study some feature which his lay knowledge recognizes as characteristic of a phoneme. Practical phonetics is an art or skill, not a science; the practical phonetician frankly accepts his everyday recognition of phonemic units and tries to tell how the speaker produces them. The term phonology is sometimes placed in contrast with the two forms of phonetics: phonology pays no heed to the acoustic nature of the phonemes, but merely accepts them as distinct units. It defines each phoneme by its rôle in the structure of speech-forms. It is important to remember that practical phonetics and phonology presuppose a
knowledge of meanings: without this knowledge we could not ascertain the phonemic features.

The description of a language, then, begins with phonology, which defines each phoneme and states what combinations occur. Any combination of phonemes that occurs in a language, is pronounceable in this language, and is a phonetic form. The combination [mnu], for instance is unpronounceable in English, but the combination [men] is pronounceable and is a phonetic form.

When the phonology of a language has been established, there remains the task of telling what meanings are attached to the several phonetic forms. This phase of the description is semantics. It is ordinarily divided into two parts, grammar and lexicon.

A phonetic form which has a meaning, is a linguistic form. Thus, any English sentence, phrase, or word is a linguistic form, and so is a meaningful syllable, such as, say, [mel] in maltreat, or [man] in Monday; a meaningful form may even consist of a single phoneme, such as the [s] which means 'more than one' in plural-forms like hats, caps, books. In the following chapters we shall see how meanings are connected with linguistic forms.
9. 1. The study of speech-sounds without regard to meanings is an abstraction: in actual use, speech-sounds are uttered as signals. We have defined the meaning of a linguistic form as the situation in which the speaker utters it and the response which it calls forth in the hearer. The speaker's situation and the hearer's response are closely co-ordinated, thanks to the circumstance that every one of us learns to act indifferently as a speaker or as a hearer. In the causal sequence

speaker's situation \(\rightarrow\) speech \(\rightarrow\) hearer's response,

the speaker's situation, as the earlier term, will usually present a simpler aspect than the hearer's response; therefore we usually discuss and define meanings in terms of a speaker's stimulus.

The situations which prompt people to utter speech, include every object and happening in their universe. In order to give a scientifically accurate definition of meaning for every form of a language, we should have to have a scientifically accurate knowledge of everything in the speakers' world. The actual extent of human knowledge is very small, compared to this. We can define the meaning of a speech-form accurately when this meaning has to do with some matter of which we possess scientific knowledge. We can define the names of minerals, for example, in terms of chemistry and mineralogy, as when we say that the ordinary meaning of the English word salt is 'sodium chloride (NaCl),' and we can define the names of plants or animals by means of the technical terms of botany or zoology, but we have no precise way of defining words like love or hate, which concern situations that have not been accurately classified — and these latter are in the great majority.

Moreover, even where we have some scientific (that is, universally recognized and accurate) classification, we often find that the meanings of a language do not agree with this classification. The whale is in German called a 'fish': Walfisch ['val-fiʃ']
and the bat a 'mouse': *Fledermaus* ['fle:der-,maws']. Physicists view the color-spectrum as a continuous scale of light-waves of different lengths, ranging from 40 to 72 hundred-thousandths of a millimetre, but languages mark off different parts of this scale quite arbitrarily and without precise limits, in the meanings of such color-names as *violet*, *blue*, *green*, *yellow*, *orange*, *red*, and the color-names of different languages do not embrace the same gradations. The kinship of persons seems a simple matter, but the terminologies of kinship that are used in various languages are extremely hard to analyze.

The statement of meanings is therefore the weak point in language-study, and will remain so until human knowledge advances very far beyond its present state. In practice, we define the meaning of a linguistic form, wherever we can, in terms of some other science. Where this is impossible, we resort to makeshift devices. One is *demonstration*. If someone did not know the meaning of the word *apple*, we could instruct him by handing him an apple or pointing at an apple, and continuing, as long as he made mistakes, to handle apples and point at them, until he used the word in the conventional way. This is essentially the process by which children learn the use of speech-forms. If a questioner understood enough of our language, we could define the word *apple* for him by *circumlocution*—that is, in the manner of our dictionaries, by a roundabout speech which fitted the same situations as does the word *apple*, saying, for instance: "The well-known, firm-fleshed, smooth-skinned, round or oblong pome fruit of the trees of the genus Malus, varying greatly in size, shape, color, and degree of acidity." Or else, if we knew enough of the questioner's language, we could answer him by *translation*—that is, by uttering a roughly equivalent form of his language; if he were a Frenchman, for instance, we could give *pomme* [pɔ̃m] as the meaning of *apple*. This method of definition appears in our bilingual dictionaries.

9. 2. The situations which prompt us to utter any one linguistic form, are quite varied; philosophers tell us, in fact, that no two situations are ever alike. Each one of us uses the word *apple*, in the course of a few months, of many individual pieces of fruit which differ in size, shape, color, odor, taste, and so on. In a favorable case, such as that of the word *apple*, all the members of the speech-community have been trained, from childhood, to use
the speech-form whenever the situation (in this case, the object) presents certain relatively definable characteristics. Even in cases like this, our usage is never quite uniform, and most speech-forms have less clear-cut meanings. Nevertheless, it is clear that we must discriminate between non-distinctive features of the situation, such as the size, shape, color, and so on of any one particular apple, and the distinctive, or linguistic meaning (the semantic features) which are common to all the situations that call forth the utterance of the linguistic form, such as the features which are common to all the objects of which English-speaking people use the word apple.

Since our study ordinarily concerns only the distinctive features of form and meaning, I shall henceforth usually omit the qualification linguistic or distinctive, and speak simply of forms and meanings, ignoring the existence of non-distinctive features. A form is often said to express its meaning.

9. 3. Even if we had an accurate definition of the meaning that is attached to every one of the forms of a language, we should still face a difficulty of another sort. A very important part of every situation is the state of the speaker's body. This includes, of course, the predisposition of his nervous system, which results from all of his experiences, linguistic and other, up to this very moment — not to speak of hereditary and pre-natal factors. If we could keep an external situation ideally uniform, and put different speakers into it, we should still be unable to measure the equipment each speaker brought with him, and unable, therefore, to predict what speech-forms he would utter, or, for that matter, whether he would utter any speech at all.

If we had perfect definitions, we should still discover that during many utterances the speaker was not at all in the situation which we had defined. People very often utter a word like apple when no apple at all is present. We may call this displaced speech. The frequency and importance of displaced speech is obvious. We recall the infant "asking for" his doll (§ 2.5). Relayed speech embodies a very important use of language: speaker A sees some apples and mentions them to speaker B, who has not seen them; speaker B relays this news to C, C to D, D to E, and so on, and it may be that none of these persons has seen them, when finally speaker X goes and eats some. In other ways, too, we utter linguistic forms when the typical stimulus is absent. A starving beggar
at the door says I'm hungry, and the housewife gives him food: this incident, we say, embodies the primary or dictionary meaning of the speech-form I'm hungry. A petulant child, at bed-time, says I'm hungry, and his mother, who is up to his tricks, answers by packing him off to bed. This is an example of displaced speech. It is a remarkable fact that if a foreign observer asked for the meaning of the form I'm hungry, both mother and child would still, in most instances, define it for him in terms of the dictionary meaning. Lying, irony, jesting, poetry, narrative fiction, and the like, are probably as old and certainly as widespread as language. As soon as we know the dictionary meaning of a form, we are fully able to use it in displaced speech; our dictionaries and handbooks of foreign languages need tell us only the dictionary meaning. The displaced uses of speech are derived in fairly uniform ways from its primary value, and require no special discussion; nevertheless, they add to our uncertainty as to the forms that a given speaker will utter (if he speaks at all) in a given situation.

9. 4. Adherents of mentalistic psychology believe that they can avoid the difficulty of defining meanings, because they believe that, prior to the utterance of a linguistic form, there occurs within the speaker a non-physical process, a thought, concept, image, feeling, act of will, or the like, and that the hearer, likewise, upon receiving the sound-waves, goes through an equivalent or correlated mental process. The mentalist, therefore, can define the meaning of a linguistic form as the characteristic mental event which occurs in every speaker and hearer in connection with the utterance or hearing of the linguistic form. The speaker who utters the word apple has had a mental image of an apple, and this word evokes a similar image in a hearer's mind. For the mentalist, language is the expression of ideas, feelings, or volitions.

The mechanist does not accept this solution. He believes that mental images, feelings, and the like are merely popular terms for various bodily movements, which, so far as they concern language, can be roughly divided into three types:

(1) large-scale processes which are much the same in different people, and, having some social importance, are represented by conventional speech-forms, such as I'm hungry (angry, frightened, sorry, glad; my head aches, and so on);

(2) obscure and highly variable small-scale muscular contractions and glandular secretions, which differ from person to person,
and, having no immediate social importance, are not represented by conventional speech-forms;

(3) soundless movements of the vocal organs, taking the place of speech-movements, but not perceptible to other people ("thinking in words," § 2.4).

The mechanist views the processes in (1) simply as events which the speaker can observe better than anyone else; the various problems of meaning, such as that of displaced speech (the naughty child saying I'm hungry), exist here no less than elsewhere. The mechanist believes that the processes in (2) are private habits left over, as traces, from the vicissitudes of education and other experience; the speaker reports them as images, feelings, and so on, and they differ not only for every speaker, but for every occasion of speech. The speaker who says, "I had the mental image of an apple," is really saying, "I was responding to some obscure internal stimuli of a type which was associated at some time in my past with the stimuli of an apple." The sub-vocal speech in (3) seems to the mechanist merely a derivative of the habit of actual speech-utterance; when we are assured that a speaker has inaudibly performed the speech-movements of a certain utterance ("thought it in words"), we face exactly the same problem as when he has audibly uttered the same speech-form. In sum, then, the "mental processes" seem to the mechanist to be merely traditional names for bodily processes which either (1) come within the definition of meaning as speaker's situation, or (2) are so distantly correlated with speech-utterance as to be negligible factors in the speaker's situation, or (3) are mere reproductions of the speech-utterance.

Although this difference of opinion plays a decisive part in our views about the fundamentals of language, as of other human activities, and although mentalists lean heavily upon their terminology in all discussion of meaning, the dispute has really very little to do with problems of linguistic meaning. The events which the mentalist designates as mental processes and the mechanist classifies otherwise, affect in every case only one person: every one of us responds to them when they occur within him, but has no way of responding to them when they occur in anyone else. The mental processes or internal bodily processes of other people are known to each one of us only from speech-utterances and other observable actions. Since these are all we have to work with, the mentalist in practice defines meanings exactly as does the mecha-
nist, in terms of actual situations; he defines *apple* not as "the image of the well-known, firm-fleshed, etc. . . . fruit," but, like the mechanist, omits the first three of these words, and, in fact, for all speakers except himself, merely infers that the image was present, either from the fact that the speaker used the word *apple*, or from some more definite utterance of the speaker's ("I had a mental image of an apple"). In practice, then, all linguists, both mentalists and mechanists, define meanings in terms of the speaker's situation and, whenever this seems to add anything, of the hearer's response.

9. 5. Linguistic meanings are more specific than the meanings of non-linguistic acts. A great deal of human co-operation is effected without language, by such means as gestures (for instance, pointing at something), the handling of objects (placing an object into someone's hand, dashing an object to the ground), contact (nudging, caressing), non-linguistic sounds, both non-vocal (snapping the fingers, applause) and vocal (laughing, crying), and so on. We must mention especially, in this last connection, the non-linguistic (non-distinctive) features of speech-sound, such as plaintive, angry, commanding, drawling "tones of voice"; the manner of speech, in fact, is, next to speech itself, our most effective method of signaling. Linguistic forms, however, result, for the most part, in far more accurate, specific, and delicate co-ordination than could be reached by non-linguistic means; to see this, one need only listen to a few chance speeches: *Four feet three and a half inches.* — *If you don't hear from me by eight o'clock, go without me.* — *Where's the small bottle of ammonia?* Apparent exceptions, such as elaborate systems of gesture, deaf-and-dumb language, signaling-codes, the use of writing, telegraphy, and so on, turn out, upon inspection, to be merely derivatives of language.

Since we have no way of defining most meanings and of demonstrating their constancy, we have to take the specific and stable character of language as a presupposition of linguistic study, just as we presuppose it in our everyday dealings with people. We may state this presupposition as the *fundamental assumption of linguistics* (§ 5.3), namely:

*In certain communities (speech-communities) some speech-utterances are alike as to form and meaning.*

This virtue of speech-forms is bought at the cost of rationality. The non-linguistic modes of communication are based directly
upon our bodily make-up, or else arise directly from simple social situations, but the connection of linguistic forms with their meanings is wholly arbitrary. What we call horse, the German calls Pferd [pfe:rt], the Frenchman cheval [ʃeval], the Cree Indian [misatim], and so on; one set of sounds is as unreasonable as any other.

Our fundamental assumption implies that each linguistic form has a constant and specific meaning. If the forms are phonemically different, we suppose that their meanings also are different — for instance, that each one of a set of forms like quick, fast, swift, rapid, speedy, differs from all the others in some constant and conventional feature of meaning. We suppose, in short, that there are no actual synonyms. On the other hand, our assumption implies also that if the forms are semantically different (that is, different as to linguistic meaning), they are not "the same," even though they may be alike as to phonetic form. Thus, in English, the phonetic form [bɛə] occurs with three different meanings: bear 'to carry; to give birth to,' bear 'ursus,' and bare 'uncovered.' Similarly, [peər] represents two nouns (pear and pair) and a verb (pare), and many other examples will occur to the reader. Different linguistic forms which have the same phonetic form (and differ, therefore, only as to meaning) are known as homonyms. Since we cannot with certainty define meanings, we cannot always decide whether a given phonetic form in its various uses has always the same meaning or represents a set of homonyms. For instance, the English verb bear in bear a burden, bear troubles, bear fruit, bear offspring, can be viewed as a single form or as a set of two or perhaps even more homonyms. Similarly, charge, in charge the cannon with grapeshot, charge the man with larceny, charge the gloves to me, charge him a stiff price, can be viewed in several ways; the infantry will charge the fort seems to be different. The quality sloth and the animal sloth probably represent a pair of homonyms to some speakers and a single meaning to others. All this shows, of course, that our basic assumption is true only within limits, even though its general truth is presupposed not only in linguistic study, but by all our actual use of language.

9. 6. Although the linguist cannot define meanings, but must appeal for this to students of other sciences or to common knowledge, yet, in many cases, having obtained definitions for some forms, he can define the meanings of other forms in terms of
these first ones. The mathematician, for instance, who is here acting as a linguist, cannot define such terms as one and add, but if we give him a definition of these, he can define two ('one added to one'), three ('one added to two'), and so on, without end. What we see plainly in mathematical language, where the denotations are very precise, appears also in many ordinary speech-forms. If the meanings of the English past tense and of the word go are defined, the linguist can define went as 'the past of go.' If the difference male : female is defined for the linguist, he can assure us that this is the difference between he : she, lion : lioness, gender : goose, ram : ewe. The linguist has this assurance in very many cases, where a language, by some recognizable phonetic or grammatical feature, groups a number of its forms into form-classes: in any one form-class, every form contains an element, the class-meaning, which is the same for all forms of this form-class. Thus, all English substantives belong to a form-class, and each English substantive, accordingly, has a meaning, which, once it is defined for us (say, as 'object'), we can attribute to every substantive form in the language. English substantives, further, are subdivided into the two classes of singular and plural; granted a definition of the meanings of these two classes, we attribute one of these meanings to every substantive.

In every language we find certain forms, substitutes, whose meaning consists largely or entirely of class-meanings. In English, the pronouns are the largest group of substitutes. The pronouns show us a very interesting combination of meanings. The principal features are class-meanings; thus, somebody, someone have the class-meanings of substantives, singulars, personals; he has the class-meanings of substantives, singulars, personals, males; it has the class-meanings of substantives, singulars, non-personals; they has the class-meanings of substantives and plurals. In the second place, a pronoun may contain an element of meaning which makes the pronoun represent some particular substantive form of the language. Thus, the pronouns some and none tell us that the particular substantive is one which has been recently mentioned (Here are apples : take some); in contrast with this, something, somebody, someone, nothing, nobody, no one tell nothing about the species. Thirdly, some pronouns contain an element of meaning which tells us which particular objects in a species are concerned. Thus, he, she, it, they imply that not only the species (say, policeman) has
been mentioned, but also that the particular object of this species (say, Officer Smith, or the one at this corner) has been identified. This feature of meaning, once defined, will be found in various other forms of our language; it occurs, apparently without admixture, as the meaning of the article the, for this little word tells us only that the following substantive denotes an identified individual of a species.

In sum, then, we may say that certain meanings, once they are defined, can be recognized as recurring in whole series of forms. In particular, the last-named type, which has to do with the identification of individual objects of a species, in the way of selection, inclusion, exclusion, or numbering, elicits very uniform responses from different persons, and recurs with relative uniformity in different languages; these types of meaning, accordingly, give rise to the specially accurate form of speech which we call mathematics.

9.7. Vocal gestures, serving an inferior type of communication, occur not only outside of speech, as in an inarticulate outcry, but also in combination with speech-forms, in the disposition of non-distinctive features of speech-sound, such as the "tone of voice." Some conventional speech-forms, in fact, seem to lie on the border-line; thus, we have seen that, in English, the exclamations pst [pst] and sh [/], with which we demand silence, violate the phonetic pattern by the use as syllables of the relatively un-sonorous phonemes [s, f]. Less striking deviations from the phonetic pattern sometimes occur in words whose meaning resembles that of a pointing gesture. In English the initial phoneme [ð] occurs only in words of demonstrative and related meanings, such as this, that, the, then, there, though; in Russian, the phoneme [e] occurs initially in none but demonstrative words, such as ['eto] 'this.'

Non-phonemic, gesture-like features may become fairly fixed. In Plains Cree the word [e:] 'yes' is ordinarily spoken with a diphthongal glide in the vowel and a final glottal stop, somewhat as [ee:ʔ], although neither of these features is phonemic in the language. In our slang fashions, peculiar pitch-schemes occasionally become fixed for certain values; in the last years, Yeah? and Is that so? with a peculiar modification of the question-pitch, have been used as facetious vulgarisms, expressing disbelief.

The latter expression has also a form Is sat so? which illustrates another phase of unusual linguistic features, facetious mispronun-
ciation. To say Please, excuse me, for instance, is a form of tired wit. These distortions get their value from a resemblance to other linguistic forms (as in our example, the word ox) or to the speech-forms of foreigners, sub-standard speakers, and children, as in the facetious use of [oj] for [r] in words like bird (imitating the sub-standard speech of New York City), or in the use of baby-talk (Atta boy! Atta dirl!).

Certain expressions have slurred and shortened by-forms in which the phonetic pattern is lost; these are common formulas of social intercourse, such as greetings and terms of address. Thus, How do you do? is shortened in all manner of ways into forms which cannot be recorded in terms of English phonemes, but only suggested by such sketches as [ʤ̃ˈduw] or [dˈduw]; How are you? is something like [hwaj, haj]; madam appears as [m] in Yes'm. These by-forms occur only in the formula; in asking How do you do it? [ˈhaw ʤu ˈduw it.] for example, we do not use the over-slurred form. These shortened forms occur in various languages; their relation to normal speech is obscure, but evidently they represent a kind of sub-linguistic communication, in which the ordinary meaning of the forms plays no part.

We can mention any sound by means of a rough imitation in terms of vocal sound, as when we tell the calls of animals, or when we report the noise of an engine. In this way we can also mention speech-sounds; talking about a person who lisps, for instance, someone may say, "I am tired of his eternal yeth, yeth." The commonest case is hypostasis, the mention of a phonetically normal speech-form, as when we say, "That is only an if," or "There is always a but," or when we talk about "the word normalcy" or "the name Smith." One may even speak of parts of words, as I shall speak in this book of "the suffix -ish in boyish." Hypostasis is closely related to quotation, the repetition of a speech.

9.8. The peculiarities of the forms discussed in the last paragraph consist in deviations from the ordinary tie-up of phonetic form with dictionary meaning. When there is no such deviation, and only a normal phonetic form with a dictionary meaning is to be considered, the latter will still exhibit great complexity. We have already seen that present-day knowledge does not suffice to unravel all the entanglements of meaning, but there are two main features of the dictionary meaning of speech-forms which demand such comment as we are able to make.
Very many linguistic forms are used for more than one typical situation. In English, we speak of the head of an army, of a procession, of a household, or of a river, and of a head of cabbage; of the mouth of a bottle, cannon, or river; of the eye of a needle, and of hooks and eyes on a dress; of the teeth of a saw; of the tongue of a shoe or of a wagon; of the neck of a bottle and of a neck of the woods; of the arms, legs, and back of a chair; of the foot of a mountain; of hearts of celery. A man may be a fox, an ass, or a dirty dog; a woman, a peach, lemon, cat, or goose; people are sharp and keen or dull, or else bright or foggy, as to their wits; warm or cold in temperament; crooked or straight in conduct; a person may be up in the air, at sea, off the handle, off his base, or even beside himself, without actually moving from the spot. The reader will be able to add examples practically without limit; there is no greater bore than the enumeration and classification of these "metaphors."

The remarkable thing about these variant meanings is our assurance and our agreement in viewing one of the meanings as normal (or central) and the others as marginal (metaphoric or transferred). The central meaning is favored in the sense that we understand a form (that is, respond to it) in the central meaning unless some feature of the practical situation forces us to look to a transferred meaning. If we hear someone say There goes a fox! we look for a real fox, and if this is out of the question, we are likely to take the utterance as displaced speech: (say, as make-believe or as part of a fairy-tale). Only if some situational feature forces us — say, if the speaker is pointing at a man — do we take the form in the transferred sense. Even if we heard someone say, The fox promised to help her, we should think of a fairy-tale rather than of fox 'unscrupulous and clever person.' Sometimes the practical feature that forces us to take a form in transferred meaning, has been given by speech: Old Mr. Smith is a fox is bound to be taken in transferred meaning, because we do not call real foxes 'Mr.' or give them family-names. He married a lemon forces us to the transferred meaning only because we know that men do not go through a marriage ceremony with a piece of fruit. On the other hand, special practical situations may change all this. People who lived close to the Fox Indians might, without special constraint, take fox in our examples in the transferred sense 'member of the Fox nation.'
In some cases a transferred meaning is linguistically determined by an accompanying form. The word cat always has a transferred meaning when it is accompanied by the suffix -kin (catkin), and the word pussy when it is compounded with willow (pussy-willow); similarly, the word eye when it has the suffix -let (eyelet). The words dog, monkey, beard when they appear with the marks of verb derivation (say, with a preceding to), always have transferred meaning (to dog someone's footsteps; don't monkey with that; to beard a lion in his den). These linguistic features may be purely negative: give out, used without an object (his money gave out; our horses gave out), always has a transferred meaning ('become exhausted'). In these cases the structure of the language recognizes the transferred meaning. Even a linguist who made no attempt to define meanings would have to specify that give out, intransitive, meant something different (was a different form) from give out, transitive (he gave out tickets).

In many cases we hesitate whether to view the form as a single form with several meanings or as a set of homonyms. Examples of this are air 'atmosphere; tune, melody; manner' (this last including airs 'haughty manners'), key 'instrument for locking and unlocking; set of tones in music,' charge 'attack; load; accuse; debit,' sloth 'name of an animal; laziness.'

We are likely to make the mistake of thinking that the transferred meanings of our language are natural and even inevitable in human speech — the more so, as they appear also in other European languages. This last, however, is merely a result of our common cultural traditions; while transferred meanings occur in all languages, the particular ones in any given language are by no means to be taken for granted. Neither in French nor in German can one speak of the eye of a needle or of an ear of grain. To speak of the foot of a mountain seems natural to any European, but it would be nonsense in Menomini and doubtless in many other languages. On the other hand, in Menomini [una: new] 'he places him in position' has also the transferred meaning 'he picks lice from him.' In Russian, [no'ga] 'leg' is not used of the leg of a chair or table; this transferred meaning appears only in the diminutive ['nofaska] 'little leg; leg of a chair or table.' Accordingly, when the linguist tries to state meanings, he safely ignores the uses of displaced speech, but does his best to register all cases of transferred meaning.
All this applies also to another type of deviant meaning, the *narrowed* meaning, with this difference, that we are far more ready to accept a form in a narrowed meaning. The practical situation guides us at once to take *car* in different narrowed senses in *The diner is the second car forward* (‘railroad-carriage’); *Does the car stop at this corner?* (‘street-car’); *Bring the car close to the curb* (‘motor-car’). When we hear the command to *call a doctor*, we take it at once to mean a *doctor of medicine*. A *burner* is primarily a person or instrument that burns things, but usually, in a narrowed sense, a gas-tap arranged to give a certain kind of flame. A *bulb* among gardeners is one thing and among electricians another. A *glass* is usually a drinking-glass or a looking-glass; *glasses* are usually eye-glasses. Narrowed meanings are hard to define, because, after all, every occurrence of a form is prompted by some one practical situation which need not contain all the possibilities of meaning: *apple* is used now of a green one, now of a red one, and so on.

The language itself, by formal characteristics, recognizes narrowed meanings in certain combinations. For instance, *blackbird* is not merely any ‘black bird’: in this combination the meaning of *black* is greatly narrowed; similarly *blueberry*, *whitefish*, and the like.

*Widened* meanings are less common. In general, *cat* is the domestic animal, but now and then we use the word to include lions, tigers, and so on; the word *dog*, however, is not similarly used to include wolves and foxes. On the other hand, *hound* is used poetically and facetiously of any kind of dog. Often, the widened meaning is recognized in the structure of the language, and appears only when certain accompanying forms are present. Thus *meat* is edible flesh, but in *meat and drink* and in *sweetmeats* it is food in general; *fowl* is an edible bird, but in *fish, flesh, or fowl* or *the fowl of the air* it is any bird.

Often enough the speakers of a language do not distinguish a central and a marginal meaning in cases where an outsider might see two situationally different values; thus, *day* in English means a period of twenty-four hours (Swedish *dygn* [ˈdyːn]) or the light part of this period (in contrast with *night*; Swedish *dag* [ˈdaːɡ]).

9. 9. The second important way in which meanings show instability, is the presence of supplementary values which we call *connotations*. The meaning of a form for any one speaker is nothing
more than a result of the situations in which he has heard this form. If he has not heard it very many times, or if he has heard it under very unusual circumstances, his use of the form may deviate from the conventional. We combat such personal deviations by giving explicit definitions of meaning; this is a chief use of our dictionaries. In the case of scientific terms, we manage to keep the meaning nearly free from connotative factors, though even here we may be unsuccessful; the number thirteen, for instance, has for many people a strong connotation.

The most important connotations arise from the social standing of the speakers who use a form. A form which is used by a less privileged class of speakers often strikes us as coarse, ugly, and vulgar. I ain't got none, I seen it, I done it sound nasty to the speaker of standard English. This may be offset by some special factor: the speech-forms of tramps or criminals may bear a connotation of devil-may-care wit, and those of a rustic type may strike us as homely but poetic. A form used by a more privileged class of speakers may strike us as over-formal or prettified and affected. Most speakers of Central-Western American English find this connotation in the use of [c] instead of [ç] in forms like laugh, bath, can't and of [juw] instead of [uw] in forms like tune, sue, stupid.

Connotations of local provenience are closely akin to these; a Scotch or an Irish locution has its own tang; so have, in America, certain real or supposed Anglicisms, such as luggage (for baggage) or old chap, old dear as terms of address.

Even in communities that have no writing, some forms are recognized (rightly or wrongly) as archaisms; in communities that have written records, these serve as additional sources of archaic forms. Examples are, in English, the old second-person singular forms (thou hast), the third-person forms in -th (he hath), the old present subjunctive (if this be treason), the pronoun ye, and many forms like eve, e'en, e'er, morn, anent, and so on. Sometimes fully current locutions may preserve some special aphoristic form; thus, an old sentence-construction survives in a few proverbs, such as First come, first served or Old saint, young sinner.

The connotation of technical forms gets its flavor from the standing of the trade or craft from which they are taken. Sea-terms sound ready, honest, and devil-may-care: abaft, aloft, the cut of his jib, stand by; legal terms precise and a bit tricky: without let or
hindrance, in the premises, heirs and assigns; criminals’ terms crass but to the point: a stickup, a shot (of whiskey), get pinched.

The connotation of learned forms is vaguer but more frequent: almost any colloquial form has a parallel form with learned connotation.

<table>
<thead>
<tr>
<th>Normal</th>
<th>Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>He came too soon.</td>
<td>He arrived prematurely.</td>
</tr>
<tr>
<td>It’s too bad.</td>
<td>It is regrettable.</td>
</tr>
<tr>
<td>Where’re you going?</td>
<td>What is your destination?</td>
</tr>
<tr>
<td>now</td>
<td>at present</td>
</tr>
<tr>
<td>if he comes</td>
<td>in case (in case that, in the event that, in the contingency that) he comes; should he come, . . .</td>
</tr>
<tr>
<td>so (that) you don’t lose it.</td>
<td>in order that you may not lose it, lest you lose it.</td>
</tr>
</tbody>
</table>

As these examples show, the learned, elegant, and archaic types of connotation merge in many a form. In formal speech and in writing, we customarily prefer learned forms, up to a certain degree: he who uses too many learned forms is a stilted speaker or a tiresome writer.

Foreign speech-forms bear connotations of their own, which reflect our attitude toward foreign peoples. The foreign features of form may consist in peculiarities of sound or of phonetic pattern: garage, mirage, rouge, a je ne sais quoi; olla podrida, chile con carne; dolce far niente, fortissimo; Zeitgeist, Wanderlust; intelligentsia. In other instances, the foreign feature lies in the construction, as in the French types marriage of convenience and that goes without saying. This flavor is turned to facetious use in mock-foreign forms, such as nix come erouse (mock-German), ish gabibble (‘it’s none of my concern,’ supposedly Judeo-German). Schoolboys use mock-Latinisms, such as the nonsense-form quid sidi quidit, or macaronic verse: Boyibus kissibus priti gilorum, girlibus likibus, wanti somorum.

Some languages, and most notably, perhaps, English, contain a great mass of semi-foreign or foreign-learned forms — a class of forms with a separate style of pattern and derivation. Our textbooks of rhetoric distinguish these forms, as the “Latin-French” part of our vocabulary, from the “native” or “Anglo-Saxon” forms. The connotation, however, does not depend directly upon the actual provenience of the forms. The word chair, for instance,
is Latin-French in origin, but does not belong to the foreign-learned part of our vocabulary. The chief formal characteristic of our foreign-learned forms is perhaps the use of certain accented suffixes and combinations of suffixes, such as [-iti] ability; [-'ejf'n] education. Another feature is the use of certain phonetic alternations, such as [sijv] in receive, but [sep] in reception and [sij] in receipt, or [vajd] in provide, but [vid] in provident, [viz] in visible, and [vi3] in provision. These peculiarities suffice to mark certain words and constituents of words as foreign-learned, especially certain prefixes (ab-, ad-, con-, de-, dis-, ex-, in-, per-, pre-, pro-, re-, trans-); these prefixes themselves in part show peculiar phonetic alternations, as in con-tain but collect, correct, and ab-jure but abs-tain. Semantically, our foreign-learned forms are peculiar in the capricious and highly specialized meanings of the combinations; it seems impossible, for instance, to set up any consistent meaning for elements like [sijv] in conceive, deceive, perceive, receive or [tend] in attend, contend, distend, pretend, or [d(j)uws] in adduce, conduce, deduce, induce, produce, reduce. The connotative flavor of these forms lies in the learned direction: a speaker's ability to use these forms measures his education. Errors in their use (malapropisms) mark the semi-educated speaker. The less educated speaker fails to understand many of these forms, and is to this extent shut out from some types of communication; he may take vengeance by using mock-learned forms, such as absquatulate, discombobulate, rambunctious, scrumptious. Many languages contain a foreign-learned layer of this kind: the Romance languages have a Latin type, largely identical with ours; Russian, beside a fair sprinkling of this type, has learned forms from Old Bulgarian; Turkish has a stratum of Persian and Arabic words, and Persian of Arabic; the languages of India similarly use Sanskrit forms.

Opposed to the foreign-learned connotation, the slangy connotation is facetious and unrestrained: the users of slang forms are young persons, sportsmen, gamblers, vagrants, criminals, and, for that matter, most other speakers in their relaxed and unpretentious moods. Examples are familiar, such as guy, gink, gazebo, gazook, bloke, bird for 'man,' rod or gat for 'pistol,' and so on; the slang form may at the same time be foreign, as loco 'crazy,' sabby 'understand,' vamoose 'go away,' from Spanish. The value is largely facetious; when the slang form has been in use too long, it is likely to be replaced by some new witticism.
9. 10. The varieties of connotation are countless and indefinable and, as a whole, cannot be clearly distinguished from denotative meaning. In the last analysis, every speech-form has its own connotative flavor for the entire speech-community and this, in turn, is modified or even offset, in the case of each speaker, by the connotation which the form has acquired for him through his special experience. It may be well, however, to speak briefly of two more types of connotation which stand out with at least relative clearness.

In many speech-communities certain improper speech-forms are uttered only under restricted circumstances; a speaker who utters them outside the restriction is shamed or punished. The strictness of the prohibition ranges from a mild rule of propriety to a severe tabu. The improper forms belong for the most part to certain spheres of meaning, but often enough there exist by their side forms with the same denotation but without the improper connotation, as prostitute by the side of the improper form whore.

Some improper forms denote objects or persons that are not to be named in a casual way, or perhaps not to be named at all. In English, various terms of religion, such as God, devil, heaven, hell, Christ, Jesus, damn are proper only in serious speech. Violation of the rule exposes the speaker to reproof or avoidance; on the other hand, in certain groups or under certain conditions, the violation connotes vigor and freedom. In many communities the names of persons are tabu under some circumstances or to some people. The male Cree Indian, for example, does not speak the names of his sisters and of some other female relatives; he explains the avoidance by saying, "I respect her too much."

Another direction of impropriety is the tabu on so-called obscene forms. In English there is a severe tabu on some speech-forms whose meaning is connected with excretory functions, and on some that deal with reproduction.

A third type of improper connotation is less universal among us; the avoidance of ominous speech-forms, which name something painful or dangerous. One avoids the words die and death (if anything should happen to me) and the names of some diseases. Other peoples avoid mention of the left hand, or of thunderstorms.

In some communities one avoids the names of game animals, either during the hunt or more generally. Under special conditions
(as, on the war-path), many speech-forms may be avoided, or inverted speech, saying the opposite of what one means, may be in order.

9. 11. The second more specialized type of connotation that here deserves to be pointed out, is intensity. The most characteristic intense forms are exclamations. For these we have in English not only a special secondary phoneme [!], but also certain special speech-forms, interjections, such as oh! ah! ouch! These forms all reflect a violent stimulus, but differ in connotation from an ordinary statement in which the speaker merely says that he is undergoing a strong stimulus.

Certain speech-forms have an animated flavor, akin to the exclamatory, as, for instance, the placing first of certain adverbs: Away ran John; Away he ran. In connected narrative a similar flavor appears in less violent transpositions: Yesterday he came (and said . . .) is more lively than He came yesterday . . . In English the historical present, in narrating past events, is either elegant, as in the summary of a play or story, or, in ordinary speech, slightly vulgar: Then he comes back and says to me . . .

English is especially rich in another type of intense forms, the symbolic forms. Symbolic forms have a connotation of somehow illustrating the meaning more immediately than do ordinary speech-forms. The explanation is a matter of grammatical structure and will concern us later; to the speaker it seems as if the sounds were especially suited to the meaning. Examples are flip, flap, flop, flitter, flimmer, flicher, flutter, flash, flush, flare, glare, glitter, glow, gloat, glimmer, bang, bump, bump, thump, thwack, whack, sniff, snuffle, snuff, sizzle, wheeze. Languages that have symbolic forms show some agreement, but probably more disagreement as to the types of sounds and meanings which are associated. A special type of symbolic form, which is quite widely distributed, is the repetition of the form with some phonetic variation, as in snip-snap, zig-zag, riff-raff, jim-jams, fiddle-faddle, teeny-tiny, ship-shape, hodge-podge, hugger-mugger, honky-tonk.

Closely akin to these are imitative or onomatopoetic intense forms, which denote a sound or an object which gives out a sound: the imitative speech-form resembles this sound: cock-a-doodle-doo, meew, moo, baa. Many bird names are of this sort: cuckoo, bob-white, whip-poor-will. Doubled forms are common: bow-wow, ding-dong, pee-see, choo-choo, chug-chug. These forms differ from
language to language: the French dog says *gnaf-gnaf* [j^af naf]; 
the German bell says *bim-bam*.

Among the forms just cited, some have an *infantile* connotation; 
they are *nursery-forms*. The most familiar are *papa* and *mama*. 
In English almost any doubled syllable may be used, in almost 
any meaning, as a *nursery-word*; each family develops its 
private supply of the type *[di’didj, dajdaj, dajdi, mijmi, wà:wa:]*. 
This custom provides speech-forms which the infant can repro­
duce with relative ease, and it helps adults to turn the infant’s 
utterances into conventional signals.

The *pet-name* or *hypochoristic* connotation largely merges with 
that of the nursery. In English, relatively few pet-names like *Lulu*, 
have the doubled nursery form; in French this type is common: 
*Mimi, Nana*, and so on. English pet-names are less uniform: 
*Tom, Will, Ed, Pat, Dan, Mike* can be described structurally as 
shortenings of the full name; this is not the case in *Bob* for *Robert*, 
*Ned* for *Edward, Bill* for *William, Dick* for *Richard, Jack* for *John*. 
Some have the diminutive suffix [-i], as *Peggy, Maggie* for *Mar­
garet, Fanny* for *Frances, Johnny, Willie, Billy*.

There is some intensity also in the connotation of *nonsense­
forms*. Some of these, though conventional, have no denotation 
at all, as *tra-la-la, hey-diddle-diddle, tarara-boom-de-ay*; others 
have an explicitly vague denotation, as *fol-de-rol, gadget, con­
niption fits*. Any speaker is free to invent nonsense-forms; in fact, 
any form he invents is a nonsense-form, unless he succeeds in 
the almost hopeless task of getting his fellow-speakers to accept 
it as a signal for some meaning.
CHAPTER 10

GRAMMATICAL FORMS

10. 1. Our discussion so far has shown us that every language consists of a number of signals, linguistic forms. Each linguistic form is a fixed combination of signaling-units, the phonemes. In every language the number of phonemes and the number of actually occurring combinations of phonemes, is strictly limited. By uttering a linguistic form, a speaker prompts his hearers to respond to a situation; this situation and the responses to it, are the linguistic meaning of the form. We assume that each linguistic form has a constant and definite meaning, different from the meaning of any other linguistic form in the same language. Thus, hearing several utterances of some one linguistic form, such as I'm hungry, we assume (1) that the differences in sound are irrelevant (unphonetic), (2) that the situations of the several speakers contain some common features and that the differences between these situations are irrelevant (unsemantic), and (3) that this linguistic meaning is different from that of any other form in the language. We have seen that this assumption cannot be verified, since the speaker's situations and the hearer's responses may involve almost anything in the whole world, and, in particular, depend largely upon the momentary state of their nervous systems. Moreover, when we deal with the historical change of language, we shall be concerned with facts for which our assumption does not hold good. In the rough, however, our assumption is justified by the mere fact that speakers co-operate in a very refined way by means of language-signals. In describing a language, we are concerned primarily with the working of this cooperation at any one time in any one community, and not with its occasional failures or with its changes in the course of history. Accordingly, the descriptive phase of linguistics consists in a somewhat rigid analysis of speech-forms, on the assumption that these speech-forms have constant and definable meanings (§ 9.5).

Our basic assumption does have to be modified, however, right at the outset, in a different way. When we have recorded a fair
number of forms in a language, we always discover a feature which we have so far ignored in our discussion: the partial resemblance of linguistic forms. Suppose we hear a speaker say

*John ran,*

and a little later hear him or some other speaker say

*John fell.*

We recognize at once that these two forms, *John ran* and *John fell,* are in part phonetically alike, since both of them contain an element *John* [dʒɔn], and our practical knowledge tells us that the meanings show a corresponding resemblance: whenever a form contains the phonetic element [dʒɔn], the meaning involves a certain man or boy in the community. In fact, if we are lucky, we may hear someone utter the form

*John!*

to itself, without any accompaniment.

After observing a number of such cases, we shall be constrained to modify the basic assumption of linguistics to read: In a speech-community some utterances are alike or partly alike in sound and meaning.

The common part of partly like utterances (in our example, *John*) consists of a phonetic form with a constant meaning: it answers, therefore, to the definition of a linguistic form. The parts which are not common to the partly-like utterances (in our example, *ran* in the one utterance, and *fell* in the other) may, in the same way, turn out to be linguistic forms. Having heard the form *John ran,* we may later hear the form *Bill ran,* and perhaps even (say, in answer to a question) an isolated *Ran.* The same will happen with the component *fell* in *John fell:* we may hear a form like *Dan fell* or even an isolated *Fell.*

In other cases, we may wait in vain for the isolated form. Knowing the forms *John, Bill,* and *Dan,* we may hear the forms, *Johnny, Billy,* and *Danny* and hope to hear now an isolated *-y* [-i] with some such meaning as 'little,' but in this instance we shall be disappointed. In the same way, familiar with the forms *play* and *dance,* we may hear the forms *playing* and *dancing,* and then hope, in vain, to hear an isolated *-ing* [-in], which might reassure us as to the somewhat vague meaning of this syllable. In spite of the fact that some components do not occur alone, but only as parts of larger forms, we nevertheless call these components linguistic
forms, since they are phonetic forms, such as [i] or [in], with constant meanings. A linguistic form which is never spoken alone is a bound form; all others (as, for instance, John ran or John or run or running) are free forms.

In other cases we wait in vain for the occurrence of a form even as part of some other form. For instance, having heard the form cranberry, we soon recognize the component berry in other forms, such as blackberry, and may even hear it spoken alone, but with the other component of cranberry we shall have no such luck. Not only do we wait in vain to hear an isolated *cran, but, listen as we may, we never hear this element outside the one combination cranberry, and we cannot elicit from the speakers any other form which will contain this element cran-. As a practical matter, observing languages in the field, we soon learn that it is unwise to try to elicit such forms; our questions confuse the speakers, and they may get rid of us by some false admission, such as, “Oh, yes, I guess cran means red.” If we avoid this pitfall, we shall come to the conclusion that the element cran- occurs only in the combination cranberry. However, since it has a constant phonetic form, and since its meaning is constant, in so far as a cranberry is a definite kind of berry, different from all other kinds, we say that cran-, too, is a linguistic form. Experience shows that we do well to generalize this instance: unique elements, which occur only in a single combination, are linguistic forms.

Sometimes we may be unable to decide whether phonetically like forms are identical in meaning. The straw- in strawberry is phonetically the same as the straw- in strawflower and as the isolated straw, but whether the meanings are “the same,” we cannot say. If we ask the speakers, they will answer sometimes one way, sometimes another; they are no more able to tell than we. This difficulty is part of the universal difficulty of semantics: the practical world is not a world of clear-cut distinctions.

10. 2. We see, then, that some linguistic forms bear partial phonetic-semantic resemblances to other forms; examples are, John ran, John fell, Bill ran, Bill fell; Johnny, Billy; playing, dancing; blackberry, cranberry; strawberry, strawflower. A linguistic form which bears a partial phonetic-semantic resemblance to some other linguistic form, is a complex form.

The common part of any (two or more) complex forms is a linguistic form; it is a constituent (or component) of these complex
forms. The constituent is said to be contained in (or to be included in or to enter into) the complex forms. If a complex form, beside the common part, contains a remainder, such as the cran- in cranberry, which does not occur in any other complex form, this remainder also is a linguistic form; it is a unique constituent of the complex form. The constituent forms in our examples above are: John, ran, Bill, fell, play, dance, black, berry, straw, flower, cran- (unique constituent in cranberry), -y (bound-form constituent in Johnny, Billy), -ing (bound-form constituent in playing, dancing). In any complex form, each constituent is said to accompany the other constituents.

A linguistic form which bears no partial phonetic-semantic resemblance to any other form, is a simple form or morpheme. Thus, bird, play, dance, cran-, -y, -ing are morphemes. Morphemes may show partial phonetic resemblances, as do, for instance, bird and burr, or even homonymy, as do pear, pair, pare, but this resemblance is purely phonetic and is not paralleled by the meanings.

From all this it appears that every complex form is entirely made up, so far as its phonetically definable constituents are concerned, of morphemes. The number of these ultimate constituents may run very high. The form Poor John ran away contains five morphemes: poor, John, ran, a- (a bound form recurring, for instance, in aground, ashore, aloft, around), and way. However, the structure of complex forms is by no means as simple as this; we could not understand the forms of a language if we merely reduced all the complex forms to their ultimate constituents. Any English-speaking person who concerns himself with this matter, is sure to tell us that the immediate constituents of Poor John ran away are the two forms poor John and ran away; that each of these is, in turn, a complex form; that the immediate constituents of ran away are ran, a morpheme, and way, a complex form, whose constituents are the morphemes a- and way; and that the constituents of poor John are the morphemes poor and John. Only in this way will a proper analysis (that is, one which takes account of the meanings) lead to the ultimately constituent morphemes. The reasons for this will occupy us later.

10. 3. A morpheme can be described phonetically, since it consists of one or more phonemes, but its meaning cannot be analyzed within the scope of our science. For instance, we have
seen that the morpheme *pin* bears a phonetic resemblance to other morphemes, such as *pig, pen, tin, ten,* and, on the basis of these resemblances, can be analyzed and described in terms of three phonemes (§ 5.4), but, since these resemblances are not connected with resemblances of meaning, we cannot attribute any meaning to the phonemes and cannot, within the scope of our science, analyze the meaning of the morpheme. The meaning of a morpheme is a *sememe.* The linguist assumes that each sememe is a constant and definite unit of meaning, different from all other meanings, including all other sememes, in the language, but he cannot go beyond this. There is nothing in the structure of morphemes like *wolf, fox,* and *dog* to tell us the relation between their meanings; this is a problem for the zoologist. The zoologist's definition of these meanings is welcome to JS as a practical help, but it cannot be confirmed or rejected on the basis of our science.

A workable system of signals, such as a language, can contain only a small number of signaling-units, but the things signaled about — in our case, the entire content of the practical world — may be infinitely varied. Accordingly, the signals (linguistic forms, with morphemes as the smallest signals) consist of different combinations of the signaling-units (phonemes), and each such combination is arbitrarily assigned to some feature of the practical world (sememe). The signals can be analyzed, but not the things signaled about.

This re-enforces the principle that linguistic study must always start from the phonetic form and not from the meaning. Phonetic forms — let us say, for instance, the entire stock of morphemes in a language — can be described in terms of phonemes and their succession, and, on this basis, can be classified or listed in some convenient order, as, for example, alphabetically; the meanings — in our example, the sememes of a language — could be analyzed or systematically listed only by a well-nigh omniscient observer.

10. 4. Since every complex form is made up entirely of morphemes, a complete list of morphemes would account for all the phonetic forms of a language. The total stock of morphemes in a language is its *lexicon.* However, if we knew the lexicon of a language, and had a reasonably accurate knowledge of each sememe, we might still fail to understand the forms of this language. Every utterance contains some significant features that are not accounted for by the lexicon. We saw, for instance, that the five
morphemes, *John, poor, ran, way, a-* which make up the form *Poor John ran away*, do not fully account for the meaning of this utterance. Part of this meaning depends upon the arrangement — for example, upon the order of succession — in which these morphemes appear in the complex form. Every language shows part of its meanings by the *arrangement* of its forms. Thus, in English, *John hit Bill* and *Bill hit John* differ in meaning by virtue of the two different orders in which the morphemes are uttered.

The meaningful arrangements of forms in a language constitute its *grammar*. In general, there seem to be four ways of arranging linguistic forms.

1. **Order** is the succession in which the constituents of a complex form are spoken. The significance of order appears strikingly in contrasts such as *John hit Bill* versus *Bill hit John*. On the other hand, *Bill John hit* is not an English form, because our language does not arrange these constituents in this order; similarly, *play-ing* is a form, but *ing-play* is not. Sometimes differences of order have connotative values; thus, *Away ran John* is livelier than *John ran away*.

2. **Modulation** is the use of secondary phonemes. Secondary phonemes, we recall (§ 5.11), are phonemes which do not appear in any morpheme, but only in grammatical arrangements of morphemes. A morpheme like *John* [dʒɔn] or *run* [rʌn] is really an abstraction, because in any actual utterance the morpheme is accompanied by some secondary phoneme which conveys a grammatical meaning. In English, if the morpheme is spoken alone, it is accompanied by some secondary phoneme of pitch (§ 7.6): it is either *John!* or *John?* or *John [.]* — this last with falling final-pitch, as, in answer to a question — and there is no indifferent or abstract form in which the morpheme is not accompanied by any final-pitch. In English complex forms, some of the constituents are always accompanied by secondary phonemes of stress (§ 7.3); thus, the difference in the place of stress distinguishes the noun *convict* from the verb *convict*.

3. **Phonetic modification** is a change in the primary phonemes of a form. For instance, when the forms *do* [duː] and *not* [nɔt] are combined into a complex form, the [uw] of *do* is ordinarily replaced by [ow], and, whenever this happens, the *not* loses its vowel, so that the combined form is *don't* [dɒnt]. In this example the modification is optional, and we have also the unmodified
forms in *do not*, with a difference of connotation. In other cases we have no choice. Thus, the suffix -ess with the meaning 'female,' as in count-ess, is added also to *duke* [d(j)uwk], but in this combination the form *duke* is modified to *duch-* [dʌʧ-], for the word is *duchess* ['dʌʧɪs].

Strictly speaking, we should say that the morpheme in such cases has two (or, sometimes, more) different phonetic forms, such as *not* [nɔt] and [nt], *do* [duw] and [dow], *duke* and *duch-* , and that each of these alternants appears under certain conditions. In our examples, however, one of the alternants has a much wider range than the other and, accordingly, is a basic alternant. In other cases, the alternants are more on a par. In *run* and *ran*, for instance, neither alternant is tied to the presence of any accompanying form, and we might hesitate as to the choice of a basic alternant. We find, however, that in cases like *keep* : *kep-t* the past-tense form contains an alternant (*kep-*) which occurs only with a certain accompanying form (-t); accordingly, to obtain as uniform as possible a statement, we take the infinitive form (*keep, run*) as basic, and describe the alternant which appears in the past tense (*kep-, ran*) as a phonetically modified form. We shall see other instances where the choice is more difficult; we try, of course, to make the selection of a basic alternant so as to get, in the long run the simplest description of the facts.

(4) *Selection* of forms contributes a factor of meaning because different forms in what is otherwise the same grammatical arrangement, will result in different meanings. For instance, some morphemes spoken with exclamatory final-pitch, are calls for a person's presence or attention (*John! Boy!*), while others, spoken in the same way, are commands (*Run! Jump!*), and this difference extends also to certain complex forms (*Mr. Smith! Teacher! versus Run away! Backwater!*). The forms which, when spoken with exclamatory final-pitch, have the meaning of a call, may be said, by virtue of this fact, to make up a form-class of the English language; we may call it the form-class of "personal substantive expressions." Similarly, the forms which, when spoken with exclamatory final-pitch, have the meaning of a command, make up, by virtue of this fact, the English form-class of "infinitive expressions." Whether an exclamation is a call or a command, depends upon the selection of the form from the one or the other of these two classes.
The meaning of a complex form depends in part upon the selection of the constituent forms. Thus, *drink milk* and *watch John* name actions, and, as we have just seen, are infinitive expressions, but *fresh milk* and *poor John* name objects and are substantive expressions. The second constituents, *milk*, and *John*, are the same; the difference depends upon the selection of the first constituent. By virtue of this difference, the forms *drink* and *watch* belong to one English form-class (that of "transitive verbs"), and the forms *fresh* and *poor* to another (that of "adjectives").

The features of selection are usually quite complicated, with form-classes divided into sub-classes. In English, if we combine a form like *John* or *the boys* (form-class of "nominative substantive expressions") with a form like *ran* or *went home* (form-class of "finite verb expressions"), the resultant complex form means that this object 'performs' this action (*John ran, the boys ran, John went home, the boys went home*). These features of selection, however, are supplemented by a further habit: we say *John runs fast* but *the boys run fast*, and we never make the reverse combinations of *John* with *run fast*, or of *the boys* with *runs fast*. The form-class of nominative expressions is divided into two sub-classes ("singular" and "plural") and the form-class of finite verb expressions likewise, into two sub-classes ("singular" and "plural"), such that in the complex forms which mean that an object performs an action, the two constituents agree as to the "singular" or "plural" sub-class. In Latin, the form *pater filium amat* (or *filium pater amat*) means 'the father loves the son,' and the form *patrem filius amat* (or *filius patrem amat*) means 'the son loves the father'; the forms *pater* 'father' and *filius* 'son' belong to a form-class ("nominative case") whose forms, in combination with a verb like *amat* 'he loves,' denote the 'performer' of the action; the forms *patrem* 'father' and *filium* 'son' belong to a different form-class ("accusative case"), whose forms, in combination with a verb like *amat*, denote the 'undergoer' ('object' or 'goal') of the action.

The features of selection are often highly arbitrary and whimsical. We combine *prince, author, sculptor* with the suffix -ess in *princess, authoress, sculptress* (in this last case with phonetic modification of [ə] to [r]), but not *king, singer, painter*. By virtue of this habit, the former words belong to a form-class from which the latter words are excluded.
10.5. The features of grammatical arrangement appear in various combinations, but can usually be singled out and separately described. A simple feature of grammatical arrangement is a grammatical feature or taxeme. A taxeme is in grammar what a phoneme is in the lexicon — namely, the smallest unit of form. Like a phoneme, a taxeme, taken by itself, in the abstract, is meaningless. Just as combinations of phonemes, or, less commonly, single phonemes, occur as actual lexical signals (phonetic forms), so combinations of taxemes, or, quite frequently, single taxemes, occur as conventional grammatical arrangements, tactic forms. A phonetic form with its meaning is a linguistic form; a tactic form with its meaning is a grammatical form. When we have occasion to contrast the purely lexical character of a linguistic form with the habits of arrangement to which it is subject, we shall speak of it as a lexical form. In the case of lexical forms, we have defined the smallest meaningful units as morphemes, and their meanings as sememes; in the same way, the smallest meaningful units of grammatical form may be spoken of as tagmemes, and their meanings as episememes.

The utterance *Run!*, for example, contains two grammatical features (taxemes), namely, the modulation of exclamatory final-pitch, and the selective feature which consists in the use of an infinitive verb (as opposed, for instance, to the use of a noun, as in *John!*). Each of these two taxemes happens to be, in English, a tactic form, since each is currently used as a unit of signaling. Taking each of them with its meaning, we describe them as units of grammatical form (tagmemes). The tagmeme of exclamatory final-pitch occurs with any lexical form and gives it a grammatical meaning (an episememe) which we may roughly describe, perhaps, as ‘strong stimulus.’ The tagmeme of selection by which infinitive forms are marked off as a form-class, has a grammatical meaning (an episememe) which we may call a class-meaning and roughly define as ‘action.’

A tagmeme may consist of more than one taxeme. For instance, in forms like *John ran; poor John ran away; the boys are here; I know*, we find several taxemes. One constituent belongs to the form-class of nominative expressions (*John, poor John, the boys, I*). The other constituent belongs to the form-class of finite verb expressions (*ran, ran away, are here, know*). A further taxeme of selection assigns certain finite verb expressions to certain nomina-
tive expressions; thus, the constituents are not interchangeable in the three examples *I am, John is, you are. A taxeme of order places the nominative expression before the finite verb expression: we do not say *ran John. Further taxemes of order, in part reversing the basic one, appear in special cases like did John run? away ran John; will John? A taxeme of modulation appears only in special cases, when the nominative expression is unstressed, as in *I know [aj 'now]. Taxemes of phonetic modification appear also in certain special cases, such as John's here, with [z] for is, or I'd go, with [d] for would. Now, none of these taxemes, taken by itself, has any meaning, but, taken all together, they make up a grammatical form, a tagmeme, whose meaning is this, that the one constituent (the nominative expression) 'performs' the other constituent (the finite verb expression).

If we say John ran! with exclamatory pitch, we have a complex grammatical form, with three tagmemes. One of these is 'strong stimulus,' the second is '(object) performs (action),' and the third has the episememe of 'complete and novel' utterance, and consists, formally, in the selective feature of using an actor-action phrase as a sentence.

10. 6. Any utterance can be fully described in terms of lexical and grammatical forms; we must remember only that the meanings cannot be defined in terms of our science.

Any morpheme can be fully described (apart from its meaning) as a set of one or more phonemes in a certain arrangement. Thus, the morpheme duke consists of the phonemes, simple and compound, [d], [juw], [k], in this order; and the morpheme -ess consists of the phonemes [i], [s], in this order. Any complex form can be fully described (apart from its meaning) in terms of the immediate constituent forms and the grammatical features (taxemes) by which these constituent forms are arranged. Thus, the complex form duchess ['dʌʃɪs] consists of the immediate constituents duke [djuwIk] and -ess [is], arranged in the following way:

Selection. The constituent duke belongs to a special class of English forms which combine with the form -ess. This form-class includes, for instance, the forms count, prince, lion, tiger, author, waiter, but not the forms man, boy, dog, singer; it is a sub-class of a larger form-class of male personal nouns. The form -ess constitutes a little form-class of its own, by virtue of the fact that it (and it alone) combines with precisely the forms in the class just
described. All these facts, taken together, may be viewed as a single taxeme of selection.

Order. The form -ess is spoken after the accompanying form.

Modulation. The form -ess is spoken unstressed; the accompanying form has a high stress.

Phonetic modification. The [juw] of duke is replaced by [ʌ], and the [k] by [tʃ].

Given the forms duke and -ess, the statement of these four grammatical features fully describes the complex form duchess.

Any actual utterance can be fully described in terms of the lexical form and the accompanying grammatical features. Thus, the utterance Duchess! consists of the lexical form duchess and the two taxemes of exclamatory final-pitch and selection of a substantive expression.

If some science furnished us with definitions of the meanings of the units here concerned, defining for us the meanings (sememes) of the two morphemes (duke and -ess) and the meanings (epi-sememes) of the three tagmemes (arrangement of duke and -ess; use of exclamatory final-pitch; selection of a substantive expression), then the meaning of the utterance Duchess! would be fully analyzed and defined.

10.7. The grammatical forms are no exception to the necessary principle — strictly speaking, we should call it an assumption — that a language can convey only such meanings as are attached to some formal feature: the speakers can signal only by means of signals. Many students of language have been misled in this matter by the fact that the formal features of grammar are not phonemes or combinations of phonemes which we can pronounce or transcribe, but merely arrangements of phonetic forms. For this our scholastic tradition may be largely to blame; if it were not for this tradition, there would perhaps be nothing difficult about the fact, for instance, that in English, John hit Bill and Bill hit John signal two different situations, or that convict stressed on the first syllable differs in meaning from convict stressed on the second syllable, or that there is a difference of meaning between John! and John? and John.

A form like John or run, mentioned in the abstract, without, for instance, any specification as to final-pitch, is, properly speaking, not a real linguistic form, but only a lexical form; a linguistic form, as actually uttered, always contains a grammatical form.
No matter how simple a form we take and how we utter it, we have already made some selection by virtue of which the utterance conveys a grammatical meaning in addition to its lexical content, and we have used some pitch-scheme which, in English at any rate, lends it a grammatical meaning such as ‘statement’ ‘yes-or-no question,’ ‘supplement-question,’ or ‘exclamation.’

The grammatical forms of a language can be grouped into three great classes:

(1) When a form is spoken alone (that is, not as a constituent of a larger form), it appears in some sentence-type. Thus, in English, the use of the secondary phoneme [!] gives us the sentence-type of exclamation, and the use of a substantive expression gives us the type of a call (John!).

(2) Whenever two (or, rarely, more) forms are spoken together, as constituents of a complex form, the grammatical features by which they are combined, make up a construction. Thus, the grammatical features by which duke and -ess combine in the form duchess, or the grammatical features by which poor John and ran away combine in the form poor John ran away, make up a construction.

(3) A third great class of grammatical forms must probably be set up for the cases where a form is spoken as the conventional substitute for any one of a whole class of other forms. Thus, the selective feature by which the form he in English is a conventional substitute for a whole class of other forms, such as John, poor John, a policeman, the man I saw yesterday, whoever did this, and so on (which forms, by virtue of this habit, constitute form-class of “singular male substantive expressions”), must doubtless be viewed as an example of a third class of grammatical forms, to which we may give the name of substitutions.
11.1. In any utterance, a linguistic form appears either as a constituent of some larger form, as does John in the utterance John ran away, or else as an independent form, not included in any larger (complex) linguistic form, as, for instance, John in the exclamation John! When a linguistic form occurs as part of a larger form, it is said to be in included position; otherwise it is said to be in absolute position and to constitute a sentence.

A form which in one utterance figures as a sentence, may in another utterance appear in included position. In the exclamation just cited, John is a sentence, but in the exclamation Poor John! the form John is in included position. In this latter exclamation, poor John is a sentence, but in the utterance Poor John ran away, it is in included position. Or again, in the utterance just cited, poor John ran away is a sentence, but in the utterance When the dog barked, poor John ran away, it is in included position.

An utterance may consist of more than one sentence. This is the case when the utterance contains several linguistic forms which are not by any meaningful, conventional grammatical arrangement (that is, by any construction) united into a larger form, e.g.: How are you? It's a fine day. Are you going to play tennis this afternoon? Whatever practical connection there may be between these three forms, there is no grammatical arrangement uniting them into one larger form: the utterance consists of three sentences.

It is evident that the sentences in any utterance are marked off by the mere fact that each sentence is an independent linguistic form, not included by virtue of any grammatical construction in any larger linguistic form. In most, or possibly all languages, however, various taxemes mark off the sentence, and, further, distinguish different types of sentence.

In English and many other languages, sentences are marked off by modulation, the use of secondary phonemes. In English, secondary phonemes of pitch mark the end of sentences, and distinguish three main sentence-types: John ran away [.]

ran away [?] Who ran away [i]. To each of these, further, we may add the distortion of exclamatory sentence-pitch, so that we get in all, six types, as described in § 7.6.

This use of secondary phonemes to mark the end of sentences makes possible a construction known as parataxis, in which two forms united by no other construction are united by the use of only one sentence-pitch. Thus, if we say It's ten o'clock [.] I have to go home [.] with the final falling pitch of a statement on o'clock, we have spoken two sentences, but if we omit this final-pitch (substituting for it a pause-pitch), the two forms are united, by the construction of parataxis, into a single sentence: It's ten o'clock [,] I have to go home [.]

Another feature of sentence-modulation in English and many other languages, is the use of a secondary phoneme to mark emphatic parts of a sentence. In English we use highest stress for this ("Now it's my turn," § 7.3). The emphatic element in English may be marked also by the use of special constructions (It was John who did that) and by word-order (Away he ran); in languages where stress is not significant, such methods prevail, as in French C'est Jean qui l'a fait [s e zä ki l a fe] 'It is John who did it.' Some languages use special words before or after an emphatic element, as Tagalog [ikaw 'ño' aŋ nag'sa:bi nijan] 'you (emphatic particle) the one-who-said that,' i.e. 'You yourself said so'; Menomini ['jo:hpeh 'niw, kan 'wenah 'wa:pah] 'Today (emphatic particle), not (emphatic particle) tomorrow.' Our high stress can even strike forms that are normally unstressed: of, for, and by the people; immigration and emigration.

11. 2. Beside features of modulation, features of selection may serve to mark off different sentence-types. This is the case in some of the examples just given, where a special construction, or the use of a special particle, marks an emphatic element. In English, supplement-questions are distinguished not only by their special pitch-phoneme [i], but also by a selective taxeme: the form used as a supplement-question either consists of a special type of word or phrase, which we may call an interrogative substitute, or else contains such a word or phrase; Who? With whom? Who ran away? With whom was he talking?

Perhaps all languages distinguish two great sentence-types which we may call full sentences and minor sentences. The difference consists in a taxeme of selection: certain forms are favorite
sentence-forms; when a favorite sentence-form is used as a sentence, this is a full sentence, and when any other form is used as a sentence, this is a minor sentence. In English we have two favorite sentence-forms. One consists of actor-action phrases — phrases whose structure is that of the actor-action construction: *John ran away. Who ran away? Did John run away?* The other consists of a command — an infinitive verb with or without modifiers: *Come! Be good!* This second type is always spoken with exclamatory sentence-pitch; the infinitive may be accompanied by the word *you* as an actor: *You be good!* As these examples show, the meaning of the full sentence-type is something like 'complete and novel utterance' — that is, the speaker implies that what he says is a full-sized occurrence or instruction, and that it somehow alters the hearer's situation. The more deliberate the speech, the more likely are the sentences to be of the full type. The nature of the episememe of full sentences has given rise to much philosophic dispute; to define this (or any other) meaning exactly, lies beyond the domain of linguistics. It is a serious mistake to try to use this meaning (or any meanings), rather than formal features, as a starting-point for linguistic discussion.

Quite a few of the present-day Indo-European languages agree with English in using an actor-action form as a favorite sentence-type. Some, such as the other Germanic languages and French, agree also in that the actor-action form is always a phrase, with the actor and the action as separate words or phrases. In some of these languages, however — for instance, in Italian and Spanish and in the Slavic languages — the actor and the action are bound forms which make up a single word: Italian *canto* ['kant-o] 'I sing,' *canti* ['kant-ij 'thou singest,' *cant-a* ['kant-a] 'he (she, it) sings,' and so on. A word which contains a favorite sentence-form of its language is a sentence-word.

Some languages have different favorite sentence-types. Russian has an actor-action type of sentence-word finite verbs, like those of Italian: [po'ju] 'I sing,' [po'joj] 'thou singest,' [po'jot] 'he (she, it) sings,' and so on. In addition to this, it has another type of full sentence: [i'van du'rak] 'John (is) a fool,' [sol'dat 'xrabr] 'the soldier (is) brave,' [o'tets 'doma] 'Father (is) at home.' In this second type, one component, which is spoken first, is a substantive; the other form is a substantive to which the first
is equated, or an adjective (adjectives have a special form for this use), or an adverbial form.

When a language has more than one type of full sentence, these types may agree in showing constructions of two parts. The common name for such bipartite favorite sentence-forms is *predications*. In a predication, the more object-like component is called the *subject*, the other part the *predicate*. Of the two Russian types, the former is called a *narrative* predication, the latter an *equational* predication. For a language like English or Italian, which has only one type of bipartite sentence, these terms are superfluous, but often employed: *John ran* is said to be a predication, in which the actor (*John*) is the subject and the action (*ran*) the predicate.

Latin had the same types of full sentence as Russian, but the narrative type existed in two varieties: one with an actor-action construction: *cantat* ‘he (she, it) sings,’ *amat* ‘he (she, it) loves,’ and one with a goal-action construction: *cantātur* ‘it is being sung,’ *amātur* ‘he (she, it) is loved.’ The equational type was less common than in Russian: *beatus ille* ‘happy (is) he.’

Tagalog has five types of predication, with this common feature: either the subject precedes and a particle [aj] (after vowels, [j]) intervenes, or the reverse order is used without the particle.

There is, first, an equational type: [an ‘ba:ta j maba’it] ‘the child is good,’ or, with inverse order, [maba’it an ‘ba:ta] ‘good (is) the child.’ Then there are four narrative types, in which the predicates are *transient* words, which denote things in four different relations to an action. The four types of transient words are:

- **actor**: [pu’mu:tu] ‘one who cut’
- **goal**: [pi’n:tu] ‘something cut’
- **instrument**: [ipi’n:tu] ‘something cut with’
- **place**: [pinu’tudan] ‘something cut on or from.’

These transient words are by no means confined, like our verbs, to predicative position; they can figure equally well, for instance, in equational sentences, as: [an pu’mu:tu] aj si ‘hwan] ‘the one who did the cutting was John,’ but in the predicate position they produce four types of narrative predication:

- **actor-action**: [sja j pu’mu:tu] naŋ ‘ka:huj] ‘he cut some wood’
- **goal-action**: [pi’n:tu] naŋ ‘ka:huj] ‘was-cut by-him the wood,’ i.e. ‘he cut the wood’
instrument-action: [ipi\textquoteright nu:tu: nja an 'gu:luk] 'was-cut-with by-him the bolo-knife,' i.e. 'he cut with the bolo'

place-action: [piu\textquoteright tu:lan nja an 'ka:huj] 'was-cut-from by-him the wood,' i.e. 'he cut (a piece) off the wood.'

Georgian distinguishes between an action-type, as ['v-ts?er] 'I-write' and a sensation-type, as ['m-e-smi-s] 'me-sound-is,' i.e. 'I hear.' Such distinctions are never carried out with scientific consistency; Georgian classifies sight in the action-type: ['v-naxav] 'I-see.'

Not all favorite sentence-forms have bipartite structure: the command in English consists of merely an infinitive form (come; be good) and only occasionally contains an actor (you be good). In German, beside a favorite sentence-type of actor-action which closely resembles ours, there is an impersonal variety, which differs by not containing any actor: mir ist kalt [mi:r ist 'kalt] 'to-me is cold,' that is, 'I feel cold;' hier wird getanzt ['hi:r virt ge'tantst] 'here gets danced,' that is, 'there is dancing here.' In Russian, there is an impersonal type which differs from the equational predication by the absence of a subject: ['nu3no] 'it is necessary.'

11. 3. English has a sub-type of full sentences which we may call the explicit-action type; in this type the action centers round the verb do, does, did. This taxeme of selection appears in the contrast between, say, I heard him and I did hear him. The explicit-action type has several uses. When the verb is an emphatic element (spoken with highest stress), the normal type emphasizes the lexical content (the sememe) of the verb, as in "I heard him" (but did not see him), or in "Run home!" (don't walk); the explicit-action type emphasizes the occurrence (as opposed to non-occurrence) or the time (present or past) of the action, as in "I did hear him," or "Do run home!" Secondly, we use the explicit-action type wherever the verb is modified by not, as in I didn't hear him or Don't run away; thus, English, by a taxeme of selection, distinguishes a negative type of full sentence.

Further, within our explicit-action type, we distinguish a subtype in which the verb do, does, did precedes the actor. This inverted type occurs in formal yes-or-no questions, along with question-pitch; Did John run away? Didn't John run away? in contrast with the uninverted (informal) type: John ran away? John didn't run away?
The features just discussed are not so widely paralleled among languages as the more general characteristics of English full sentences. In German, for instance, the negative adverb is not tied up with a special-sentence-type: *Er kommt nicht* [e:r 'komt 'nixt] 'he comes not' is like *Er kommt bald* [e:r 'komt 'balt] 'he comes soon.' Other languages, however, resemble English in using special sentence-types with negative value. In Finnish, negative sentences have a special construction: the verb (which, as in Italian, includes actor and action in one sentence-word) is a special negative verb, which may be modified by an infinitive-like form of another verb:

- *luen* 'I read'    *en lue* 'I-don’t read'
- *luet* 'thou readest'    *et lue* 'thou-dost-not read'
- *lukee* 'he reads'    *ei lue* 'he-doesn’t read.'

In Menomini there are three main types of full sentence, equational, narrative, and negative:

- narrative: [pi:w] 'he-comes'
- equational: [enu? pajiat] 'he — the one who comes,' that is, 'It’s he that’s coming'
- negative: [kan upianan] 'not he-comes (negative),' that is, 'He does not come.'

In the negative type the two parts are, on the one side, the negative word [kan] in its various inflections and, on the other, the rest of the sentence, marked by the use of special verb-forms.

Special types of full sentences for formal questions are more widespread. German uses actor-action forms in which the verb precedes the actor: *Kommt er?* ['komt e:r?] 'comes he?' in contrast with *Er kommt* [e:r 'komt] 'he comes.' French also uses special interrogative constructions: 'Is John coming?' is either *Jean vient-il?* [3a vjet i?] 'John comes he?' or *Est-ce que Jean vient?* [e s ko 3a vjet?] 'Is it that John comes?' In Menomini the three main types of full sentence have each an interrogative sub-type:

- narrative: [pi:]? 'Is he coming?'
- equation: [enut pajiat?] 'he (interrogative) the one who comes?' that is, 'Is it he that is coming?'
- negative: [kanc?: upianan?] 'not (interrogative) he-comes (negative)?' that is, 'Isn’t he coming?'

Other languages lack a special sentence-type for formal yes-or-no questions, but some of them use special interrogative words, as Latin *venitne?* [we'nit ne?] 'Is he coming?' and *num venit?* 'You
don't mean to say he is coming?' (expectation of negative reply), in contrast with *venit?* 'He is coming?' This use of special little words (particles) to mark a formal yes-or-no question, appears in many languages, such as Russian, Chinese, Tagalog, Cree.

Most languages agree with English in marking supplement-questions by the presence of special words, but the details differ: in Tagalog and in Menomini, for instance, the supplement-question is always an equational sentence, e.g., Menomini [awe:'] pajiat:] 'who the-one-who-comes?' that is, 'Who is coming?'

The English command is an example of a special sentence-type used in exclamations. Other languages also have special types of full sentence for some kinds of exclamations. In Menomini there are two such, one of *surprise*, where the occurrence is new or unforeseen, and one of *disappointment* at the non-occurrence of something expected:

**Surprise**

narrative: [piasah!] 'and so he's coming!'

equational: [enusa'] pajiat!] 'and so it's he that's coming!'

negative: [kasa'] upianan!] 'and so he isn't coming!'

**Disappointment**

narrative: [piapah!] 'but he was coming!'

equational: [enupa'] pajiat!] 'but he was the one who was coming!'

negative: [kapa'] upianan!] 'but he wasn't coming!'

11. 4. A sentence which does not consist of a favorite sentence-form is a *minor sentence*. Some forms occur predominantly as minor sentences, entering into few or no constructions other than parataxis; such forms are *interjections*. Interjections are either special words, such as *ouch, oh, sh, gosh, hello, sir, ma'm, yes*, or else phrases (secondary interjections), often of peculiar construction, such as *dear me, goodness me, goodness gracious, goodness sakes alive, oh dear, by golly, you angel, please, thank you, good-bye*.

In general, minor sentences seem to be either *completive* or *exclamatory*. The *completive* type consists of a form which merely supplements a situation — that is, an earlier speech, a gesture, or the mere presence of an object: *This one.* *Tomorrow morning. Gladly, if I can. Whenever you're ready. Here. When? With whom? Mr. Brown: Mr. Smith* (in introducing people). *Drugs. State Street.* They occur especially as answers to questions; for this use
we have the special completive interjections, *yes* and *no*. Even in this regard languages differ: French says *si* ‘yes’ in answer to negative questions, such as ‘Isn’t he coming?’ but *oui* [wi] ‘yes’ in answer to others, such as ‘Is he coming?’ Some languages have no such interjections. Polish answers with ordinary adverbs, affirmatively with *tak* ‘thus, so’ and negatively with *nie* [ne] ‘not.’ Finnish answers affirmatively by an ordinary form, e.g. *Tulette-ko kaupungista?* — *Tuleemme*. ‘Are you coming from town?’ — ‘We are coming,’ and negatively by its negative verb: *Tunnettel-ko herra Lehdon?* — *En* (or *En tunne*) ‘Do you know Mr. Lehto?’ — ‘I don’t’ (or ‘I don’t know’).

**Exclamatory** minor sentences occur under a violent stimulus. They consist of interjections or of normal forms that do not belong to favorite sentence-types, and often show parataxis: *Ouch, damn it!* *This way, please!* A substantive form naming a hearer is used in English as a demand for his presence or attention: *John! Little boy!* *You with the glasses!* With parataxis: *Hello, John! Come here, little boy!* The interjections *sir* and *ma’am* are especially devoted to this use; in the same way Russian uses an interjection [s], as [da-s] ‘yes, sir; yes, ma’am,’ without distinction of sex. Many languages have special *vocative* forms for this use, as Latin *Balbus* (man’s name), vocative *Balbe*, or Fox [iʃkwe:wa] ‘woman,’ vocative [iʃkwe], and [iʃkwe:wak] ‘women,’ vocative [iʃkwe:tike]. In Menomini the terms of relationship have special, highly irregular vocative forms: [ne?neh] ‘my older brother,’ vocative [nane?] or [neki:jah] ‘my mother,’ vocative [ne?e:h]. Other words are spoken as vocatives with short vowels instead of long: [mete:muh] ‘woman,’ vocative [metemuh]. In Sanskrit, vocative forms were unstressed.

Occasionally we find minor sentences of aphoristic type (§ 9.9) used with much the same value as full sentences; English examples are *The more you have, the more you want. The more, the merrier. First come, first served. Old saint, young sinner.*

11. 5. In most languages the sentence is characterized also by a selective feature more general than all those we have been discussing: some linguistic forms, which we call *bound forms* (§ 10.1), are never used as sentences. English examples are the -*ess* [is] in *countess, lioness, duchess,* etc., or the -*ish* [iʃ] in *boyish, childish, greenish,* etc., or the -*s* [s] in *hats, books, cups,* etc. These are genuine linguistic forms and convey a meaning, but they occur only in
construction, as part of a larger form. Forms which occur as sentences are *free forms*. Not every language uses bound forms: modern Chinese, for instance, seems to have none.

A free form which consists entirely of two or more lesser free forms, as, for instance, *poor John* or *John ran away* or *yes, sir*, is a *phrase*. A free form which is not a phrase, is a *word*. A word, then, is a free form which does not consist entirely of (two or more) lesser free forms; in brief, a word is a *minimum free form*.

Since only free forms can be isolated in actual speech, the word, as the minimum of free form, plays a very important part in our attitude toward language. For the purposes of ordinary life, the word is the smallest unit of speech. Our dictionaries list the words of a language; for all purposes except the systematic study of language, this procedure is doubtless more useful than would be a list of morphemes. The analysis of linguistic forms into words is familiar to us because we have the custom of leaving spaces between words in our writing and printing. People who have not learned to read and write, have some difficulty when, by any chance, they are called upon to make word-divisions. This difficulty is less in English than in some other languages, such as French. The fact that the spacing of words has become part of our tradition of writing, goes to show, however, that recognition of the word as a unit of speech is not unnatural to speakers; indeed, except for certain doubtful cases, people easily learn to make this analysis.

In our school tradition we sometimes speak of forms like *book*, *books*, or *do*, *does*, *did*, *done* as "different forms of the same word." Of course, this is inaccurate, since there are differences of form and meaning between the members of these sets: the forms just cited are different linguistic forms and, accordingly, different words.

In other cases, inconsistencies in our habits of writing may make us uncertain. We write *John's* in *John's ready*, where it is two words (*John* and *[z]*, an alternant of *is*) and in *John's hat*, where it is one word (consisting of *John* and the bound form *[z]*, possessive). We write *the boy's* as though it were two or three words, but, strictly speaking, it is only one word, since the immediate constituents are *the boy* and *[z]* possessive, and the latter is a bound form; this appears clearly in cases like *the king of England's* or *the man I saw yesterday's*, where the meaning shows that the *[z]*
is in construction with the entire preceding phrase, so that the two are united into a single long word.

11. 6. In the case of many languages, however, it is impossible to distinguish consistently, on the one hand, between phrases and words and, on the other hand, between words and bound forms. The linguist cannot wait indefinitely for the chance of hearing a given form used as a sentence — that is, spoken alone. Some forms are rarely so used. Inquiry or experiment may call forth very different responses from hearers. Are English forms like the, a, is, and ever spoken alone? One can imagine a dialogue: Is? — No; was. The word because is said to be a woman's answer. An impatient listener says And? We can imagine a hesitant speaker who says The . . . and is understood by his hearers. Aside from such far-fetched situations, the general structure of a language may make one classification more convenient than another for our purpose. The form the, though rarely spoken alone, plays much the same part in our language as the forms this and that, which freely occur as sentences; this parallelism leads us to class the as a word:

\[
\text{this thing} : \text{that thing} : \text{the thing}
\]

\[
\text{this} : \text{that} : \text{(the)}.
\]

In other cases, the difficulty is due to features of phonetic modification. The forms [z] in John's ready, [m] in I'm hungry, or [nt] in Don’t! are unpronounceable in English, but we have to class them as words, for they are merely alternants of the pronounceable forms is, am, not. In French we have even the case of a single phoneme representing two words: au [o] in a phrase like au roi [o rwa] 'to the king,' arises by phonetic modification of the two words d [a] 'to' and le [la] 'the'; this [o] is homonymous with the words eau 'water' and haut 'high.'

In other cases the doubtful forms are units of grammatical selection rather than of modification, and yet, in view of the total structure of their language, may be best classified as words. French, again, has several forms of this sort. Absolute forms like moi [mwa] 'I, me' and lui [luil] 'he, him' are replaced in certain constructions by shorter forms that do not ordinarily appear in absolute use, such as je [ʒe] 'I,' me [me] 'me,' il [i] 'he,' le [la] 'him'; for instance: je le connais [ʒe l kone] 'I know him,' il me connaît [i m kone] 'he knows me.' The replacement of the absolute forms by these conjunct forms is to be described as a feature of
selection rather than of modification; nevertheless, the conjunct forms, largely because of their parallelism with the absolute forms, have the status of words.

A less important border-line case is the use of bound forms in hypostasis (§ 9.7), as when we speak of a girl in her teens, taking up all kinds of isms and ologies.

At the other extreme we find forms which lie on the border between words and phrases. A form like blackbird resembles a two-word phrase (black bird), but we shall find that a consistent description of English is bound to class this form as a single (compound) word. In this case there is a clear-cut difference, since in blackbird the second word (bird), has a weaker stress instead of a normal high stress, a difference which in English is phonemic, and this formal difference correlates with the semantic difference between blackbird and black bird. The distinction is not always so clear: ice-cream ['ajs ,krijm], spoken with only one high stress, will be classed as a (compound) word, but the variant pronunciation ice cream ['ajs 'krijm], with two high stresses, will be classed as a two-word phrase. Similar variants exist in types like messenger boy, lady friend.

This criterion of stress fails us in forms like devil-may-care (as in a devil-may-care manner) or jack-in-the-pulpit (as the name of a plant). If the former were devil-may-care-ish, we should not hesitate to class it as a word, since here one of the immediate constituents is the bound form -ish. The forms of the type devil-may-care are classed as words (phrase-words) because of certain other features which, within the system of the English language, place them on a level with other words. One of these is their peculiar function; as a phrase devil-may-care would be an actor-action form, but as a phrase-word it fills the position of an adjective. Another is their indivisibility: the plant-name jack-in-the-pulpit cannot be modified by putting the word little in front of pulpit, but the corresponding phrase permits of this and other expansions.

This latter principle, namely that a word cannot be interrupted by other forms, holds good almost universally. Thus, one can say black — I should say, bluish-black — birds, but one cannot similarly interrupt the compound word blackbirds. The exceptions to this principle are so rare as to seem almost pathological. Gothic had a bound form [ga-] which was prefixed especially to verbs: ['se:hwi] ‘he should see,’ [ga'se:hwi] ‘he should be able to see.'
Yet occasionally we find words included between this [ga-] and the main body of the verb, as in the translation of Mark 8, 23: ['frah ina ga- u hwa 'se:hwi] 'he asked him whether [u] he saw anything [hwa].'

None of these criteria can be strictly applied: many forms lie on the border-line between bound forms and words, or between words and phrases; it is impossible to make a rigid distinction between forms that may and forms that may not be spoken in absolute position.

11. 7. The word is not primarily a phonetic unit: we do not, by pauses or other phonetic features, mark off those segments of our speech which could be spoken alone. In various ways, however, different languages give phonetic recognition to the word-unit: some, like French, very little, and others, like English, very much.

As a free form, the word is capable of being spoken in absolute position; accordingly, it is subject to the phonetic patterning of its language. It is sure to contain at least one of the phonemes which normally serve as syllables; interjections, such as our sh [ʃ] and pst [pst], occasionally violate this principle. The initial and final consonants and clusters in the word are necessarily such as can occur at the beginning and at the end of speech; thus, no English word begins with [u] or [mb] and none ends with [h] or [mb].

Beyond this, many languages place further restrictions on the phonetic structure of the word. We may find that some of the permitted medial clusters do not occur within the body of a single word; in English, permitted clusters like [ʃtʃ, vt, tsv, ststr], as in rash child, give ten, it’s very cold, least strong, and double consonants, like [nn, tt, bb], as in ten nights, that time, nab Bill, do not occur within simple words. On the other hand, French, with its insertion of [ə], and languages like Fox or Samoan, which use no final consonants, tolerate no more clusters within a phrase than within a word.

Some languages have the peculiar restriction, known as vowel-harmony, of tolerating only certain combinations of vowels in the successive syllables of a word. Thus, in Turkish, the vowels of a word are either all front vowels [i, y, e, ø], as in [sevildirememek] ‘not to be able to cause to be loved,’ or all back vowels [i, u, a, o], as in [jazildiramamak] ‘not to be able to cause to be written’.
In Chinese we have the extreme of structural word-marking; each word consists of one syllable and of two or three primary phonemes: a non-syllabic simple or compound phoneme as initial, a syllabic simple or compound phoneme as final; and one of the pitch-schemes (§ 7.7); the initial non-syllabic may be lacking; the language has no bound forms.

In English and many other languages, each word is marked by containing cæ and only one high stress (forgiving; convict, verb; convict, noun). In some of these languages the word-unit is even more plainly marked, in that the position of a word-stress bears a definite relation to the beginning or to the end of the word: in Bohemian and in Icelandic the first syllable is stressed, in Cree the third-last (the antepenult), in Polish the next-to-last (the penult). In Latin the penult was stressed, as in amamus [aˈmaː-mus] 'we love,' unless this syllable had a short vowel followed by no more than one consonant, in which case the antepenult was stressed, as in capimus ['kapimus] 'we take.' In languages like these, the stress is a word-marker, which indicates the beginnings or ends of words, but, since its position is fixed, it cannot distinguish between different words. In Italian, Spanish, and modern Greek, the stress comes always on one of the last three syllables of a word. In ancient Greek a word had either a simple accent on one of the last three syllables or a compound accent on one of the last two, with some further restrictions based on the nature of the primary phonemes in these syllables.

Among stress-using languages, some, like English, start the stress at the beginning of a word whose stress comes on the first syllable; witness contrasts like a name versus an aim or that scold versus that's cold (§ 7.5); others, such as Dutch, Italian, Spanish, and the Slavic languages, regulate the onset of stress by purely phonetic habits, starting the stress on a consonant which precedes a stressed vowel, even though this consonant belongs to another word, as in Italian un altro [uˈnaltro] 'another.' A language like French, which uses no stress-phonemes, cannot in this way mark its word-units.

Phonetic recognition of the word-unit, in cases like the above, is disturbed chiefly by two factors. Words which contain, among their ultimate constituents, two or more free forms, generally have the phonetic character of phrases. In English, compound words have the same medial clusters as phrases: stove-top [vt],
chest-strap [ststr], pen-knife [nn], grab-bag [bb]; phrase-derivatives may even have more than one high stress: old-maidish ['owlid ˈmejdiʃ], jack-in-the-pulpit ['dʒɛk in ə 'pulpit].

On the other hand, words in included position are subject to modulations and phonetic modifications which may remove the phonetic characteristics of word-marking. Thus not in the phrase don't ['dow nt] loses both its high stress and its syllabic; compare, similarly, lock it, with locket, feed her ['fijd ə] with feeder, and so on. English unstressed words are phonetically like affixal syllables. In the normal pronunciation at all [ə't əd] the stress begins on the [t] of at. These included variants, in which a word loses the phonetic features that characterize words in absolute position, will concern us in the next chapter. In the present connection it is worth noticing, however, that in a small way these modified phrases may nevertheless involve phonetic recognition of the word-unit, because they contain phonetic sequences that do not occur in single words. Thus, the final sequence [ownt] is permitted in English, but occurs only in the phrases don’t and won’t, and not in any one word. In South German dialects some initial clusters, such as [tn, tʃt] occur in phrases, thanks to phonetic modification of the first word, as in [t ˈnækt] ‘the night,’ [t ʃtaːʧ] ‘thou standest,’ but not in any one word. In North Chinese a phrase may end in syllabic plus [r], as in [ʃjaw ˈma rɔ] ‘little horse,’ but only as a result of phonetic modification of two words, — in our example, [maɾ] ‘horse’ and [rɔ] ‘son, child, small.’

In the few languages which use no bound forms, the word has a double importance, since it is the smallest unit not only of free form but also of linguistic form in general. In languages which use bound forms, the word has great structural importance because the constructions in which free forms appear in phrases differ very decidedly from the constructions in which free or bound forms appear in words. Accordingly, the grammar of these languages consists of two parts, called syntax, and morphology. However, the constructions of compound words and, to some extent, of phrase-derivatives, occupy an intermediate position.
12.1. Traditionally, the grammar of most languages is discussed under two heads, syntax and morphology. The sentence-types, which we surveyed in the last chapter, are placed under the former heading, and so are the types of substitution (which we shall consider in Chapter 15), but grammatical constructions, which we shall now examine, are dealt with partly under the heading of morphology. There has been considerable debate as to the usefulness of this division, and as to the scope of the two headings. In languages that have bound forms, the constructions in which bound forms play a part differ radically from the constructions in which all the immediate constituents are free forms. Accordingly, we place the former under the separate heading of morphology. The difficulty is this, that certain formal relations, such as the relation between he and him, consist in the use of bound forms, while the semantic difference between these forms can be defined in terms of syntactic construction; he serves, for instance, as an actor (he ran) and him as an undergoer (hit him). Nevertheless, the traditional division is justified: it merely happens that in these cases the meanings involved in the morphologic construction are definable in terms of syntax instead of being definable merely in terms of practical life. Syntactic constructions, then, are constructions in which none of the immediate constituents is a bound form. Border-line cases between morphology and syntax occur chiefly in the sphere of compound words and phrase-words.

12.2. The free forms (words and phrases) of a language appear in larger free forms (phrases), arranged by taxemes of modulation, phonetic modification, selection, and order. Any meaningful, recurrent set of such taxemes is a syntactic construction. For instance, the English actor-action construction appears in phrases like these:

\[
\begin{align*}
    &John \quad ran \\
    &John \quad fell \\
    &Bill \quad ran \\
    &Bill \quad fell \\
    &Our \quad horses \quad ran \quad away.
\end{align*}
\]
In these examples we see taxemes of selection. The one constituent (John, Bill, our horses) is a form of a large class, which we call nominative expressions; a form like ran or very good could not be used in this way. The other constituent (ran, fell, ran away) is a form of another large class, which we call finite verb expressions; a form like John or very good could not be used in this way. Secondly, we see a taxeme of order: the nominative expression precedes the finite verb expression. We need not stop here to examine the various other types and sub-types of this construction, which show different or additional taxemes. The meaning of the construction is roughly this, that whatever is named by the substantive expression is an actor that performs the action named by the finite verb expression. The two immediate constituents of the English actor-action construction are not interchangeable: we say that the construction has two positions, which we may call the positions of actor and of action. Certain English words and phrases can appear in the actor position, certain others in the action position. The positions in which a form can appear are its functions or, collectively, its function. All the forms which can fill a given position thereby constitute a form-class. Thus, all the English words and phrases which can fill the actor position in the actor-action construction, constitute a great form-class, and we call them nominative expressions; similarly, all the English words and phrases which can fill the action position on the actor-action construction, constitute a second great form-class, and we call them finite verb expressions.

12. 3. Since the constituents of phrases are free forms, the speaker may separate them by means of pauses. Pauses are mostly non-distinctive; they occur chiefly when the constituents are long phrases; in English they are usually preceded by a pause-pitch.

We have seen (§ 11.1) that free forms which are united by no other construction may be united by parataxis, the mere absence of a phonetic sentence-final, as in It's ten o'clock [,] I have to go home [.]. In ordinary English parataxis a pause-pitch appears between the constituents, but we have also a variety of close parataxis without a pause-pitch, as in please come or yes sir.

A special variety of parataxis is the use of semi-absolute forms, which grammatically and in meaning duplicate some part of the form with which they are joined in parataxis, as in John, he ran away. In French this type is regularly used in some kinds of
questions, as Jean quand est-il venu? [ʒə k á t e t i vny?] 'John, when did he come?'

Parenthesis is a variety of parataxis in which one form interrupts the other; in English the parenthetic form is ordinarily preceded and followed by a pause-pitch: I saw the boy [,] I mean Smith's boy [,] running across the street [.]. In a form like Won't you please come? the please is a close parenthesis, without pause-pitch.

The term apposition is used when paratactically joined forms are grammatically, but not in meaning, equivalent, e.g. John [,] the poor boy. When the appositional group appears in included position, one of its members is equivalent to a parenthesis: John [,] the poor boy [,] ran away [.]. In English we have also close apposition, without a pause-pitch, as in King John, John Brown, John the Baptist, Mr. Brown, Mount Everest.

Often enough non-linguistic factors interfere with construction; what the speaker has said is nevertheless meaningful, provided he has already uttered a free form. In aposiopesis the speaker breaks off or is interrupted: I thought he —. In anacolouthon he starts over again: It's high time we — oh, well, I guess it won't matter. When a speaker hesitates, English and some other languages offer special parenthetic hesitation-forms, as [ə] or [ɛ] in Mr. — ah — Sniffen or Mr. — what you may call him — Sniffen or that — thing-amajig — transmitter.

12. 4. Features of modulation and of phonetic modification play a great part in many syntactic constructions; they are known as sandhi. The form of a word or phrase as it is spoken alone is its absolute form; the forms which appear in included positions are its sandhi-forms. Thus, in English, the absolute form of the indefinite article is a ['ej]. This form appears in included position only when the article is an emphatic element and the next word begins with a consonant, as in “not a house, but the house.” If the next word begins with a vowel, we have instead a sandhi-form, an ['en], as in “not an uncle, but her uncle.”

A feature of modulation appears in the fact that when a, an is not an emphatic element, it is spoken as an unstressed syllable, as in a house [ə 'haws], an arm [ən 'aːm]. In English, a word in absolute form has one high stress; hence we may say that in a sandhi-form without high stress a word is spoken as if it were part

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1 This term, like many technical terms of linguistics, comes from the ancient Hindu grammarians. Literally, it means 'putting together.'
of another word. Various languages use sandhi-forms of this sort; they are known as *atonic* forms. This term is not altogether appropriate, since the peculiarity is not always a lack of stress. In the French phrase *l'homme* ['l əm] 'the man,' the article *le* ['lə] is atonic, because its sandhi-form ['l] could not be spoken alone on account of the phonetic pattern (lack of a vowel). In the Polish phrase ['d ə ə] 'to the feet,' the preposition *do* 'to' is atonic precisely because it has the stress, for the stress in this language is placed on the next-to-last syllable of each word, and falls on *do* only because this word is treated as part of the following word.

An atonic form which is treated as part of the following word — this is the case in our examples so far — is a *proclitic*. An atonic form which is treated as if it were part of the preceding word is an *enclitic*; thus, in *I saw him* ['əj 'sə:əm], the ['aj] is proclitic, but the ['im] enclitic.

The sandhi which substitutes *an* for *a*, and the sandhi by which this and other words are unstressed in phrasal combinations, are examples of *compulsory sandhi*. Other English sandhi habits are *optional*, because paralleled by unaltered variants, which have usually a formal or elevated connotation; for instance, the dropping of ['h] in *him* does not take place in the more elevated variant *I saw him* ['əj 'sə: əm]. Beside the sandhi-forms in *did you?*, *won't you?*, at all ['ə ətə:] (in American English with the voiced tongue-flip variant of ['t]), we have the more elegant variants ['d əj 'wənt juw? 'ət ətə:].

Sandhi-forms may be unpronounceable when taken by themselves; this is the case in a number of English examples:

<table>
<thead>
<tr>
<th>Absolute form</th>
<th>Sandhi-form</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>is</em> ['iz]</td>
<td>['z] <em>John's ready.</em></td>
</tr>
<tr>
<td><em>has</em> ['hez]</td>
<td>['z] <em>John's got it.</em></td>
</tr>
<tr>
<td><em>am</em> ['em]</td>
<td>['m] <em>I'm ready.</em></td>
</tr>
<tr>
<td><em>are</em> ['ə:]</td>
<td>['ə] <em>We're waiting.</em></td>
</tr>
<tr>
<td><em>have</em> ['hev]</td>
<td>['v] <em>I've got it.</em></td>
</tr>
<tr>
<td><em>had</em> ['hed]</td>
<td>['d] <em>He'd seen it.</em></td>
</tr>
<tr>
<td><em>would</em> ['wud]</td>
<td>['d] <em>He'd see it.</em></td>
</tr>
<tr>
<td><em>will</em> ['wil]</td>
<td>['l] <em>I'll go.</em></td>
</tr>
<tr>
<td><em>them</em> ['əm]</td>
<td>['əm] <em>That'll do.</em></td>
</tr>
</tbody>
</table>

..
The French language has a great deal of sandhi. Thus, the article la [la] ‘the’ (feminine) loses the [a] before a vowel or diphthong: la femme [la fam] ‘the woman,’ but l’encore [l ə kr] ‘the ink,’ l’oie [l wa] ‘the goose.’ The adjective ce [sə] ‘this’ (masculine) adds [t] before the same sounds: ce couteau [sə kuto] ‘this knife,’ but cet homme [sət əm] ‘this man.’ A plural pronoun adds [z] before the initial vowel of a verb: vous faites [vu fet] ‘you make,’ but vous êtes [vuz e:t] ‘you are.’ A plural noun-modifier behaves similarly: les femmes [le fam] ‘the women,’ but les hommes [lez əm] ‘the men.’

A first-person or second-person verb adds [z], a third-person verb [t], before certain initial vowels: va [va] ‘go thou,’ but vas-y [vaz i] ‘go thou there’; elle est [əl e] ‘she is,’ but est-elle? [e t e?] ‘is she?’ A few masculine adjectives add sandhi-consonants before a vowel: un grand garçon [ə grə garson] ‘a big boy,’ but un grand homme [ə grət əm] ‘a great man.’

In languages with distinctions of pitch in the word, modifications of pitch may play a part in sandhi. Thus, in Chinese, beside the absolute form [i¹] ‘one,’ there are the sandhi-forms in [i¹ phi² ‘ma³] ‘one horse’ and [i² ko³ əm²] ‘one man.’

Sandhi-modification of initial phonemes is less common than that of the end of a word; it occurs in the Celtic languages, as, in modern Irish:

<table>
<thead>
<tr>
<th>Absolute form</th>
<th>Sandhi-form</th>
</tr>
</thead>
<tbody>
<tr>
<td>['bo:] ‘cow’</td>
<td>[an 'vo:] ‘the cow’</td>
</tr>
<tr>
<td>['uv] ‘egg’</td>
<td>[an 'tuv] ‘the egg’</td>
</tr>
<tr>
<td>['ba:n] ‘white’</td>
<td>[a 'huv] ‘her egg’</td>
</tr>
<tr>
<td>['bog] ‘soft’</td>
<td>[‘bo; ‘va:n] ‘white cow’</td>
</tr>
<tr>
<td>['briʃ] ‘break’</td>
<td>[do 'vriʃ] ‘did break.’</td>
</tr>
</tbody>
</table>

12. 5. Our examples so far illustrate special or irregular cases of sandhi, peculiar to certain forms and constructions. General
or regular sandhi applies to any and all words in a short (close-knit) phrase. In some forms of English, such as New England and southern British, words which in absolute position have a final vowel, add [r] before an initial vowel: *water* [ˈwɔːtə] but *the water* is [ˈðə ˈwɔːtər ɪz]; *idea* [ˈajdɪə] but *the idea* is [ˈbɪj ˈajdɪər ɪz]. When three consonants come together in French, the word-final adds [ɔ]; thus, *porte* [pɔʁt] ‘carries’ and *bien* [bje] ‘well’ appear in the phrase as *porte bien* [pɔʁt ə bjɛ] ‘carries well.’ A word whose first syllable in absolute form contains [ə], either because the word has no other syllable or because otherwise it would begin with an unpermitted cluster (§ 8.6), loses this [ə] in the phrase whenever no unpermitted group would result: *le* [lə] ‘the’ but *l’homme* [l ɔ̃m] ‘the man’; *cheval* [ʃəval] ‘horse,’ but *un cheval* [œ ʃval] ‘a horse’; *je* [ʒə] ‘I,’ *ne* [nə] ‘not,’ *le* [lə] ‘it,’ *demande* [dɔmɑ̃d] ‘ask,’ but *je ne le demande pas* [ʒə n ə dɔmɑ̃d pə] ‘I don’t ask it’ and *si je ne le demande pas* [sə ʒə ɗ ə dɔmɑ̃d pə] ‘if I don’t ask it.’

In Sanskrit there is a great deal of general sandhi; for instance, final [ah] of the absolute form appears in the following sandhi-variants: absolute [deːˈvah] ‘a god,’ sandhi-forms: [deːˈvɐst ˈtatra] ‘the god there,’ [deːˈvaɾ carati] ‘the god wanders,’ [deːˈva eːti] ‘the god goes,’ [deːˈvoː dadaːti] ‘the god gives,’ and, with change also of a following initial, before [ˈatra] ‘here,’ [deːˈvoː tra] ‘the god here.’ Certain words, however, behave differently; thus, [ˈpunah] ‘again’ gives [ˈpunar dadaːti] ‘again he gives,’ [ˈpunar ˈatra] ‘again here.’ The divergent words may be marked off by some structural feature. Thus, in some Dutch pronunciations the absolute forms *heb* [ˈheb] ‘have’ and *stop* [ˈstøp] ‘stop’ behave differently in sandhi: *heb ik?* [ˈheb ek?] ‘have I?’ but *stop ik?* [ˈstøp ek?] ‘do I stop?’ The forms which have the voiced consonant in sandhi have it also whenever it is not at the end of the word, as *hebben* [ˈhebe] ‘to have,’ in contrast with *stoppen* [ˈstøpe] ‘to stop.’ Sandhi-distinctions based on morphologic features like this, may be called reminiscent sandhi.

Sandhi may go so far as to restrict the word-final in a phrase beyond the ordinary medial restrictions of a language. Thus, the sequence [tə] is permitted medially in Sanskrit, as in [ˈpətəti] ‘he falls,’ but [t] at the end of the word is in close-knit phrases replaced by [d] before a vowel: absolute [ˈtət] ‘that,’ but [ˈtad astə] ‘that is.’
12.6. Taxemes of selection play a large part in the syntax of most languages; syntax consists largely in defining them — in stating, for instance, under what circumstances (with what accompanying forms or, if the accompanying forms are the same, with what difference of meaning) various form-classes (as, say, indicative and subjunctive verbs, or dative and accusative nouns, and so on) appear in syntactic constructions. We have seen that the selective taxemes delimit form-classes. These classes are most numerous in the languages that use most taxemes of selection. The syntactic constructions of a language mark off large classes of free forms, such as, in English, the nominative expression or the finite verb expression. Since different languages have different constructions, their form-classes also are different. We shall see that the great form-classes of a language are most easily described in terms of word-classes (such as the traditional "parts of speech"), because the form-class of a phrase is usually determined by one or more of the words which appear in it.

In languages which make a wide use of selective taxemes, the large form-classes are subdivided into smaller ones. For instance, the English actor-action construction, in addition to the general selective taxemes, shows some more specialized taxemes of the same sort. With the nominative expressions John or that horse we can join the finite verb expression runs fast, but not the finite verb expression run fast; with the nominative expressions John and Bill or horses the reverse selection is made. Accordingly, we recognize in each of these two form-classes a division into two sub-classes, which we call singular and plural, such that a singular nominative expression is joined only with a singular finite verb expression, and a plural nominative expression only with a plural finite verb expression. It would not do to define these sub-classes by meaning — witness cases like wheat grows but oats grow. Further examination shows us several varieties of selection: (1) many finite verb expressions, such as can, had, went, appear with any actor; (2) many, such as run : runs, show the twofold selection just described; (3) one, was : were, shows a twofold selection that does not agree with the preceding; (4) one, finally, am : is : are, shows a threefold selection, with a special form that accompanies the actor I, precisely the actor form as to which (2) and (3) disagree:
Thus we find among nominative expressions and among finite verb expressions a threefold subdivision, due to taxemes of selection; among nominative expressions sub-class A contains only the form I; sub-class B contains those which are joined with finite verb expressions such as runs, was, is, and sub-class C contains those which are joined with finite verb expressions such as run, were, are. In fact, we can base our definition of the three subclasses on the selection of the three finite verb forms am : is : are. Conversely, we define the sub-classes of finite verb expressions by telling with which nominative expressions (say, I : the boy : the boys) they occur.

The narrower type of selection in cases like this one is in principle no different from the more inclusive type by which our language distinguishes great form-classes like nominative expressions and finite verb expressions, but there are some differences of detail. The narrower type of selection, by which great form-classes are subdivided into selective types, is called agreement. In a rough way, without real boundaries, we can distinguish three general types of agreement.

12. 7. In our example, the agreement is of the simplest kind, which is usually called concord or congruence: if the actor is a form of sub-class A, the action must be a form of sub-class A, and so on. Sometimes one of the subdivisions is otherwise also recognized in the structure of the language; thus, in our example, classes B and C of nominative expressions are otherwise also definable in our language; namely, by the use of the modifiers this, that with class B, but these, those with class C: we say this boy, this wheat, but these boys, these oats. Accordingly, we view the subdivision of nominative expressions into singulars and plurals as more fundamental than that of finite verb expressions, and say that the latter agree with or stand in congruence with the former. For the same reason, we say that the forms this, that, these, those stand in congruence with the accompanying substantive form. Congruence plays a great part in many languages; witness for example
the inflection of the adjectives in most Indo-European languages in congruence with various sub-classes (number, gender, case) of the noun: German der Knabe [der 'kna:be] 'the boy,' ich sehe den Knaben [ix 'ze:e den 'kna:ben] 'I see the boy,' die Knaben [di: 'kna:ben] 'the boys,' where the selection of der, den, die agrees with the sub-classes of the noun (singular and plural, nominative and accusative); in das Haus [das 'haws] 'the house,' the form das, as opposed to der, is selected in agreement with the so-called gender-classes into which German nouns are divided. These genders are arbitrary classes, each of which demands different congruence-forms in certain kinds of accompanying words. German has three gender-classes; for each of these I give phrases showing the congruence of the definite article and of the adjective kalt 'cold':

"masculine gender": der Hut [der 'hu:t] 'the hat,' kalter Wein [kalter 'vajn] 'cold wine'
"feminine gender": die Uhr [di: 'u:r] 'the clock' kalte Milch [kalte 'milx] 'cold milk'
"neuter gender": das Haus [das 'haws] 'the house,' kaltes Wasser [kaltes 'vaser] 'cold water.'

French has two genders, "masculine," le couteau [la kuto] 'the knife,' and "feminine," la fourchette [la furfet] 'the fork.'

Some languages of the Bantu family distinguish as many as twenty gender-classes of nouns.

12. 8. In other cases the subsidiary taxeme of selection has to do with the syntactic position of the form. For instance, we say I know but watch me, beside me. The choice between the forms I (he, she, they, we) and me (him, her, them, us) depends upon the position of the form: the I-class appears in the position of actor, the me-class in the position of goal in the action-goal construction (watch me) and in the position of axis in the relation-axis construction (beside me). This type of selection is called government; the accompanying form (know, watch, beside) is said to govern (or to demand or to take) the selected form (I or me). Government, like congruence, plays a great part in many languages, including many of the Indo-European family. Thus, in Latin, different verbs govern different case-forms in the substantive goal: videt bovem 'he sees the ox,' nocet bovi 'he harms the ox,' utitur bove 'he uses the ox,' meminit bovis 'he remembers the ox.' Similarly, different main clauses may govern different forms of subordinate verbs,
as in French je pense qu’il vient [ʒə pɑ̃s k i vje] ‘I think he is coming,’ but je ne pense pas qu’il vienne [ʒə n pɔ̃s pa k i vjen] ‘I don’t think he is coming.’

Identity and non-identity of objects are in many languages distinguished by selective features akin to government. In English we say he washed him when actor and goal are not identical, but he washed himself (a reflexive form) when they are the same person. Swedish thus distinguishes between identical and non-identical actor and possessor: han tog sin hatt [han ˈtoːɡ siːn ˈhat] ‘he took his (own) hat’ and han tog hans hatt [hans ˈhat] ‘his (someone else’s) hat.’ The Algonquian languages use different forms for non-identical animate third persons in a context. In Cree, if we speak of a man and then, secondarily, of another man, we mention the first one as [ˈnaːpəw] ‘man,’ and the second one, in the so-called obviative form, as [ˈnaːpəwa]. Thus, the language distinguishes between the following cases, where we designate the principal person as A and the other (the obviative) as B:

[ˈutinəm uːtastutini] ‘he (A) took his (A’s) hat’
[ˈutinam utastutiniw] ‘he (A) took his (B’s) hat’
[utinaˈmijiwa uːtastutini] ‘he (B) took his (A’s) hat’
[utinaˈmijiwa utastutiniw] ‘he (B) took his (B’s) hat.’

12.9. In the third type of agreement, cross-reference, the subclasses contain an actual mention of the forms with which they are joined. This mention is in the shape of a substitute-form, resembling our pronouns. In non-standard English this occurs in such forms as John his knife or John he ran away; here the form his knife actually mentions a male possessor, who is more explicitly mentioned in the accompanying semi-absolute form John; similarly, the he in he ran away mentions the actor John — contrast Mary her knife and Mary she ran away. In French, cross-reference occurs in the standard language especially in certain types of questions, such as Jean où est-il? [ʒə u e t i?] ‘John where is he?’ that is, ‘Where is John?’ (§ 12.3). A Latin finite verb, such as cantat ‘he (she, it) sings,’ includes substitutive mention of an actor. It is joined in cross-reference with a substantive expression that makes specific mention of the actor, as in puella cantat ‘(the) girl she-sings.’ In many languages verb-forms include substitutive (pronominal) mention of both an actor and an undergoer, as, in Cree [ˈwəːpameːw] ‘he saw him or her’; accordingly, more specific
mention of both actor and undergoer is in cross-reference ['wa:-pame:w 'atimwa a'wa na:pe:w] ‘he-saw-him (obviative) a-dog (obviative) that man’; that is, ‘the man saw a dog.’ Similarly, in many languages, a possessed noun includes pronominal mention of a possessor, as, in Cree, ['astutin] ‘hat,’ but [ni'tastutin] ‘my hat,’ [ki'tastutin] ‘thy hat,’ [u'tastutin] ‘his, her, its hat’; hence, when the possessor is mentioned in another word or phrase, we have cross-reference, as in ['fa:n u'tastutin] ‘John his-hat,’ i.e. ‘John’s hat.’

12.10. Every syntactic construction shows us two (or sometimes more) free forms combined in a phrase, which we may call the resultant phrase. The resultant phrase may belong to a form-class other than that of any constituent. For instance, John ran is neither a nominative expression (like John) nor a finite verb expression (like ran). Therefore we say that the English actor-action construction is exocentric: the resultant phrase belongs to the form-class of no immediate constituent. On the other hand, the resultant phrase may belong to the same form-class as one (or more) of the constituents. For instance, poor John is a proper-noun expression, and so is the constituent John; the forms John and poor John have, on the whole, the same functions. Accordingly, we say that the English character-substance construction (as in poor John, fresh milk, and the like) is an endocentric construction.

The exocentric constructions in any language are few. In English we have, beside the actor-action construction, also that of relation-axis, as beside John, with me, in the house, by running away; the constituents are a prepositional expression and an accusative expression, but the resultant phrase has a function different from either of these, appearing in entirely different syntactic positions (e.g. as a modifier of verbs: sit beside John, or of nouns: the boy beside John). Another exocentric construction of English is that of subordination. The constituents in one type (clause-subordination) are a subordinating expression and an actor-action phrase, as in if John ran away; the resultant phrase has the function of neither constituent, but serves as a modifier (subordinate clause). In the other type (phrase-subordination) the constituents are a subordinating expression and any other form, especially a substantive: as I, than John, and the resultant phrase has the function of a modifier (as big as I, bigger than John). Although the resultant phrase in an exocentric construction has a function different from
the function of any constituent, yet one of these constituents is usually peculiar to the construction and serves to characterize the resultant phrase; thus, in English, finite verbs, prepositions, and subordinating conjunctions regularly appear in the exocentric constructions just illustrated, and suffice to characterize them.

Endocentric constructions are of two kinds, co-ordinative (or serial) and subordinative (or attributive). In the former type the resultant phrase belongs to the same form-class as two or more of the constituents. Thus, the phrase boys and girls belongs to the same form-class as the constituents, boys, girls; these constituents are the members of the co-ordination, and the other constituent is the co-ordinator. Sometimes there is no co-ordinator: books, papers, pens, pencils, blotters (were all lying . . . ); sometimes there is one for each member, as in both Bill and John, either Bill or John. There may be minor differences of form-class between the resultant phrase and the members; thus Bill and John is plural, while the members are each singular.

In subordinative endocentric constructions, the resultant phrase belongs to the same form-class as one of the constituents, which we call the head: thus, poor John belongs to the same form-class as John, which we accordingly call the head; the other member, in our example poor, is the attribute. The attribute may in turn be a subordinative phrase: in very fresh milk the immediate constituents are the head milk, and the attribute very fresh, and this phrase, in turn, consists of the head fresh and the attribute very. In this way there can be several ranks of subordinative position; in very fresh milk there are three: (1) milk, (2) fresh, (3) very. In the same way, the head also may show an attributive construction: the phrase this fresh milk consists of the attribute this and the head fresh milk, and this, in turn, of the attribute fresh and the head milk.

12.11. If all the syntactic constructions which go to make up a phrase are endocentric, then the phrase will contain among its ultimate constituents some word (or several words, members of a co-ordination) whose form-class is the same as that of the phrase. This word is the center of the phrase. In the phrase all this fresh milk, the word milk is the center, and in the phrase all this fresh bread and sweet butter, the words bread and butter are the centers. Since most of the constructions in any language are endocentric, most phrases have a center: the form-class of a phrase is usually the same as that of some word that is contained in the phrase.
The exceptions are phrases of exocentric construction, and these, too, we have seen, are definable in terms of word-classes. The syntactic form-classes of phrases, therefore, can be derived from the syntactic form-classes of words: the form-classes of syntax are most easily described in terms of word-classes. Thus, in English, a substantive expression is either a word (such as John) which belongs to this form-class (a substantive), or else a phrase (such as poor John) whose center is a substantive; and an English finite verb expression is either a word (such as ran) which belongs to this form-class (a finite verb), or else a phrase (such as ran away) whose center is a finite verb. An English actor-action phrase (such as John ran or poor John ran away) does not share the form-class of any word, since its construction is exocentric, but the form-class of actor-action phrases is defined by their construction: they consist of a nominative expression and a finite verb expression (arranged in a certain way), and this, in the end, again reduces the matter to terms of word-classes.

The term *parts of speech* is traditionally applied to the most inclusive and fundamental word-classes of a language, and then, in accordance with the principle just stated, the syntactic form-classes are described in terms of the parts of speech that appear in them. However, it is impossible to set up a fully consistent scheme of parts of speech, because the word-classes overlap and cross each other.

In speaking of form-classes we use the term *expression* to include both words and phrases: thus John is a substantive, poor John a substantive phrase, and both forms are substantive expressions.

Within the great form-classes which contain both words and (thanks to endocentric constructions) a vast number of phrasal combinations, there may be sub-classes due to small differences of phrasal construction. For instance, when an attribute like fresh, good, or sweet is joined to the head milk, as in fresh milk, this resultant phrase is still capable of joining with other attributes, as in good, sweet, fresh milk: the phrase has entirely the same functions as its center (and head), namely the word milk. If, however, we join a form like milk or fresh milk with the attribute this, the resultant phrase, this milk or this fresh milk has not quite the same function as the head or center, since the resultant phrase cannot be joined with attributes like good, sweet: the construction in this milk, this fresh milk is partially closed. The possibilities in this
direction, in fact, are limited to adding the attribute all, as in all this milk or all this fresh milk. When the attribute all has been added, the construction is closed: no more attributes of this type (adjectives) can be added.

12.12. An example of a taxeme of order is the arrangement by which the actor form precedes the action form in the normal type of the English actor-action construction: John ran. In languages which use highly complex taxemes of selection, order is largely non-distinctive and connotative; in a Latin phrase such as pater amat filium 'the father loves the son,' the syntactic relations are all selective (cross-reference and government) and the words appear in all possible orders (pater filium amat, filium pater amat, and so on), with differences only of emphasis and liveliness. In English, taxemes of order appear in the difference between actor-action and action-goal, as in John ran and catch John; the difference between John hit Bill and Bill hit John rests entirely upon order. In general, however, taxemes of order in English occur along with taxemes of selection. Languages which in this respect and in the general configuration of their syntax resemble English, may still show great differences as to taxemes of order. Thus, standard German differs from English in allowing only one attribute (word or phrase) of the verb to precede a finite verb: heute spielen wir Ball ['hojte 'pi:len vi:r 'bal] 'today play we ball.' Further, it places several elements last in the sentence: certain adverbs, as ich stehe um sieben Uhr auf ['ix 'ste:ə um 'zi:ben 'u:r 'awf] 'I get at seven o'clock up'; participles, as ich habe ihn heute gesehen ['ix ,ha:be i:n 'hojte ge'ze:n] 'I have him today seen'; infinitives, as ich werde ihn heute sehen ['ix ,verde i:n 'hojte 'ze:n] 'I shall him today see'; the verb of a dependent clause: wenn ich ihn heute sehe [ven ix i:n 'hojte 'ze:e] 'if I him today see.'

French has a complicated and rigid system of ordering certain substitute ('conjunct') accompaniments of its verbs. In the ordinary (non-interrogative) sentence-type, it distinguishes seven positions of these elements, which precede the finite verb:

(1) actors, such as je [ʒe] 'I,' il [il] 'he, it,' ils [il] 'they,' on [ɔ] 'one,' ce [sə] 'it, that'
(2) the negative adverb ne [nə] 'not'
(3) farther goals of first and second persons, such as me [mə] 'to me,' vous [vu] 'to you,' and of the reflexive se [sə] 'to himself, herself, themselves'
SYNTAX

(4) nearer goals, such as me [me] 'me,' vous [vu] 'you,' se [se] 'himself, herself, themselves,' le [lo] 'him, it,' les [le] 'them'

(5) farther goals of the third person: lui [lui] 'to him, to her,' leur [lœ:r] 'to them'

(6) the adverb y [i] 'there, thither, to it, to them'

(7) the adverb en [ä] 'from there, of it, of them.'

For example: (1-2-3-4) il ne me le donne pas [i n mœ l dɔn pa] 'he does not give it to me'

(1-3-6-7) il m'y en donne [i m j a dɔn] 'he gives me some of it there'

(1-4-5) on le lui donne [ɔ la lui dɔn] 'one gives it to him'

(1-2-6-7) il n'y en a pas [i n j ən a pa] 'there aren't any,' literally it has not of them there.'

Occasionally order serves finer distinctions. In French most adjectives follow their nouns: une maison blanche (yn mezɔ blæʃ] 'a white house'; a certain few precede: une belle maison [yn bel mezɔ] 'a pretty house'; others precede only with transferred meanings or with emphatic or intense connotations: une barbe noire [yn bærbɔ nwar] 'a black beard': une noire trahison [yn nwar traizɔ] 'a black betrayal'; un livre excellent [œ lœ:vʁ ekseLt] 'an excellent book': un excellent livre 'a splendid book!' A few show greater differences of meaning: un livre cher [œ lœ:vʁ ʃε:r] 'a costly book': un cher ami [œ ʃε:r am] 'a dear friend,' sa propre main [sa prɔpr mɛ] 'his own hand': une main propre [yn mɛ prɔpr] 'a clean hand.'

Viewed from the standpoint of economy, taxemes of order are a gain, since the forms are bound to be spoken in some succession; nevertheless, few languages allow features of order to work alone: almost always they merely supplement taxemes of selection.

12. 13. The languages of the Indo-European family are peculiar in having many parts of speech; no matter upon what constructions we base our scheme, a language like English will show at least half a dozen parts of speech, such as substantive, verb, adjectival, adverb, preposition, co-ordinating conjunction, and subordinating conjunction, in addition to interjections. Most languages show a smaller number. A distribution into three types is quite frequent (Semitic, Algonquian); usually one resembles our substantives and one our verbs. It is a mistake to suppose that our part-of-speech system represents universal features of human expression. If such classes as objects, actions, and qualities exist apart from
our language, as realities either of physics or of human psychology, then, of course, they exist all over the world, but it would still be true that many languages lack corresponding parts of speech.

In languages with few parts of speech, the syntactic form-classes appear rather in phrases. Often the class of a phrase is indicated by some special word, a marker; strictly speaking, the marker and the form which it accompanies are joined in an exocentric construction which determines the class of the phrase. Aside from this selective feature, the constructions are likely to be distinguished by word-order.

The classical instance is Chinese. The parts of speech are full words and particles (that is, markers). The principal constructions are three.

(1) The favorite sentence-construction is one of subject and predicate, much like the English actor-action construction; the subject precedes the predicate: [tha₁ 'xaw³] ‘he is good,’ [tha₁ 'laj³] ‘he came.’ In certain cases, depending on differences of form-class, the predicate is marked by the particle [/a4] at its beginning: [tha₁ /a4 'xaw³ 13en²] ‘he (p.) good man,’ that is, ‘he is a good man.’

(2) There is an endocentric construction in which the attribute precedes the head; in meaning this resembles the similar English constructions: ['xaw³ 13en²] ‘good man,’ [man⁴ 1ťhy⁴] ‘slowly go,’ that is, ‘go slowly.’ The attribute is in certain cases marked by the particle [ti] at its end: [tir³ 'xaw³ ti² 13en²] ‘very good man’; [wo³ ti² 1fu⁴ fžhin¹] ‘I (p.) father,’ that is, ‘my father’; [ts¹ tfo² ti¹ 13en²] ‘sit (p.) person,’ that is, ‘a sitting person’; [wo³ tčje³ ts¹ ti 1pi³] ‘I write (p.) brush,’ that is, ‘the brush I write with’ —in this example the attribute is a phrase of subject-predicate construction; [maj³ ti 1fu¹] ‘buy (p.) book,’ that is ‘the purchased book.’

(3) A second endocentric construction, in which the attribute follows the head, resembles rather the English action-goal and relation-axis constructions: [kwa'n 'man²] ‘shut the door,’ [tsaj⁴ tjun¹ kwo] ‘in China.’ We may call this, somewhat inexactely, the action-goal construction, to distinguish it from (2).

Taxemes of selection consist largely in the marking off of a form-class which serves as subject in (1), as head in (2), and as goal in (3), resembling the English substantive expression. To this form-class (we may call it the object expression) only a few
words may be said to belong in their own right; these are substitute-words of the type [tha¹] 'he, she' or [wo³] 'I.' The other object expressions are phrases with various markers. The commonest of these markers are certain particles which precede as attributes of type (2), such as [tfə³] 'this,' [na⁴] 'that,' [na³] 'which?' Thus, [tfə³ ko⁴] 'this piece,' that is, 'this (thing).'</p>

In most instances these markers do not immediately join with a full word; but only with certain ones, like the [ko⁴] 'piece' in the last example, which hereby constitute a form-class of numeratives; the phrase of marker plus numerative joins the ordinary full word in construction (2), as: [tfə ko ’ən²] 'this (individual) man'; [wu³ |ja⁴ tfə³] 'five (individual) cart,' that is 'five carts.' Another kind of object expression is characterized by the particle [ti¹] at its end: [maj⁴ ]fu² ti] 'sell book (p.),' that is 'bookseller.'

In this way complex phrases are built up: [tha¹ taw⁴ ’thjen² li³ ’hy⁴] 'he enter field interior go,' that is, 'he goes into the field'; here the first word is the subject, the rest of the phrase the predicate; in this predicate the last word is the head and the other three are an attribute; this attribute consists of the action [taw⁴] 'enter' and the goal ['thjen² li³] 'field interior,' in which the first word is an attribute of the second. In the sentence [ni³ mej² pa³ maj³ mej² ti tfhjen³ ]kej³ wo³] 'you not take buy coal (p.) money give I,' the first word is the subject, the rest the predicate; this predicate consists of an attribute, [mej³] 'not' and a head; within this head, the first five words are again an attribute and the last two [ ]kej³ wo³] 'give I' a head, whose construction is action and goal. In the five-word attribute [pa³ maj³ mej² ti tfhjen³] 'take buy coal (p.) money,' the first word is an action and the rest a goal; this goal consists of the head [tfhjen³] 'money' and the attribute [maj³ mej² ti] which is marked as such by the particle [ti¹] appended to the phrase [maj³ mej²] 'buy coal,' whose construction is action-goal. Thus the sentence means 'you not taking buy-coal-money give me,' that is 'you haven't given me money to buy coal.'

In Tagalog, the parts of speech are, again, full word and particle, but here the full words are subdivided into two classes which we may call static and transient. The latter resemble our verbs in forming a special kind of predicate (the narrative type, with four sub-types, § 11.2) and in showing morphologic distinctions of tense and mode, but they differ from our verbs because, on the one hand, they are not restricted to the function of predicate and, on
the other hand, there exist non-narrative predicates. The chief constructions are subject and predicate, marked optionally by order (predicate precedes subject) or by the particle \([aj]\) and order (subject precedes predicate marked by initial \([aj]\)), as illustrated in §11.2. The subject and the equational predicate are selectively marked: the class of forms which fill these positions resembles the English substantive expression and, even more, the Chinese object expression. A few substitute-words, such as \([a'ku]\) 'I' and \([si'ja]\) 'he, she,' belong to this class by their own right; all other object expressions are phrases, characterized by the presence of certain attributes, as \([isa \eta \text{ 'ba:ta?}}\) 'one child,' or by certain particles, chiefly \([si]\) before names, as \([si \text{ 'hwan}}\) 'John,' and \([an]\) before other forms, as \([an \text{ 'ba:ta?}}\) 'the child, a child,' \([an \text{ pu'la}}\) 'the red,' that is, 'the redness,' \([an \text{ 'pu:tu}l\) 'the cut,' or, to illustrate transient forms, \([an \text{ pu'mu:tu}l\) 'the one who cut,' \([an \text{ pi'nu:tu}l\) 'that which was cut,' \([an \text{ ipi'nu:tu}l\) 'that which was cut with,' \([an \text{ pin'utu:la}n\) 'that which was cut from.' There are four attributive constructions. In one, a particle \([na]\), after vowels \([\eta]\), intervenes between head and attribute, in either order, as \([an \text{ 'ba:ta} \eta \text{ sumu'zu:la}t}\) or \([an \text{ sumu':-su:la}t \text{ 'ba:ta?}}\) 'the writing child'; \([an \text{ pu'la} \eta \text{ pan'ju}}\) 'the red handkerchief,' \([an \text{ pan'ju} \eta \text{ i'tu}}\) 'this handkerchief.' Another, more restricted attributive construction lacks the particle, as \([hin'di: a'ku\) 'not I,' \([hin'di: maba'it\) 'not good.' In the third attributive construction the attribute is an object expression in a special form: thus, \([a'ku\) 'I' is replaced by \([ku]\), and \([si'ja\) 'he, she' by \([ni'ja]\), and the particle \([si]\) by \([ni]\), the particle \([an]\) by \([na\eta]\): \([an \text{ pu'la} \eta \text{ pan'ju} \text{ aj mati'kad}}\) 'the red of the handkerchief is bright'; \([an \text{ 'ba:ta} \text{ j ku'ma'iu}na\eta \text{ 'ka:nin}}\) 'the child ate (some) rice,' (actor-action); \([ki'na:in \eta \text{ 'ba:ta?} \text{ 'ka:nin}}\) 'the rice was eaten by the child' (goal-action); see also the examples in §11.2. In the fourth attributive construction, too, the attribute is an object expression: \([si]\) is replaced by \([kaj]\) and \([an]\) by \([sa]\); the attribute tells of a place: \([an \text{ 'ba:ta} \text{ j na'na:ug sa 'ba:haj}}\) 'the child came out of the house, out of a house.'

12.14. The details of syntax are often complicated and hard to describe. On this point, any fairly complete grammar of a language like English, German, Latin, or French, will prove more enlightening than would an abstract discussion. Syntax is obscured, however, in most treatises, by the use of philosophical instead of formal definitions of constructions and form-classes. As a single
illustration of the more complex syntactic habits, we shall survey the main features of one construction in present-day (colloquial standard) English — the construction which we may call *character-substance*, as in *fresh milk*.

This construction is attributive, and the head is always a *noun-expression* — that is, a noun or an endocentric phrase with a noun as center. The noun is a word-class; like all form-classes, it is to be defined in terms of grammatical features, some of which, in fact, appear in what follows. When it has been defined, it shows a class-meaning which can be roughly stated as 'object of such and such a species'; examples are *boy, stone, water, kindness*. The attribute in our construction is always an *adjective expression* — that is, an adjective or an endocentric phrase with an adjective as center. The adjective is in English a word-class (part of speech), definable precisely by its function in the character-substance construction which we are now to discuss; its class-meaning will emerge from our discussion as something like 'character of specimens of a species of objects'; examples are *big, red, this, some*. Beside these features of selection, the character-substance construction contains a feature of order: the adjective expression precedes the noun expression: *poor John, fresh milk*.

The adjectives are divided into two classes, *descriptive* and *limiting*, by the circumstance that when adjectives of both these classes occur in a phrase, the limiting adjective precedes and modifies the group of descriptive adjective plus noun. Thus, in a form like *this fresh milk*, the immediate constituents are the limiting adjective *this*, and the noun phrase *fresh milk*, which consists, in turn, of the descriptive adjective *fresh* and the noun *milk*. This difference subdivides our character-substance construction into two sub-types, the *quality-substance* construction, where the attribute is a descriptive adjective expression, and the *limitation-substance* construction, where the attribute is a limiting adjective.

The quality-substance construction and the form-class of descriptive adjectives are both divided into several types by features of order. For instance, we say *big black sheep* and never *black big sheep, kind old man* and never *old kind man*, and so on. We shall not stop to examine these sub-types. The meaning of the form-class of descriptive adjectives is roughly 'qualitative character of specimens'.

The form-class of limiting adjectives is much smaller than that
of descriptive adjectives, and constitutes, in fact, what we shall later define as an *irregular* form-class — that is, a form-class which has to be described in the shape of a list of the forms; however, the boundary between limiting and descriptive adjectives is not completely definable. The class-meaning of limiting adjectives will appear from the following discussion as something like 'variable character of specimens.'

Our limiting adjectives fall into two sub-classes of *determiners* and *numeratives*. These two classes have several subdivisions and are crossed, moreover, by several other lines of classification.

The determiners are defined by the fact that certain types of noun expressions (such as *house* or *big house*) are always accompanied by a determiner (as, *this house, a big house*). The class-meaning is, roughly, 'identificational character of specimens.' This habit of using certain noun expressions always with a determiner, is peculiar to some languages, such as the modern Germanic and Romance. Many languages have not this habit; in Latin, for instance, *domus* 'house' requires no attribute and is used indifferently where we say *the house* or *a house*.

A number of features subdivides the determiners into two classes, *definite* and *indefinite*. Of these features, we shall mention only one: a definite determiner can be preceded by the numerative *all* (as in *all the water*) but an indefinite determiner (as, *some in some water*) cannot.

The definite determiners are: any possessive adjective (*John's book, my house*) and the words *this* (*these*), *that* (*those*), *the*. The class of possessive adjectives is definable in terms of morphology. It is worth observing that Italian, which has a character-substance construction much like ours, does not use possessive adjectives as determiners: *il mio amico* [il mio a'miko] 'the my friend' (that is, 'my friend') contrasts with *un* [un] *mio amico* 'a my friend' (that is, 'a friend of mine'). The class-meaning of definite determiners is 'identified specimens.' A precise statement of how the specimens are identified, is a practical matter outside the linguist's control; the identification consists in possession by some person (*John's book*), spatial relation to the speaker (*this house*), description by some accompanying linguistic form (*the house I saw*), or purely situational features (*the sky, the chairman*), among which earlier mention by speech is to be reckoned ('I saw a man, but the man did not see me'). Among the definite determiners, *this : these*
and that: those are peculiar in showing congruence with the number-class of the noun (this house: these houses).

The indefinite determiners are a (an), any, each, either, every, neither, nor, one, some, what, whatever, which, whichever, and the phrasal combinations many a, such a, what a. The class-meaning is 'unidentified specimens.'

The word a is peculiar in its sandhi-form an, used before vowels. The word one occurs not only as an indefinite determiner (one man), but also in some entirely different functions (as in a big one, if one only knew); this phenomenon may be designated as class-cleavage. The meanings of the various indefinite determiners are in part linguistically definable in terms of grammatical features of wider bearing than our present subject. For instance, what and which are interrogative, introducing supplement-questions, which prompt the hearer to supply a speech-form (what man? which man?) Whatever and whichever are relative, marking their noun as part of a subordinate clause (whatever book you take, . . .). No and neither are negative, ruling out all specimens. Each, which, and whichever imply a limited field of selection: that is, the specimens concerned belong to an identified part (or to the identified whole) of the species (which book? which parent?); either and neither go farther in limiting the field to two specimens.

Some of the determiners are atonic (barring, of course, the case where they are emphatic elements): my, our, your, his, her, its, their, the, a; others are sometimes atonic or spoken with secondary stress.

The types of noun expressions which always have a determiner, are preceded, when no more specific determiner is present, by the articles, definite the and indefinite a, whose meaning is merely the class-meaning of their respective form-classes. A grammatical classification, such as definite and indefinite, which always accompanies some grammatical feature (here the types of noun expression which demand a determiner), is said to be categoric. The definite and indefinite categories may be said, in fact, to embrace the entire class of English noun expressions, because even those types of noun expression which do not always take a determiner, can be classed as definite or indefinite: John, for instance, as definite, kindness as indefinite.

According to the use and non-use of determiners, English noun expressions fall into a number of interesting sub-classes:
I. *Names* (proper nouns) occur only in the singular number, take no determiner, and are always definite: *John, Chicago*. The class meaning is 'species of object containing only one specimen.' Here and in what follows, space forbids our entering into details, such as the class-cleavage by which a name occurs also as a common noun, in cases like homonymy (*two Johns, this John*); nor can we take up sub-classes, such as that of river-names, which are always preceded by *the* (*the Mississippi*).

II. *Common nouns* occur in both categories, definite and indefinite. The class-meaning is 'species of object occurring in more than one specimen.' In the plural number they require a determiner for the definite category (*the houses*), but not for the indefinite (*houses, corresponding to the singular form a house*).

A. *Bounded nouns* in the singular number require a determiner (*the house, a house*). The class meaning is 'species of object occurring in more than one specimen, such that the specimens cannot be subdivided or merged.'

B. *Unbounded nouns* require a determiner for the definite category only (*the milk : milk*). The class-meaning is 'species of object occurring in more than one specimen, such that the specimens can be subdivided or merged.'

1. *Mass nouns* never take *a* and have no plural (*the milk : milk*). The class-meaning is that of B with the added proviso that the specimens 'exist independently.'

2. *Abstract nouns* in the indefinite singular without a determiner include all the specimens (*life is short*); with a determiner and in the plural, the specimens are separate (*a useful life; nine lives*). The class-meaning is that of B with the proviso that the specimens 'exist only as the demeanor (quality, action, relation) of other objects.'

Among the subdivisions of II, class-cleavage is frequent and interesting, as, *an egg, eggs* (A), but "he got egg on his necktie" (B1); *coffee* (B1), but *an expensive coffee* (A).

The limiting adjectives of the other class, numeratives, fall into various sub-classes, of which we shall merely mention a few. Two of them, *all* and *both* precede a determiner (*all the apples*); the rest follow (*the other apples*). Two, however, precede *a* in phrases which are determiners: *many a, such a*. The numeratives *few,*
hundred, thousand, and those formed with the suffix -ion (million and so on), are preceded by a in phrases which serve as numeratives with plural nouns (a hundred years). The numeratives same, very, one — this last differs by class-cleavage from the determiner one — are used only with definite nouns (this same book, the very day, my one hope); the numeratives much, more, less are used only with indefinite nouns (much water); the numeralive all is used with both kinds of nouns but only with definite determiners (all the milk; all milk). Some, such as both, few, many, and the higher numbers, are used only with plural nouns; others, such as one, much, little, only with singular nouns. Some numeratives are used also in other syntactic positions, as, many and few as predicate adjectives (they were many), and all, both as semi-predicative attributes (the boys were both there). Some other interesting lines of classification among the English numeratives will appear when we take up the substitutive replacement of noun expressions in Chapter 15.
CHAPTER 13

MORPHOLOGY

13.1. By the morphology of a language we mean the constructions in which bound forms appear among the constituents. By definition, the resultant forms are either bound forms or words, but never phrases. Accordingly, we may say that morphology includes the constructions of words and parts of words, while syntax includes the constructions of phrases. As a border region we have phrase-words (jack-in-the-pulpit) and some compound words (blackbird), which contain no bound forms among their immediate constituents, and yet in some ways exhibit morphologic rather than syntactic types of construction.

In general, morphologic constructions are more elaborate than those of syntax. The features of modification and modulation are more numerous and often irregular — that is, confined to particular constituents or combinations. The order of the constituents is almost always rigidly fixed, permitting of no such connotative variants as John ran away: Away ran John. Features of selection minutely and often whimsically limit the constituents that may be united into a complex form.

Accordingly, languages differ more in morphology than in syntax. The variety is so great that no simple scheme will classify languages as to their morphology. One such scheme distinguishes analytic languages, which use few bound forms, from synthetic, which use many. At one extreme is a completely analytic language, like modern Chinese, where each word is a one-syllable morpheme or a compound word or phrase-word; at the other, a highly synthetic language like Eskimo, which unites long strings of bound forms into single words, such as [a.wlisa-ut-iss'ar-siniarpu-na] 'I am looking for something suitable for a fish-line.' This distinction, however, except for cases at the former extreme, is relative; any one language may be in some respects more analytic, but in other respects more synthetic, than some other language. Another scheme of this sort divided languages into four morphologic types, isolating, agglutinative, polysynthetic, and in-
flecting. Isolating languages were those which, like Chinese, used no bound forms; in agglutinative languages the bound forms were supposed merely to follow one another, Turkish being the stock example; polysynthetic languages expressed semantically important elements, such as verbal goals, by means of bound forms, as does Eskimo; inflectional languages showed a merging of semantically distinct features either in a single bound form or in closely united bound forms, as when the suffix -ō in a Latin form like amō 'I love' expresses the meanings 'speaker as actor,' 'only one actor,' 'action in present time,' 'real (not merely possible or hypothetical) action.' These distinctions are not co-ordinate, and the last three classes were never clearly defined.

13. 2. Since the speaker cannot isolate bound forms by speaking them alone, he is usually unable to describe the structure of words. The statement of morphology requires systematic study. The ancient Greeks made some progress in this direction, but, in the main, our technique was developed by the Hindu grammarians. No matter how refined our method, the elusive nature of meanings will always cause difficulty, especially when doubtful relations of meaning are accompanied by formal irregularities. In the series goose, gosling, gooseberry, gander, we shall probably agree that the first two forms are morphologically related, in the sense that [goz-] in gosling is a phonetic modification of goose, but the [guz-] in gooseberry does not fit the meaning, and, on the other hand, the formal resemblance [g-] of goose and gander is so slight that one may question whether it really puts the practical relation of meaning into linguistic form. This last difficulty appears also in the pair duck : drake, with their common [d ... k]. One soon learns that one cannot look to the speakers for an answer, since they do not practise morphologic analysis; if one bothers them with such questions, they give inconsistent or silly answers. If the history of a language is known, one often finds that the ambiguity was absent in some older state of the language — it appears, for instance, that some centuries ago 'gooseberry' was *grose-berry and had nothing to do with a goose — but facts of this sort evidently do not tell us how things work in the present state of the language.

In describing the modulations and modifications which occur in syntax, we naturally take the absolute form of a word or phrase as our starting-point, but a bound form which occurs in several
shapes will lead to several entirely different forms of description, according to our choice of a basic alternant. For instance, the plural-suffix of English nouns appears ordinarily in three shapes: [-iz] glasses, [-z] cards, [-s] books; by taking each of these three, in turn, as one's starting-point, one can arrive at three entirely different statements of the facts.

Very often there are further difficulties. Sometimes a grammatical feature, such as a phonetic modification, appears to express a meaning which is usually expressed by a linguistic form, as in man : men, where modification of the vowel takes the place of the plural-suffix. In other cases there is not even a grammatical feature: a single phonetic form, in the manner of homonymy, represents two meanings which are usually distinguished by means of a linguistic form, as, singular and plural noun in the sheep (grazes) : the sheep (graze). Here the Hindus hit upon the apparently artificial but in practice eminently serviceable device of speaking of a zero element: in sheep : sheep the plural-suffix is replaced by zero — that is, by nothing at all.

13. 3. What with these and other difficulties, any inconsistency of procedure is likely to create confusion in a descriptive statement of morphology. One must observe, above all, the principle of immediate constituents (§ 10.2). This principle leads us, at the outset, to distinguish certain classes of words, according to the immediate constituents:

A. Secondary words, containing free forms:
   1. Compound words, containing more than one free form: door-knob, wild-animal-tamer. The included free forms are the members of the compound word: in our examples, the members are the words door, knob, tamer, and the phrase wild animal.
   2. Derived secondary words, containing one free form: boyish, old-maidish. The included free form is called the underlying form; in our examples the underlying forms are the word boy and the phrase old maid.

B. Primary words, not containing a free form:
   1. Derived primary words, containing more than one bound form: re-ceive, de-ceive, con-ceive, re-tain, de-tain, con-tain.
   2. Morpheme-words, consisting of a single (free) morpheme: man, boy, cut, run, red, big.
The principle of immediate constituents will lead us, for example, to class a form like gentlemanly not as a compound word, but as a derived secondary word, since the immediate constituents are the bound form -ly and the underlying word gentleman; the word gentlemanly is a secondary derivative (a so-called de-compound) whose underlying form happens to be a compound word. Similarly, door-knobs is not a compound word, but a de-compound, consisting of the bound form [-z] and the underlying word door-knob.

The principle of immediate constituents leads us to observe the structural order of the constituents, which may differ from their actual sequence; thus, ungentlemanly consists of un- and gentlemanly, with the bound form added at the beginning, but gentlemanly consists of gentleman and -ly with the bound form added at the end.

13. 4. As examples of relatively simple morphologic arrangements we may take the constructions of secondary derivation that appear in English plural nouns (glass-es) and past-tense verbs (land-ed).

As to selection, the bound forms are in both cases unique, but the underlying forms belong to two great form-classes: the plural nouns are derived from singular nouns (as, glasses from glass) and the past-tense verbs from infinitive verbs (as, landed from land). Other, subsidiary taxemes of selection will concern us later.

As to order, the bound form, in both cases, is spoken after the underlying form.

By a feature of modulation common to nearly all constructions of English morphology, the underlying form keeps its stress, and the bound form is unstressed.

The taxemes of phonetic modification are more elaborate, and will show us some peculiarities that appear in the morphology of many languages.

To begin with, the bound form appears in several alternants, different shapes which imply, in this case, features of phonetic modification:

- glass : glasses [-iz]
- pen : pens [-z]
- book : books [-s].

If we collect examples, we soon find that the shape of the bound form is determined by the last phoneme of the accompanying form:
[-iz] appears after sibilants and affricates (glasses, roses, dishes, garages, churches, bridges); [-z] appears after all other voiced phonemes (saws, boys, ribs, sleeves, pens, hills, cars); and [-s] after all other unvoiced phonemes (books, cliffs). Since the differences between the three alternants [-iz, -z, -s] can be described in terms of phonetic modification, we say that they are phonetic alternants. Since the distribution of the three alternants is regulated according to a linguistically recognizable characteristic of the accompanying forms, we say that the alternation is regular. Finally, since the deciding characteristic of the accompanying forms is phonemic (namely, the identity of the last phoneme), we say that the alternation is automatic.

Regular alternations play a great part in the morphology of most languages. Not all regular alternations are phonetic or automatic. In German, for instance, the singular nouns are divided, by certain syntactic features, into three form-classes which are known as genders (§ 12.7); now, German plural nouns are derived from singulars by the addition of bound forms which differ according to the gender of the underlying singular:

- **Feminine nouns** add [-en]: die Uhr [u:r] 'clock, watch': Uhren ['u:ren] 'clocks, watches'; die Last [last] 'burden': Lasten ['lasten] 'burdens'; die Frau [fraw] 'woman': Frauen ['frawen] 'women.'

This alternation (aside from special features which we need not consider) is regular, but it is not phonetic, since, of the three alternants, [-e] with vowel change, [-e], and [-en], the last is not, in the system of the language, phonetically akin to the first two; and the alternation is not automatic, but grammatical, since it depends not upon phonetic, but upon grammatical (in this instance, syntactic) peculiarities of the underlying forms.

13. 6. We have not yet described in terms of phonetic modification, the kinship of the three alternants [-iz, -z, -s] of the bound form that appears in English plural nouns. It is evident that three entirely different statements are possible, according to our choice of one or another of the three forms as our starting-point. Our
aim is to get, in the long run, the simplest possible set of statements that will describe the facts of the English language. To try out the different possible formulae with this aim in view, often involves great labor. In the present instance our trouble is small, because our alternation has an exact parallel in English syntax: the enclitic word whose absolute form is *is* ['iz], alternates quite like our plural suffix:

\[
\begin{align*}
\text{Bess's ready} & \quad [iz, \ əz] \\
\text{John's ready} & \quad [z] \\
\text{Dick's ready} & \quad [s].
\end{align*}
\]

Since in this case the absolute form *is* necessarily serves as the starting-point of description, we reach the simplest formula if we take [-iz] as the basic alternant also of the bound form. We can say, then, that in English any morpheme of the form [iz, ez], unstressed, loses its vowel after all phonemes except sibilants and affricates, and then replaces [z] by [s] after unvoiced sounds. This covers also the alternation of the third-person present-tense verb suffix in *misses* : *runs* : *breaks* and of the possessive-adjective suffix in *Bess's*, *John's*, *Dick's*. Moreover, it leads us to use a parallel formula in the case of the past-tense suffix of verbs. This suffix appears in three similar alternants:

\[
\begin{align*}
\text{land} & \quad : \quad \text{landed} \ [-id] \\
\text{live} & \quad : \quad \text{lived} \ [-d] \\
\text{dance} & \quad : \quad \text{danced} \ [-t],
\end{align*}
\]

and we need not hesitate, now, to take [-id] as the basic form for our description and to say that this form loses its vowel after all phonemes except dental stops, and then replaces [d] by [t] after all unvoiced sounds.

13. 6. A survey of English plural nouns will soon show that the statement we have made holds good for an indefinitely large number of forms, but not for a certain limited number of exceptions.

In some instances the constituent form in the plural differs phonetically from the underlying singular noun:

\[
\begin{align*}
\text{knife} \ [najf] & \quad : \quad \text{knives} \ : \quad [najv-\text{z}] \\
\text{mouth} \ [\text{maw}θ] & \quad : \quad \text{mouls} \ : \quad [\text{maw}\text{ʊ}-\text{z}] \\
\text{house} \ [\text{haws}] & \quad : \quad \text{houses} \ : \quad [\text{ˈhawz}-\text{iz}].
\end{align*}
\]

\[1\] The types of English pronunciation which distinguish between [e] and [i] in unstressed position, use [i] in both the bound form (*glasses*) and the word (*Bess's*).
We can describe the peculiarity of these plurals by saying that the final [f, θ, s] of the underlying singular is replaced by [v, ə, z] before the bound form is added. The word "before" in this statement means that the alternant of the bound form is the one appropriate to the substituted sound; thus, the plural of knife adds not [-s], but [-z]: "first" the [-f] is replaced by [-v], and "then" the appropriate alternant [-z] is added. The terms "before, after, first, then," and so on, in such statements, tell the descriptive order. The actual sequence of constituents, and their structural order (§ 13.3) are a part of the language, but the descriptive order of grammatical features is a fiction and results simply from our method of describing the forms; it goes without saying, for instance, that the speaker who says knives, does not "first" replace [f] by [v] and "then" add [-z], but merely utters a form (knives) which in certain features resembles and in certain features differs from a certain other form (namely, knife).

If the English plural nouns which exhibit this voicing of a final spirant in the underlying form, showed any common phonetic or grammatical feature that distinguished them from other nouns, we could describe this peculiarity as a regular alternant. This, however, seems not to be the case; we have also plurals like cliffs, myths, creases, where [f, θ, s] of the underlying form appears unchanged. We can make our general statement cover one group, but will then have to furnish a list of the cases that do not fall under the general statement. A set of forms that is not covered by a general statement, but has to be presented in the shape of a list, is said to be irregular. We try, of course, to arrange our description so that as many forms as possible will be included in general statements. The choice is often decided for us by the circumstance that one group of forms is of indefinite extent and therefore amenable to a general statement, but not to a list. In the case of English nouns in [-s], we obviously face this condition, for house : houses is the only instance where [-s] is replaced by [z] in the plural, while an indefinite number of plural nouns retains the [-s] of the underlying form (glasses, creases, curses, dances, and so on). Our list, in this case, includes only one form, houses, a unique irregularity. The list of plurals which substitute [ə] for the [-θ] of the underlying form is not large, embracing only the forms baths, paths, cloths, mouths (and for some speakers also laths, oaths, truths, youths); on the other side we find a number
of current forms, such as months, widths, drouths, myths, hearths, and, what is more decisive, the habit of keeping [-6] in the formation of plurals that are not traditional and may be formed by a speaker who has not heard them: the McGraths, napropaths, monoliths. In the case of [-f] the list is larger: knives, wives, lives, calves, halves, thieves, leaves, sheaves, beeves, loaves, elves, shelves (and for some speakers also hooves, rooves, scarves, dwarves, wharves); we decide to call these irregular on the strength not only of counterinstances, such as cliffs, toughs, reefs, oafs, but also of less common or occasional forms, such as (some good) laughs, (general) staffs, monographs.

Where the two treatments occur side by side, as in laths [lu:θs] or [luθz], roofs or rooves, there is usually some slight difference of connotation between the variants. The noun beef, as a mass-noun (§ 12.14), has no ordinary plural by its side; the plural beeves is a specialized derivative, since it deviates in its meaning of ‘oxen, cattle,’ with archaic-poetic connotation.

We may note in passing that the grammatical features we have discussed, determine features of the phonetic pattern (§ 8.5), by defining groups like sibilant-affricate, dental stop, voiced, unvoiced, and establishing the relation [f, θ, s] versus [v, ɹ, z], and [t] versus [d].

We may describe “voicing of final spirant plus suffix [-iz, -z, (-s)]” as an irregular alternant of the regular plural-suffix [-iz, -z, -s]; the irregularity consists in a phonetic modification of the underlying form. The same modification is accompanied by modification of the syllabic in the uniquely irregular staff: staves. In cloth [klɔ:θ] : clothes [klowz] we have a uniquely irregular plural with specialized meaning (‘garments, clothing’), beside the irregular plural cloths [klɔ:ðz] with normal meaning.

The homonymous third-person present-tense suffix of verbs is accompanied by phonetic modification of the underlying form in do [duw] : does [dəz], say [sej] : says [sez], have [hev] : has [hez].

The past-tense suffix [-id, -d, -t] is accompanied by phonetic modification in the irregular forms say : said, flee : fled, hear [hɪə] : heard [hə:d], keep : kept (and, similarly, crept, slept, swept, wept; leaped and leapt are variants), do : did, sell : sold (and, similarly, told), make : made, have : had.

13. 7. In some cases the bound form appears in an unusual shape. In die : dice the alternant [-s] appears against the general
habit; in penny : pence the same feature is accompanied by modifi-
cation (loss of [-i]) in the underlying form, together with special-
ization of meaning, in contrast with the normal variant pennies.
In the past tense, we find [-t] instead of [-d] in the archaic-flavored
variants burnt, learnt. If we say that in English the unpermitted
final cluster [-dt] is replaced by [-t], we can class here, with [-t]
instead of [-id], the forms bent, lent, sent, spent, built.

Both constituents show irregular phonetic modification in
feel : felt and similarly in dealt, knelt, dreamt, meant. If we say
that the unpermitted final clusters [-vt, -zt] are replaced by [-ft,-st],
we can class here also leave : left and lose : lost. The bound form ap-
ppears in the alternant [-t] instead of [-d], and the underlying form
replaces the syllabic and all that follows by [ɔ] in seek [sɪːk]: sought
[soʊt] and, similarly, in bought, brought, caught, taught, thought.

In the extreme case, an alternant bears no resemblance to the
other alternants. In ox : oxen the bound form added in the plural
is [-n] instead of [-iz, -z, -s]. If the language does not show parallel
cases which warrant our describing the deviant form in terms of
phonetic modification, an alternant of this sort is said to be supple-
tive; thus, [-n] in oxen is a suppletive alternant of [-iz, -z, -s],
because English grammar shows no phonetic modification of [-iz]
to [-n]. In other instances it is the underlying form which suf-
fers suppletion. Beside the ordinary derivation of kind : kinder,
warm : warmer, and so on, we have good : better, where the under-
lying word good is replaced by an entirely different form bet-,
which we describe, accordingly, as a suppletive alternant of good.
In the same way, the infinitive be suffers suppletion, by [i-], in
the third-person present-tense form is [iz]. In child : children a
suppletive alternant [-ran] of the bound form is accompanied by
phonetic modification of the underlying word.

Another extreme case is that of zero-alternants (§ 13.2), in which
a constituent is entirely lacking, as in the plurals sheep, deer, moose,
fish, and so on. These plurals are irregular, for although some of
them (for instance, species of fish, like perch, bass, pickerel, large
enough to be eaten in separate specimens, and not named after
other objects) can be classified by purely practical features of
meaning, they have no formal characteristic by which we could
define them. The past-tense suffix of verbs shows a zero-alternant
in bet, let, set, wet, hit, slit, split, cut, shut, put, beat, cast, cost, burst,
shed, spread, wed. The third-person present-tense suffix has a
zero-alternant in can, shall, will, must, may, and, in certain constructions (for instance, with the modifier not), in need, dare; this is a regular grammatical alternation, since these verbs are definable by their syntactic function of taking an infinitive modifier without the preposition to. Our possessive-adjective suffix [-iz, -z, -s] has a zero-alternant in one instance, namely, after an underlying form which ends in the plural-suffix [-iz, -z, -s] as the-boys'.

A zero-alternant may go with modification of the accompanying form. Thus, the plural nouns geese, teeth, feet, mice, lice, men, women ['wiman] add no bound form to the singular, but contain a different syllabic. In these plurals a grammatical feature, phonetic modification, expresses a meaning (namely, the sememe 'more than one object') which is normally expressed by a linguistic form (namely, the morpheme [-iz, -z, -s]). We may say that "substitution of [i̯]" (for the stressed syllabic of the underlying form) in geese, teeth, feet, "substitution of [aj]" in mice, lice, "substitution of [e]" in men, and "substitution of [i]" in women, are alternants of the normal plural-suffix — substitution-alternants or substitution-forms. In our past-tense verbs we find substitution of various syllables taking the place of [-id, -d, -t], as:

[ ɔ ] got, shot, trod
[ ɛ ] drank, sank, shrank, rang, sang, sprang, began, ran, swam, sat, spat
[ ɛ ] bled, fed, led, read, met, held, fell
[ ɪ ] bit, lit, hid, slid
[ ə ] saw, fought
[ ʌ ] clung, flung, hung, slung, swung, spun, won, dug, stuck, struck
[ u ] shook, took
[ ej ] ate, gave, came, lay
[ aw ] bound, found, ground, wound
[ ow ] clove, drove, wove, bore, swore, tore, wore, broke, 8'ke, woke, chose, froze, rose, smote, wrote, rode, stole, shone; with dove as a variant beside regular dived

[(j)uw] knew, blew, flew, slew, drew, grew, threw.

In stand : stood we have a more complex case with an alternant describable as "substitution of [u] and loss of [n]."

A zero-alternant replaces the bound form, and a suppletive alternant the underlying form, in cases like be : was, go : went, I : my, we : our, she : her, bad : worse.
In cases like *have* [hev] : *had* [he-d] or *make* [mejk] : *made* [mej-d], one of the constituents is modified by the loss of a phoneme. This loss may be described as a *minus-feature*; like zero-features or substitution-features, minus-features may occur independently. For instance, in a French adjective, the regular type has only one form, regardless of whether the adjective accompanies a masculine or a feminine noun, e.g. *rouge* [ru:ʒ] 'red': *un livre* rouge [œ li:vʁe ru:ʒ] 'a red book,' masculine, and *une plume* rouge [yn plym ru:ʒ] 'a red feather or pen,' feminine. In a fairly large irregular type, however, the masculine and feminine forms differ: *un livre* vert [ve:r] 'a green book,' but *une plume* verte [ver] 'a green feather or pen.' Thus:

<table>
<thead>
<tr>
<th>Masculine</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>plat</em> [pla] 'flat'</td>
<td><em>platte</em> [plat]</td>
</tr>
<tr>
<td><em>laid</em> [le] 'ugly'</td>
<td><em>laide</em> [led]</td>
</tr>
<tr>
<td><em>distinct</em> [distɛ] 'distinct'</td>
<td><em>distîkte</em> [distɛkt]</td>
</tr>
<tr>
<td><em>long</em> [lɔ] 'long'</td>
<td><em>longue</em> [lɔɡ]</td>
</tr>
<tr>
<td><em>bas</em> [ba] 'low'</td>
<td><em>basse</em> [ba:s]</td>
</tr>
<tr>
<td><em>gris</em> [gri] 'gray'</td>
<td><em>grise</em> [griːz]</td>
</tr>
<tr>
<td><em>frais</em> [fre] 'fresh'</td>
<td><em>fraîche</em> [freːʃ]</td>
</tr>
<tr>
<td><em>gentil</em> [ʒati] 'gentle'</td>
<td><em>gentille</em> [ʒatiː]</td>
</tr>
<tr>
<td><em>léger</em> [leʒe] 'light'</td>
<td><em>légère</em> [leʒe:r]</td>
</tr>
<tr>
<td><em>soul</em> [su] 'drunk'</td>
<td><em>soule</em> [sul]</td>
</tr>
<tr>
<td><em>plein</em> [plɛ] 'full'</td>
<td><em>pleine</em> [pleːn].</td>
</tr>
</tbody>
</table>

It is evident that two forms of description are here possible. We could take the masculine forms as a basis and tell what consonant is added in each case in the feminine form, and this would, of course, result in a fairly complicated statement. On the other hand, if we take the feminine form as our basis, we can describe this irregular type by the simple statement that the masculine form is derived from the feminine by means of a minus-feature, namely, loss of the final consonant and of the cluster [-kt]. If we take the latter course, we find, moreover, that all the other differences between the two forms, as to vowel quantity and as to nasalization (as in our last example), re-appear in other phases of French morphology and can in large part be attributed to the phonetic pattern.

The last part of our discussion has shown us that a word may have the character of a secondary derivative and yet consist of
only one morpheme, accompanied by a zero-feature (sheep, as a plural; cut as a past), by a substitution-feature (men, sang), by suppletion (went, worse), or by a minus-feature (French vert, masculine). We class these words as secondary derivatives and recognize their peculiarity by calling them secondary morpheme-words.

13. 8. The bound forms which in secondary derivation are added to the underlying form, are called affixes. Affixes which precede the underlying form are prefixes, as be- in be-head; those which follow the underlying form are called suffixes, as [-iz] in glasses or -ish in boyish. Affixes added within the underlying form are called infixes; thus, Tagalog uses several infixes which are added before the first vowel of the underlying form: from [su:lat] ‘a writing’ are derived [su'mu:lat] ‘one who wrote,’ with the infix [-um-], and [si'nu:lat] ‘that which was written,’ with infix [-in-]. 

Reduplication is an affix that consists of repeating part of the underlying form, as Tagalog [su:-'su:lat] ‘one who will write,’ [ga:mit] ‘thing of use’: [ga:-'ga:mit] ‘one who will use.’ Reduplication may be of various extent: Fox [wa:pame:wa] ‘he looks at him’: [wa:-wa:pame:wa] ‘he examines him,’ [wa:pa-wa:pame:wa] ‘he keeps looking at him.’ It may differ phonetically in some conventional way from the underlying word: ancient Greek ['phaejn] ‘it shines, it appears’: [pam-'phaejn] ‘it shines brightly’; Sanskrit ['bharti] ‘he bears’: ['bi-bharti] ‘he bears up,’ ['bhari-bharti] ‘he bears off violently.’

13. 9. We have seen that when forms are partially similar, there may be a question as to which one we had better take as the underlying form, and that the structure of the language may decide this question for us, since, taking it one way, we get an unduly complicated description, and, taking it the other way, a relatively simple one. This same consideration often leads us to set up an artificial underlying form. For instance, in German the voiced mutes [b, d, g, v, z] are not permitted finals, and are in final position replaced by the corresponding unvoiced phonemes. Accordingly we get sets like the following:

<table>
<thead>
<tr>
<th>UNDERLYING WORD</th>
<th>DERIVED WORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gras [gra:s] ‘grass’</td>
<td>grasen ['gra:z-en] ‘to graze’</td>
</tr>
<tr>
<td>Haus [haws] ‘house’</td>
<td>hausen ['hawz-en] ‘to keep house, to carry on’</td>
</tr>
<tr>
<td>Spasz [/pa:s] ‘jest’</td>
<td>spaszen [/pa:s-en] ‘to jest’</td>
</tr>
<tr>
<td>aus [aws] ‘out’</td>
<td>auszen ['aws-en] ‘on the outside’</td>
</tr>
</tbody>
</table>
It is evident that if we took the underlying words in their actual shape as our basic forms, we should have to give a long list to tell which ones appeared in derivatives with [z] instead of [s]. On the other hand, if we start from an artificial underlying form with [-z], as [gra:z-, hawz-], in contrast with [spa:s, aws], we need give no list and can account for the uniform final [-s] which actually appears in the independent forms, by the rule of permitted finals. Similarly for the other voiced mutes, as in

\[
\text{rund} \quad \text{runde} \quad \text{bunt} \quad \text{bunte}
\]

where we set up a theoretical basic form [rund-] in contrast with [bunt]. We have seen that in some languages these theoretical forms appear also in the phrase, by reminiscent sandhi (§ 12.5).

Similarly, some languages permit no final clusters and yet show included free forms with clusters. Compare the following noun-forms in Menomini:

<table>
<thead>
<tr>
<th>SINGULAR (suffix zero)</th>
<th>PLURAL (suffix [-an])</th>
</tr>
</thead>
<tbody>
<tr>
<td>nene:h ‘my hand’</td>
<td>nene:hkan ‘my hands’</td>
</tr>
<tr>
<td>mete:h ‘a heart’</td>
<td>mete:hjan ‘hearts’</td>
</tr>
<tr>
<td>wi:ki:h ‘birch-bark’</td>
<td>wi:ki:hsan ‘pieces of birch-bark’</td>
</tr>
<tr>
<td>neke:îteneh ‘my thumb’</td>
<td>neke:îtene:htjan ‘my thumbs’</td>
</tr>
<tr>
<td>pe:htjekuna:h ‘medicine-bundle’</td>
<td>pe:htjekuna:htjan ‘medicine-bundles’</td>
</tr>
</tbody>
</table>

It is evident that a description which took the singular forms as a basis would have to show by elaborate lists what consonants, as, [k, j, s, tj, tj], are added before a suffix; the simple and natural description is to take as a starting-point the free forms not in their absolute shape, but in the form which appears before suffixes, as [wi:ki:hs-] and the like.

Another example is furnished by Samoan, which permits no final consonants at all, and therefore has sets like the following:

<table>
<thead>
<tr>
<th>WITHOUT SUFFIX</th>
<th>WITH SUFFIX [-iā]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[tani] ‘weep’</td>
<td>[tanisīa] ‘wept’</td>
</tr>
<tr>
<td>[inu] ‘drink’</td>
<td>[inumīa] ‘drunk’</td>
</tr>
<tr>
<td>[ulu] ‘enter’</td>
<td>[ulufīa] ‘entered.’</td>
</tr>
</tbody>
</table>

It is clear that a useful description will here set up the basic forms in theoretical shape, as [tanis-, inum-, uluf-].
13.10. Modulation of secondary phonemes often plays a part in morphologic constructions. In English, affixes are normally unstressed, as in *be-wail-ing*; *friend-li-ness* and the like. In our foreign-learned vocabulary, shift of stress to an affix is a taxeme in many secondary derivatives. Thus, some suffixes have *pre-suffixal stress*: the accent is on the syllable before the suffix, regardless of the nature of this syllable; thus, *-ity* in *able*: *ability*, *formal*: *formality*, *major*: *majority*; [*-i*] in *music*: *musician*, *audit*: *audition*, *educate*: *education*; [*-ik*] in *demon*: *demonic*, *anarchist*: *anarchistic*, *angel*: *angelic*. In the derivation of some of our foreign-learned nouns and adjectives from verbs, the stress is put on the prefix: from the verb *insert* [*in'sa:t*] we derive the noun *insert* [*'insa:t*]; similarly, *contract*, *convict*, *convert*, *converse*, *discourse*, *protest*, *project*, *rebel*, *transfer*. In other cases this modulation appears along with a suffix: *conceive*: *concept*, *perceive*: *percept*, *portend*: *portrait*; in some, the underlying verb has to be theoretically set up, as in *precept*.

In some languages modulation has greater scope. In Sanskrit, with some suffixes the derivative form keeps the accent of the underlying form:

[*'keːca-*] ‘hair’ : [*'keːca-vant-*] ‘having long hair’
[*pu'tra-*] ‘son’ : [*pu'tra-vant-*] ‘having a son.’

Others are accompanied by shift of accent to the first syllable:

[*'puruş[a-*] ‘man’ : [*'pa:wruʃ-e:ja-*] ‘coming from man’
[*va'sti-*] ‘bladder’ : [*'va:st-e:ja-*] ‘of the bladder.’

Others have presuffixal accent:

[*'puruş[a-*] ‘man’ : [*puruʃa-ta:-*] ‘human nature’
[*de:va-*] ‘god’ : [*de:va-ta:-*] ‘divinity.’

Other affixes are themselves accented:

[*'r jī-*] ‘sage’ : [*a:rʃ-e:ja-*] ‘descendant of a sage’
[*sa:'rama:-*] (proper noun) : [*sa:ram-e:ja-*] ‘descended from Sarama.’

Others require an accentuation opposite to that of the underlying word:

[*'atithi-*] ‘guest’ : [*a:ti'th-ja-*] ‘hospitality’
[*pali'ta-*] ‘gray’ : [*'pa:lit-ja-*] ‘grayness.’
Tagalog uses both stress and vowel-lengthening as auxiliary phonemes; three suffixes of the form [-an] differ in the treatment of these modulations.

Suffix [-an]\(^1\) is characterized by presuffixal stress and by long vowel in the first syllable of the underlying form:

\['i:big\] 'love' : \[i:'bi:gan\] 'love-affair'
\[i'num\] 'drink' : \[i:'nu:man\] 'drinking-party.'

The meaning is 'action (often reciprocal or collective) by more than one actor.'

Suffix [-an]\(^2\) is stressed when the underlying word has stress on the first syllable; otherwise it is treated like [-an]\(^1\):

\['tu:lug\] 'sleep' : \[tulu'gan\] 'sleeping-place'
\[ku'lu\] 'enclose' : \[ku:'lu:nan\] 'place of imprisonment.'

The meaning is 'place of action, usually by more than one actor, or repeated.'

Suffix [-an]\(^3\) has presuffixal stress when the underlying word is stressed on the first syllable; it is stressed when the underlying word is stressed on the last syllable; there is no vowel-lengthening beyond what is demanded by the phonetic pattern:

(a) \['sa:gin\] 'banana' : \[sa'gi:nan\] 'banana-grove'
\[ku'lu\] 'enclose' : \[ku:lu:nan\] 'cage, crate'

(b) \['pu:tu\] 'cut' : \[pu'tu:lan\] 'that which may be cut from'
\[la'kas\] 'strength' : \[laka'san\] 'that upon which strength may be expended.'

The meaning is (a) 'an object which serves as locality of the underlying object, action, etc.,' and (b) 'that which may be acted upon.'

In languages with auxiliary phonemes of pitch, these may play a part in morphology. Thus, in Swedish, the suffix -er of agent-nouns shows the normal compound word-pitch of polysyllables (§7.7) in the resultant form: the verb-stem \[le:s-\] 'read' forms läser ['le:ser] 'reader'; but the -er of the present tense demands simple word-pitch in the resultant form: (han) läser ['le:ser] '(he) reads.'

13.11. In all observation of word-structure it is very important to observe the principle of immediate constituents. In Tagalog, the underlying form \['ta:wa\] 'a laugh' appears reduplicated in the derivative \[ta:'ta:wa\] 'one who will laugh'; this form, in turn,
underlies a derivative with the infix [-um-], namely [tuma:'ta:wa] 'one who is laughing.' On the other hand, the form ['pi:lit] 'effort' first takes the infix [-um-], giving [pu'mi:lit] 'one who compelled,' and is then reduplicated, giving [-pu:pu'mi:lit], which underlies [nag-pu:pu'mi:lit] 'one who makes an extreme effort.' Close observation of this principle is all the more necessary because now and then we meet forms which compromise as to immediate constituents. Tagalog has a prefix [pan-], as in [a'tip] 'roofing': [pan-a'tip] 'that used for roofing; shingle.' The [n] of this prefix and certain initial consonants of an accompanying form are subject to a phonetic modification — we may call it morphologic sandhi — by which, for instance, our prefix joins with ['pu:tul] 'a cut' in the derivative [pa-'mu:tul] 'that used for cutting,' with substitution of [m] for the combination of [-q] plus [p-]. In some forms, however, we find an inconsistency as to the structural order; thus, the form [pa-mu-'mu:tul] 'a cutting in quantity' implies, by the actual sequence of the parts, that the reduplication is made "before" the prefix is added, but at the same time implies, by the presence of [m-] for [p-] in both reduplication and main form, that the prefix is added "before" the reduplication is made. A carelessly ordered description would fail to bring out the peculiarity of a form like this.

13.12. In languages of complex morphology we can thus observe a ranking of constructions: a complex word can be described only as though the various compoundings, affixations, modifications, and so on, were added in a certain order to the basic form. Thus, in English, the word actresses consists, in the first place, of actress and [-iz], just as lasses consists of lass and [-iz]; actress, in turn consists of actor and -ess, just as countess consists of count and -ess; actor, finally, consists of act and [-ə]. There would be no parallel for a division of actresses, say into actor and -esses. In languages of this type, then, we can distinguish several ranks of morphologic structure.

In many languages these ranks fall into classes: the structure of a complex word reveals first, as to the more immediate constituents, an outer layer of inflectional constructions, and then an inner layer of constructions of word-formation. In our last example, the outer, inflectional layer is represented by the construction of actress with [-iz], and the inner, word-formational layer by the remaining constructions, of actor with -ess and of act with [-ə].
This distinction cannot always be carried out. It is based on several features. The constructions of inflection usually cause closure or partial closure (§ 12.11), so that a word which contains an inflectional construction (an inflected word) can figure as a constituent in no morphologic constructions or else only in certain inflectional constructions. The English form *actresses*, for instance, can enter into only one morphologic construction, namely the derivation of the possessive adjective *actresses’* (with the zero-alternant of [-iz, -z, -s], § 13.7). This latter form, in turn, cannot enter into any morphologic construction; it has complete closure.

Another peculiarity of inflection, in contrast with word-formation, is the rigid parallelism of underlying and resultant forms. Thus, nearly all English singular nouns underlie a derived plural noun, and, vice versa, nearly all English plural nouns are derived from a singular noun. Accordingly, English nouns occur, for the most part in parallel sets of two: a singular noun *(hat)* and a plural noun derived from the former *(hats)*. Given one of these, the speaker is usually capable of producing the other. Each such set of forms is called a paradigmatic set or paradigm, and each form in the set is called an inflected form or inflection. Some languages have large paradigms, which contain many inflections. In Latin, for instance, the verb appears in some 125 inflectional forms, such as *amāre* ‘to love,’ *amō* ‘I love,’ *amās* ‘thou lovest,’ *amat* ‘he loves,’ *amāmus* ‘we love,’ *amem* ‘I may love,’ *amor* ‘I am loved,’ and so on; the occurrence of one form usually guarantees the occurrence of all the others. It is this parallelism of the inflections which forces us to treat a single phonetic form, like *sheep* as a set of homonyms, a singular noun *sheep* (corresponding to *lamb*) and a plural noun *sheep* (corresponding to *lambs*). It is this parallelism also, which leads us to view entirely different phonetic forms, like *goː went,* as morphologically related (by suppletion): *go* as an infinitive (parallel, say, with *show*) and *went* as a past-tense form (parallel, then, with *showed*).

The parallelism, to be sure, is sometimes imperfect. Defective paradigms lack some of the inflections; thus, *can,* *may,* *shall,* *will,* *must* have no infinitive, *must* has no past tense, *scissors* no singular. If, as in these cases, the lacking form happens to underlie the actually existing ones, we do best to set up a theoretical underlying form, such as a non-existent infinitive *can* or singular *scissor-.* On the other hand, some irregular paradigms are over-differenti-
ated. Thus, corresponding to a single form of an ordinary paradigm like *play* (to play, I play, we play), the paradigm of *be* has three forms (to be, I am, we are), and, corresponding to the single form *played*, it has the forms (I) was, (we) were, been. The existence of even a single over-differentiated paradigm implies homonymy in the regular paradigms.

The parallelism of inflected forms goes hand in hand with a further characteristic: the different inflections differ in syntactic function. If we say *the boys chauffe*, our syntactic habit of congruence (§ 12.7) requires us, when *the boy* is the actor, to supply also the form *chauffes*. In the case of the present and past inflections of the English verb this is not true: the parallelism of *plays : played* is not required by any habits of our syntax, but is carried out none the less rigidly.

If there are several ranks of inflection, we get compound paradigms; the inflections of the English noun, for instance, consist of an outer construction, the derivation of the possessive adjective, and an inner one, the derivation of the plural:

<table>
<thead>
<tr>
<th>SINGULAR</th>
<th>PLURAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>nominative-accusative</td>
<td>man</td>
</tr>
<tr>
<td>possessive adjective</td>
<td>man's</td>
</tr>
<tr>
<td></td>
<td>men</td>
</tr>
<tr>
<td></td>
<td>men's</td>
</tr>
</tbody>
</table>

In the Latin verb we find a very complicated compound paradigm: an outer layer for different actors or undergoers, distinguished as to person (speaker, hearer, third person), number (singular, plural), and voice (actor, undergoer), an inner layer for differences of tense (present, past, future) and mode (real, hypothetical, unreal), and an innermost layer for a difference as to completion of the act (imperfectic, perfectic).

13.13. We come, finally, to an important characteristic of inflection, akin to those we have mentioned, the *derivational unity* of paradigms. The inflectional forms of a paradigm do not each enter into composition and derivation, but the paradigm as a whole is represented by some one form. In English, the forms of a noun-paradigm are represented by the singular, as in *manslaughter*, *mannish*, and those of the verb-paradigm by the infinitive, as in *playground*, *player*. An English paradigm consists of an underlying word (itself a member of the paradigm) and some secondary derivatives containing this underlying word; as a constituent in further derivation and composition, the paradigm,
a whole, is represented by the underlying form; the English language, accordingly, may be said to have *word-inflection, word-derivation, and word-composition*.

In many languages, especially in those which have a more complex morphology, none of the forms in a paradigm can conveniently be viewed as underlying the others. Thus, the regular paradigms of the German verb contain a common element which is not equal to any of the inflectional forms. For instance, the paradigm represented by the forms *lachen* ['lax-cn] 'to laugh,' *(ich) lache* ['lax-e] '(I) laugh,' *(er) lacht* [lax-t] '(he) laughs,' *(er) lachte* ['lax-te] '(he) laughed,' *gelacht* [ge-lax-t] 'laughed' (participle), and so on, shows a common element *lach-* in all the inflectional forms, but none of these inflectional forms consists simply of the element *lach-* without an affix. In secondary derivation and composition the paradigm is represented by this same form, as in *Lacher* ['lax-er] 'laugher' and *Lachkrampf* ['lax-,krampf] 'laughing-spasm.' This *lach-,* strictly speaking, is a bound form; it is called the *kernel or stem* of the paradigm. The German verb is an example of *stem-inflection, stem-derivation, and stem-composition.* In our description, we usually treat the stem as if it were a free form.

In some languages of this type, the common element of the paradigm differs from the stem which represents the paradigm in derivatives and compounds. Thus, an ancient Greek noun-paradigm has stem-inflection. It contains a common element, a kernel, much like the German verb-stem, e.g. [*hipp-]* 'horse':

\[
\begin{array}{ll}
\text{SINGULAR} & \text{PLURAL} \\
\text{nominative} & ['hipp-os] & ['hipp-oj] \\
\text{vocative} & ['hipp-e] & ['hipp-oj] \\
\text{accusative} & ['hipp-on] & ['hipp-ows] \\
\text{dative} & ['hipp-o:j] & ['hipp-ojs] \\
\text{genitive} & ['hipp-ow] & ['hipp-o:n] \\
\end{array}
\]

In secondary derivation, however, this paradigm is represented not by the common element [hipp-], but by a special *deriving-form* [hipp-o-] as in [hip'po-tes] 'horseman,' or with loss of the [o] by phonetic modification, in [hipp-i'kos] 'pertaining to horses.' Similarly, as a compound-member, the paradigm is represented by a special *compounding-form,* homonymous with the preceding: [hippo-kantharos] 'horse-beetle.' Thus, we distinguish between the *kernel* [hipp-], which actually (subject, however; in principle,
to phonetic modification) appears in all the forms, and the stem [hipp-o-], which underlies the further derivatives.

Some exceptions to the principle of paradigmatic unity are only apparent. The possessive-adjective form in the English compounds like bull's-eye or the plural form in longlegs are due, as we shall see, to the phrasal structure of these compounds. Real exceptions do, however, occur. German has a suffix -chen [-xen] 'small,' which forms secondary derivatives from nouns, as: Tisch [tij] 'table': Tischchen ['tij-xen] 'little table.' In the system of German morphology, this is a construction of word-formation, but in a certain few instances the suffix [-xen] is added to nouns which already have plural inflection: beside Kind [kint] 'child': Kindchen ['kint-xen] 'little child,' the plural inflection Kinder ['kinder] 'children' underlies the derivative Kinderchen ['kinder-xen] 'little children.' If a language contained too many cases of this sort, we should simply say that it did not distinguish such morphologic layers as are denoted by the terms inflection and word-formation.
14. 1. Of the three types of morphologic constructions which can be distinguished according to the nature of the constituents—namely, composition, secondary derivation, and primary derivation (§ 13.3)—the constructions of compound words are most similar to the constructions of syntax.

Compound words have two (or more) free forms among their immediate constituents (door-knob). Under the principle of immediate constituents, languages usually distinguish compound words from phrase-derivatives (as, old-maidish, a secondary derivative with the underlying phrase old maid), and from de-compounds (as, gentlemanly, a secondary derivative with the underlying compound word gentleman). Within the sphere of compound words, the same principle usually involves a definite structural order; thus, the compound wild-animal-house does not consist, say, of three members wild, animal, and house, and not of the members wild and animal-house, but of the members wild animal (a phrase) and house; and, similarly, the compound doorknob-wiper consists, unmistakably, of the members door-knob and wiper, and not, for instance, of door and knob-wiper.

The grammatical features which lead us to recognize compound words, differ in different languages, and some languages, doubtless, have no such class of forms. The gradations between a word and a phrase may be many; often enough no rigid distinction can be made. The forms which we class as compound words exhibit some feature which, in their language, characterizes single words in contradistinction to phrases.

In meaning, compound words are usually more specialized than phrases; for instance, blackbird, denoting a bird of a particular species, is more specialized than the phrase black bird, which denotes any bird of this color. It is a very common mistake to try to use this difference as a criterion. We cannot gauge meanings accurately enough; moreover, many a phrase is as specialized in meaning as any compound: in the phrases a queer bird and meat.
and drink, the words bird, meat are fully as specialized as they are in the compounds jailbird and sweetmeats.

14. 2. In languages which use a single high stress on each word, this feature distinguishes compound words from phrases. In English the high stress is usually on the first member; on the other member there is a lesser stress, as in door-knob ['dɔɹ-ˌnɔb], upkeep ['ʌp-ˌkijp]. Certain compounds have the irregularity of leaving the second member unstressed, as in gentleman ['dʒɛntlmən], Frenchman ['frentmən]; contrast milkman ['milk-ˌmən]. Certain types of compounds, chiefly some whose members are adverbs and prepositions, stress the second member: without, upon. Accordingly, wherever we hear lesser or least stress upon a word which would always show high stress in a phrase, we describe it as a compound-member: ice-cream ['ajs-ˌkrijm] is a compound, but ice cream ['ajs 'krijm] is a phrase, although there is no denotative difference of meaning. However, a phrase as prior member in a compound keeps all its high stresses: in wild-animal-house ['wajld-ˌenim-ˌhaws] the stress assures us only that house is a compound-member; the rest of the structure is shown by other criteria.

As to the phonetic pattern, compound words are generally treated like phrases: in English, clusters like [vt] in shrove tide or [nn] in pen-knife do not occur within simple words. Sandhi-like phonetic modifications mark a compound as a single word only when they differ from the sandhi of syntax in the same language. Thus gooseberry ['guzbrɪ] is marked as a compound because the substitution of [z] for [s] is not made in English syntax, but only in morphology, as in gosling ['gɔzliŋ]. Similarly, in French, pied-à-terre [pjet-ɑ̃tɛr] 'temporary lodging' (literally 'foot-on-ground') beside pied [pjɛ] 'foot,' or pot-au-feu [po-tœ-fœ] 'broth' (literally 'pot-on-the-fire') beside pot [po] 'pot,' or vinaigre [vin-ɛgr] 'vinegar' (literally 'sour-wine') beside vin [vɛ] 'wine,' are marked as compounds, because French nouns do not exhibit these types of sandhi in the phrase, but only in word-constructions, such as pieter [pjɛtɛ] 'toe the mark,' potage [pɔtaʒ] 'thick soup,' vinaire [vinər] 'pertaining to wine'; contrast, for instance, the phrase vin aigre [vɛ ɛgr] 'sour wine.'

More striking phonetic modifications may mark a compound; thus, in the following examples the prior member suffers greater modification than it does in any phrase of its language: holy ['hɔlili] : holiday ['holiːdi], moon : Monday, two [tuw] : twopence
The plainest contrast appears in languages with stem-composition (§ 13.13). A stem like German lach-, which represents a whole verb paradigm in a German compound like Lachkrampf ['lax-,krampf] 'laughing-spasm,' but does not actually occur as an independent word, makes the compound unmistakably different from any phrase. Even more plainly, a compounding-stem, such as ancient Greek [hippo-] 'horse,' may differ formally from all the inflections of its paradigm, and, in any case, characterizes a compound by its invariability; thus, [hippo-] joins some other stem, such as ['kantharo-] 'beetle,' to form a compound stem, [hippo-'kantharo-] 'horse-beetle,' but remains unchanged in all the inflectional forms.
of this compound: nominative [hippō'kantharo-s], accusative [hippō'kantharo-n], and so on.

Even when the compound-member is formally equal to some word, it may characterize the compound. In ancient Greek a noun-stem is inflected by means of suffixes. Accordingly, the first member of a compound noun-stem will remain the same in all forms of the paradigm. Thus, the phrase 'new city' will show various inflectional forms of two paradigms:

- nominative [ne'a: 'polis]
- accusative [ne'a:n 'polin]
- genitive [ne'a:s 'poleo:s],

and so on, but the compound stem [ne'a:-poli-] 'Naples,' whose first member is in nominative singular form, will show this first member unchanged in all the inflections:

- nominative [ne'a:polis]
- accusative [ne'a:polin]
- genitive [nea:'poleo:s].

In German, the adjective has word-inflection; the underlying form is used as a complement of verbs: *Das ist rot* [das ist 'ro:t] 'that is red,' and the derived inflections appear as modifiers of nouns: *roter Wein* ['ro:ter 'vajn] 'red wine.' The absence of inflectional suffixes therefore characterizes the compound-member in a form like *Rotwein* ['ro:t-|Vajn] 'red-wine.'

The use of prefixes and suffixes may decide for us what is the beginning and what the end of a word or stem. In German, the past participle of verbs is formed by the addition to the stem of a prefix [ge-] and a suffix [-t], as in *gelacht* [ge-'lax-t] 'laughed.' The position of these affixes, accordingly, shows us that a form like *geliebkost* [ge-'li:p,ko:s-t] 'caressed' is one word, derived from a compound stem, but that a form like *liebgehabt* ['li:p ge-|hap-t] 'liked' is a two-word phrase. This gives us a standard for the classification of other inflectional forms, such as the infinitives *liebkosen* ['li:p-,ko:zen] 'to caress' and *liebhaben* ['li:p ,ha:ben] 'to like.'

Sometimes the compound-member resembles an inflectional form, but one which would be impossible in the phrase. The [-z, -s] on the prior members of *bondsman, kinsman, landsman, marksman* resembles the possessive-adjective suffix, but possessive adjectives like *bond's, land's* and so on, would not be so used in the
phrase. In French, the adjective *grande* [gʁad] 'great', as in *une grande maison* [yn gʁad mezɔ] 'a big house,' drops the final consonant (§ 13.7) to make the inflectional form used with masculine nouns: *un grand garçon* [œ gʁã garsɔ] 'a big boy'; but, as a compound-member, the latter form appears also with certain feminine nouns: *grand'mère* [ɡʁã-mɛʁ] 'grandmother,' *grand'porte* [ɡʁã-port] 'main entry.' Compound-members of this type are especially common in German: *Sonnenschein* [tsonen-sa:n] 'sunshine' has the prior member *Sonne* in a form which, as a separate word in a phrase, could only be plural; in *Geburtstag* [ge'burts-ta:k] 'birthday,' the [-s] is a genitive-case ending, but would not be added, in an independent word, to a feminine noun like *die Geburt* 'birth.'

A compound-member may be characterized by some feature of word-formation which differs from what would appear in an independent word. In ancient Greek there was a highly irregular verb-paradigm, containing such forms as [da'mao:] 'I tame,' [e'dme:the:] 'he was tamed,' and so on, which grammarians conveniently describe on the basis of a stem-form [dame:-]. From this paradigm there is derived, on the one hand, the independent agent-noun [dme:'te:r] 'tamer,' and, on the other hand, with a different suffix, an agent-noun [-damo-], which is used only as a second member of compound words, as in [hip'po-damo-s] 'horse-tamer.' Compounds with special features of word-formation are known as **synthetic compounds**. Synthetic compounds occurred especially in the older stages of the Indo-European languages, but the habit is by no means extinct. In English, the verb *to black* underlies the independent agent-noun *blacker* (as in *a blacker of boots*), but forms also, with a zero-element, the agent-noun -black which appears in the compound *boot-black*; similarly, *to sweep* forms *sweeper* and the second member of *chimney-sweep*. Even forms like *long-tailed* or *red-bearded* are not aptly described as containing the words *tailed, bearded* (as in *tailed monkeys, bearded lady*); the natural starting-point is rather a phrase like *long tail or red beard*, from which they differ by the presence of the suffix -ed. This is the same thing as saying that we use compounds of the type *long-tailed, red-bearded* regardless of the existence of words like *tailed, bearded*: witness forms like *blue-eyed, four-footed, snub-nosed*. Another modern English synthetic type is that of *three-master, thousand-legger.*

In English, we freely form compounds like *meat-eater* and *meat-
eating, but not verb-compounds like *to meat-eat; these exist only in a few irregular cases, such as to housekeep, to bootlick. Now, to be sure, words like eater and eating exist alongside the compounds; the synthetic feature consists merely in the restriction that a phrase like eat meat is paralleled by compounds only when -er or -ing is at the same time added. We may designate the types meat-eating and meat-eater as semi-synthetic compounds.

14.4. Among the word-like features of the forms which we class as compound words, indivisibility (§ 11.6) is fairly frequent: we can say black — I should say, bluish-black — birds, but we do not use the compound word blackbird with a similar interruption. In some instances, however, other features may lead us to class a form as a compound word, even though it is subject to interruption. In Fox, a form like [ne-pje:tfi-wa:pam-a:-pena] ‘we have come to see him (her, them)’ has to be classed as a compound word, because the inflectional prefix [ne-] ‘I (but not thou)’ and the inflectional suffixes [-a:-] ‘him, her, them’ and [-pena] ‘plural of first person’ unmistakably mark the beginning and end of a word (§ 14.3). The members of the compound are the particle [pje:tfi] ‘hither’ and the verb-stem [wa:pam-] ‘see (an animate object).’ Nevertheless, the Fox language sometimes inserts words and even short phrases between the members of such compounds, as in [ne-pje:tfi-keta:nesa-wa:pam-a:-pena] ‘we have come to see her, thy daughter.’ In German, compound-members can be combined serially; Singvögel ['zin-,f0:gel] ‘songbirds,’ Raubvögel ['rawp-,f0:gel] ‘birds of prey,’ Sing- oder Raubvögel ['zirj-o:der-'rawp-,f0:gel] ‘songbirds or birds of prey.’

Generally, a compound-member cannot, like a word in a phrase, serve as a constituent in a syntactic construction. The word black in the phrase black birds can be modified by very (very black birds), but not so the compound-member black in blackbirds. This feature serves to class certain French forms as compound words: thus, sage-femme [sa:3-fam] ‘midwife’ is to be classed as a compound, in contrast with a homonymous phrase meaning ‘wise woman,’ because only in the latter can the constituent sage ‘wise’ be accompanied by a modifier: très sage femme [tre sa:3 fam] ‘very wise woman.’ This restriction, like the preceding, is occasionally absent in forms which by other features are marked as compound words. In Sanskrit, where stem-composition plainly marks the prior member of compound words, this member is
nevertheless occasionally accompanied by a modifying word, as in *cit'ta-prama\'thini: de:'va:na:m 'api* 'mind-disturbing of-gods even,' that is 'disturbing to the minds even of gods,' where the genitive plural noun ('of gods') is a syntactic modifier of the compound-member *cit'ta- 'mind.'

14. 5. The description and classification of the forms which the structure of a language leads us to describe as compound words, will depend upon the characteristic features of this language. Linguists often make the mistake of taking for granted the universal existence of whatever types of compound words are current in their own language. It is true that the main types of compound words in various languages are somewhat similar, but this similarity is worthy of notice; moreover, the details, and especially the restrictions, vary in different languages. The differences are great enough to prevent our setting up any scheme of classification that would fit all languages, but two lines of classification are often useful.

One of these two lines of classification concerns the relation of the members. On the one hand, we have syntactic compounds, whose members stand to each other in the same grammatical relation as words in a phrase; thus, in English, the members of the compounds *blackbird* and *whitecap* (the difference between these two examples will concern us later) show the same construction of adjective plus noun as do the words in the phrases *black bird* and *white cap.* On the other hand, we have asyntactic compounds like *door-knob,* whose members stand to each other in a construction that is not paralleled in the syntax of their language — for English has no such phrasal type as *door knob.*

The syntactic compound differs from a phrase only in the essential features which (in its language) distinguish compound words from phrases — in English, then, chiefly by the use of only one high stress. It may differ lexically from the corresponding phrase, as does *dreadnaught,* the corresponding phrase, *dreadnaught,* has an archaic connotation, and the normal phrase would be *fear nothing.* We can set up sub-classes of syntactic compounds according to the syntactic constructions which are paralleled by the members, as, in English, adjective with noun (*blackbird, whitecap, bull's-eye*), verb with goal noun (*lickspittle, dreadnaught*), verb with adverb (*gadabout*), past participle with adverb (*cast-away*), and so on:
Many compounds are intermediate between the syntactic and asyntactic extremes: the relation of the members parallels some syntactic construction, but the compound shows more than the minimum deviation from the phrase. For instance, the compound verb to housekeep differs from the phrase keep house by the simple feature of word-order. In such cases we may speak of various kinds of semi-syntactic compounds. The difference of order appears also in upkeep versus keep up, and in the French blanc-bec versus bec blanc (§ 14.2). In turnkey versus turn the key or turn keys, the difference lies in the use of the article or of the number-category.

Even types like blue-eyed, three-master, meat-eater, viewed as synthetic compounds, can be said to correspond to blue eyes, three masts, eat meat, and to differ from these phrases by simple formal characteristics, including the addition of the bound forms -ed, -er to the second member. In French, boîte-à-lettres [bwa:t-a-letr], literally 'box-for-letters,' and boîte-aux-lettres [bwa:t-o-letr], literally 'box-for-the-letters,' both meaning 'mail-box, post-box,' differ in the choice of preposition and in the use of the article from the normal phrasal type, which would give boîte pour des lettres [bwa:t pu:r de letr] 'box for letters'; the use of d and certain other prepositions in place of more specific ones, and differences of article (especially of zero in place of the phrasal article represented by the form des), are in French well-marked features which enable us to set up a class of semi-syntactic compounds.

Where semi-syntactic compounds are definable, they can be further classified in the same manner as syntactic compounds: thus, in the semi-syntactic blue-eyed the members have the same construction as in the syntactic blackbird, in three-master the same as in three-day, in housekeep, turnkey the same as in lickspittle, in upkeep the same as in gadabout.

Asyntactic compounds have members which do not combine in syntactic constructions of their language. Thus, in door-knob, horsefly, bedroom, salt-cellar, tomcat we see two nouns in a construction that does not occur in English syntax. Other asyntactic types of English compounds are illustrated by fly-blown, frost-bitten — crestfallen, footsore, fireproof, foolhardy — by-law, by-path, everglade — dining-room, swimming-hole — bindweed, cry-baby, driveway, playground, blowpipe — broadcast, dry-clean, foretell — somewhere, everywhere, nowhere. Compounds with obscure members, such as smokestack, mushroom, or with unique members, such as
cranberry, huckleberry, zigzag, choo-choo, are, of course, to be classed as asyntactic.

Although the relation between the members of asyntactic compounds is necessarily vague, yet we can sometimes extend the main divisions of syntactic and semi-syntactic compounds to cover also the asyntactic class. In English, for instance, the coordinative or copulative relation which we see in a semi-syntactic compound like *bittersweet* (compare the phrase *bitter and sweet*), can be discerned also in asyntactic compounds like *zigzag, fuzzy-wuzzy, choo-choo*. Most asyntactic compounds seem to have a kind of attribute-and-head construction: *door-knob, bulldog, cranberry*. To the extent that one can carry out this comparison, one can therefore distinguish between copulative compounds (Sanskrit *dvandva*) and determinative (attributive or subordinative) compounds (Sanskrit *tatpurusha*); these divisions will cross those of syntactic, semi-syntactic, and asyntactic compounds. One may even be able to mark off smaller divisions. The Hindu grammarians distinguished among copulative compounds a special sub-group of repetitive (amredita) compounds, with identical members, as in *choo-choo, bye-bye, goody-goody*. In English, we can mark off also a class in which the members show only some elementary phonetic difference, as *zigzag, flimflam, pell-mell, fuzzy-wuzzy*. The Hindus found it convenient to set off, among the determinatives, a special class of syntactic attribute-and-head compounds (*karmadharaya*), such as *blackbird*.

14.6. The other frequently usable line of classification concerns the relation of the compound as a whole to its members. One can often apply to compounds the distinction between endocentric and exocentric constructions which we met in syntax (§ 12.10). Since a *blackbird* is a kind of a *bird*, and a *door-knob* a kind of a *knob*, we may say that these compounds have the same function as their head members; they are endocentric. On the other hand, in *gadabout* and *turnkey* the head member is an infinitive verb, but the compound is a noun; these compounds are exocentric (Sanskrit *bahuvrihi*). To take a copulative type as an example, the adjective *bittersweet* (*‘bitter and sweet at the same time’*) is endocentric, since the compound, like its co-ordinated members, *bitter* and *sweet*, has the function of an adjective, but the plant-name *bittersweet* is exocentric, since, as a noun, it differs in grammatical function from the two adjective members.
Another type of English exocentric compounds consists of adjectives with noun head: two-pound, five-cent, half-mile, (in) apple-pie (order).

The difference of form-class may be less radical, but still recognizable in the system of the language. In English, the nouns longlegs, bright-eyes, butterfingers are exocentric, because they occur both as singulars, and, with a zero-affix, as plurals (that longlegs, those longlegs). In French, the noun rouge-gorge [ruʒɔʁʒ] 'robin' (literally 'red-throat') is exocentric, because it belongs to the masculine gender-class (le rouge-gorge 'the robin'), while the head member belongs to the feminine gender (la gorge 'the throat'). In the English type sure-footed, blue-eyed, straight-backed the synthetic suffix [-id, -d, -t] goes hand in hand with the exocentric value (adjective with noun head); however, one might perhaps hesitate as to the classification, since -footed, -eyed, -backed might be viewed as adjectives (compare horned, bearded). Types like clambake, up-keep are better described as endocentric, in English grammar, because the head members -bake and -keep can be viewed as nouns of action derived, with a zero-feature, from the verbs; if English did not use many zero-features in derivation and did not form many types of action nouns, we should have to class these compounds as exocentric. Similarly, our description will probably work out best if we class bootblack, chimney-sweep as endocentric, with -black and -sweep as agent-nouns.

On the other hand, the large class of English compounds that is exemplified by whitecap, longnose, swallow-tail, blue-coat, blue-stocking, red-head, short-horn has noun function and a noun as head member, and yet is to be classed as exocentric, because the construction implies precisely that the object does not belong to the same species as the head member: these compounds mean 'object possessing such-and-such an object (second member) of such-and-such quality (first member). This appears in the fact that the number-categories (longlegs) and the personal-impersonal categories (nose . . . it; longnose . . . he, she) do not always agree. In three-master, thousand-legger the synthetic suffix goes hand in hand with this exocentric relation. Nevertheless, there are borderline cases which may prevent a clear-cut distinction. The compound blue-bottle is endocentric if we view the insect as 'like a bottle,' but exocentric if we insist that the 'bottle' is only part of the insect.
The Hindus distinguished two special sub-classes among exo-centric compounds, namely *numeratives* (*dvigu*), nouns with a number as prior member, such as, in English, *sixpence*, *twelvemonth*, *fortnight*, and *adverbials* (*avyayabhava*), adverbs with noun head, such as *bareback*, *barefoot*, *hotfoot*, or with noun subordinate, such as *uphill*, *downstream*, *indoors*, *overseas*.

14.7. In secondary derivative words we find one free form, a phrase (as in *old-maidish*) or a word (as in *mannish*), as an immediate constituent; in the latter case, the underlying word may be a compound word (as in *gentlemanly*) or, in its own turn, a derived word (as in *actresses*, where the underlying word *actress* is itself a secondary derivative from the underlying word *actor*). We have seen, however, that for the description of some languages, we do well to set up theoretical underlying forms, namely stems, which enable us to class certain forms as secondary derivatives although, strictly speaking, they do not contain a free form (§ 13.13). A similar device is called for in the description of forms like English *scissors*, *oats*, where we set up a theoretical *scissor-*-, *oat-* as underlying forms, just as we class *cranberry*, *oatmeal*, *scissor-bill* as compound words.

The underlying free form, actual or theoretical, is accompanied either by an affix, or, as we saw, in Chapter 13, by a grammatical feature.

In many languages, secondary derivatives are divided, first of all, into inflectional forms and word-formational forms (§ 13.12), but we may do well to recall that languages of this sort nevertheless often contain border-line forms, such as, in English, *bees* or *clothes*, which predominantly resemble inflectional types, but show a formal-semantic deviation. In the same way, *learned* [ˈlɜːnd], *drunken*, *laden*, *sodden*, *molted*, and the slang *broke* ‘out of funds’ deviate from the strictly inflectional past participles *learned* [ɫənd], *drunk*, *loaded*, *seethed*, *melted*, *broken*.

The inflectional forms are relatively easy to describe, since they occur in parallel paradigmatic sets; the traditional grammar of familiar languages gives us a picture of their inflectional systems. It may be worth noticing, however, that our traditional grammars fall short of scientific compactness by dealing with an identical feature over and over again as it occurs in different paradigmatic types. Thus, in a Latin grammar, we find the nominative-singular sign -s noted separately for each of the types *amicus* ‘friend,’ *lapis*
'stone,' dux 'leader,' tussis 'cough,' manus 'hand,' faciēs 'face,' when, of course, it should be noted only once, with a full statement as to where it is and where it is not used.

Word-formation offers far more difficulty, and is largely neglected in our traditional grammars. The chief difficulty lies in determining which combinations exist. In very many cases we have to resign ourselves to calling a construction irregular and making a list of the forms. Only a list, for instance, can tell us from which English male nouns we derive a female noun by means of the suffix -ess, as in countess, lioness, and it will probably require a subsidiary list to tell in which of these derivatives a final [a] is replaced by non-syllabic [r], as in waiter : waitress, tiger : tigress — for the type without this change, as in author : authoress is probably regular. Special cases, such as duke : duchess, master : mistress, thief : thievess demand separate mention.

Once we have established a construction of this kind, we may be able to set up a typical meaning and then, as in the case of inflection, to look for parallels. Our suffix -ess, for instance, has a definable linguistic meaning, not only because of the parallel character of all the sets like count : countess, lion : lioness, but also because English grammar, by the distinction of he : she, recognizes the meaning of the -ess derivatives. Accordingly, we are able to decide, much as we are in the case of inflection, whether a given pair of forms, such as man : woman, does or does not show the same relation. This enables us to draw up supplementary statements, resembling our descriptions of paradigms, which show the various formal aspects of some grammatically determined semantic unit. Thus, we find the sememe 'female of such-and-such male' expressed not only by the suffix -ess, but also by composition, as in elephant-cow, she-elephant, nanny-goat, and by suppletion, as in ram : ewe, boar : sow; some such pairs show inverse derivation, the male derived from the female, as goose : gander, duck : drake.

Similarly, we should probably need a complete list to tell which English adjectives underlie comparative forms in -er of the type kinder, shorter, longer, and, having this list, we could recognize semantically equivalent pairs, such as good : better, much : more, little : less, bad : worse.

In other groups the semantic relations are not grammatically definable. Thus, we derive a great many verbs from nouns by means of various changes, including a zero-element, but the mean-
ings of these derived verbs in relation to the underlying noun are manifold: to man, to dog, to beard, to nose, to milk, to tree, to table, to skin, to bottle, to father, to fish, to clown, and so on. Or, again, we derive verbs from adjectives in several varieties of the meanings 'to become so-and-so' and 'to make (a goal) so-and-so,' with various formal devices:

- zero: to smoothe
- zero, from comparative: to lower
- zero, from quality-noun: old : to age
- modification of vowel: full : to fill
- suppletion (?): dead : to kill.
- prefixes: enable, embitter, refresh, assure, insure, belittle
- suffix -en: brighten

To this list we must add a large number of foreign-learned types, such as equal: equalize, archaic: archaize, English: anglicize, simple: simplify, vile: vilify, liquid: liquefy, valid: validate, long: elongate, different: differentiate, debile: debilitate, public: publish.

When derivation is made by means of grammatical features, such as phonetic modification (man : men ; mouth : to mouthe) or modulation (convict verb : convict noun) or suppletion (go : went) or zero-elements (cut infinitive : cut past tense; sheep singular: sheep plural; man noun : to man verb), we may have a hard time deciding which form of a set we had better describe as the underlying form. In English, we get a simpler description if we take irregular paradigms (such as man : men or run : ran) as underlying, and regular paradigms (such as to man or a run) as derived. In most cases this criterion is lacking; thus, we shall find it hard to decide, in cases like play, push, jump, dance, whether to take the noun or the verb as the underlying form. Whatever our decision, the derivative word (e.g. to man derived from the noun man, or a run derived from the verb to run) will often contain no affixes, and will be described (for reasons that will shortly appear) as a secondary root-word.

In the same way, phrase-derivatives, such as old-maidish, derived from the phrase old maid, offer no special difficulty so long as they contain a derivational affix, such as -ish, but when the phrase is accompanied only by a zero-feature, as in jack-in-the-pulpit or devil-may-care, we have the difficult type of phrase-words. These
differ from phrases in their uninterrupted and syntactically in-
expansible character, and often in their exocentric value.

14. 8. *Primary words* contain no free forms among their im-
mediate constituents. They may be *complex,* consisting of two
or more bound forms, as *per-ceive, per-tain, de-ceive, de-tain,* or they
may be *simple,* as *boy, run, red, and, in, ouch.*

The bound forms which make up complex primary words,
are determined, of course, by features of partial resemblance, as
in the examples just cited. In many languages the primary words
show a structural resemblance to secondary words. Thus, in
English, the primary words *hammer, rudder, spider* resemble sec-
ondary words like *dance-r, lead-er, ride-r.* The part of the primary
word which resembles the derivational affix of the secondary word
(in our examples, *-er*) can be described as a *primary affix.* Thus,
the primary words *hammer, rudder, spider* are said to contain
a primary suffix *-er.* The remaining part of the primary word —
in our examples, the syllable [hem-] in *hammer,* [rAd-] in *rudder,*
[spajd-] in *spider* — is called the *root.* The root plays the same part
in primary words as the underlying form (e.g. *dance, lead, ride*)
in secondary words (dancer, leader, rider).

This distinction between primary affixes and roots is justified
by the fact that the primary affixes are relatively few and vague
in meaning, while the roots are very numerous and therefore rela-
tively clear-cut as to denotation.¹

In accordance with this terminology, primary words that do
not contain any affix-like constituents (e.g. *boy, run, red*) are
classed as *primary root-words.* The roots which occur in primary
root-words are free roots, in contrast with bound roots which
occur only with a primary affix, such as the root [spajd-] in *spider.*

Primary affixes may be extremely vague in meaning and act
merely as an obligatory accompaniment (a *determinative*) of the
root. In English, the commonest primary suffixes do not even
tell the part of speech; thus, we have, with *-er, spider, bitter, linger, ever, under,* with *-le, bottle, little, hustle,* with *-ow, furrow,*

¹ Early students of language, who confused description with the entirely differ-
et (and much harder) problem of ascertaining historical origins, somehow got the
notion that roots possessed mysterious qualities, especially in the way of age. Now
and then one still hears the claim that the roots which we set up must once upon a
time have been spoken as independent words. The reader need scarcely be told
that this is utterly unjustified; the roots, like all bound forms, are merely units of
partial resemblance between words. Our analysis guarantees nothing about earlier
stages of the language which we are analyzing.
yellow, borrow. In other cases the meaning is more palpable; thus, -ock, in hummock, mattock, hassock, and so on, forms nouns denoting a lumpy object of moderate size, and this is confirmed by its use as a secondary suffix (class-cleavage) in words like hillock, bullock. Our foreign-learned prefixes get a vague but recognizable meaning from contrasts like con-tain, de-tain, per-tain, re-tain. In some languages, however, primary affixes bear relatively concrete meanings. The Algonquian languages use primary suffixes that denote states of matter (wood-like solid, stone-like solid, liquid, string-like thing, round thing), tools, parts of the body, animals, woman, child (but not, apparently, adult males). Thus, in Menomini, the verb-form [kepa:hkwaham] 'he puts a cover on it,' has a stem [kepa:hkwah-], which consists of the root [kep-] 'obstruction of opening,' and the primary suffixes [-a:hkw-] 'wood or other solid of similar consistency,' and [-ah-] 'act on inanimate object by tool.' Similarly, in Menomini, [akuapi:nam] 'he takes it from the water,' the verb-stem consists of the root [akua-] 'removal from a medium,' and the suffixes [-epi:-] 'liquid' and [-en-] 'act on object by hand'; [ni:sunak] 'two canoes' is a particle consisting of the root [ni:sw-] 'two' and the primary suffix [-unak] 'canoe.' These affixes are used also in secondary derivation. Some of them are derived from independent words or stems; thus, in Fox, [pje:tehkwe:we:wa] 'he brings a woman or women' is an intransitive verb (that is, cannot be used with a goal-object, — much as if we could say *he woman-brings) containing the primary suffix [-ehkw:we:-] 'woman,' which is derived from the noun [ihkw:we:wa] 'woman.' In Menomini, the cognate [-ehkiwe:-], as in [pi:tehkiwe:w] (same meaning), does not stand in this relation to any noun, because the old noun for 'woman' is here obsolete, and the actual word is [mete:muh] 'woman.' In some languages the use of primary affixes derived from nouns covers much the same semantic ground as our syntactic construction of verb with goal-object. This habit is known as incorporation; the classical instance is Nahuatl, the language of the Aztecs, where a noun like [naka-tl] 'meat' is represented by a prefix in a verb-form like [ni-naka-kwa] 'I-meat-eat,' that is, 'I eat meat.'

A root may appear in only one primary word, as is the case with most ordinary English roots, such as man, boy, cut, red, nasty (in nasty), ham- (in hammer), or it may appear in a whole series of primary words, as is the case with many of our foreign-learned
roots, like [-sijv] in deceive, conceive, perceive, receive. In either case, the primary word may underlie a whole series of secondary derivatives; thus, man underlies men, man's, man's, mannish, manly, (to) man (mans, manned, manning); deceive underlies deceiver, deceit, deception, deceptive; conceive underlies conceivable, conceit, concept, conception, conceptual; perceive underlies percepter, percept, perceptive, perception, perceptible, perceptual; and receive underlies receiver, receipt, reception, receptive, receptacle. Moreover, secondary derivatives like these may exist where the primary word is lacking; thus, we have no such primary word as *preceive, but we have the words precept, preceptor, which are best described as secondary derivatives of a theoretical underlying form *pre-ceive.

The roots of a language make up its most numerous class of morphological forms and accordingly bear its most varied and specific meanings. This is clearest in languages which have roots as free forms, as, in English, boy, man, cut, run, red, blue, green, brown, white, black. The clear-cut meaning will be found also in bound roots, such as yell- in yellow, purp- in purple, nast- in nasty, and so on. In most languages, however, there are also roots of very vague meaning, such as, in English, the foreign-learned roots of the type -ceive, -tain, -fer (conceive, contain, confer, and so on). This is particularly the case in languages whose primary affixes are relatively varied and specific in meaning.

Once we have set up a root, we face the possibility of its modification. This possibility is obvious when the root occurs as an ultimate constituent in a secondary derivative: thus, in the secondary derivative duchess the modification of the underlying word duke is at the same time a modification of the root duke, and in the secondary derivatives sang, sung, song, the modifications of the underlying sing, are necessarily modifications of the root sing. The alternant shapes of roots are in some languages so varied that the describer may well hesitate as to the choice of a basic form. In ancient Greek we find the alternants [dame:-, dme:-, dmo:-, dama-, dam-] in the forms [e-'dame:] 'he tamed,' [e-'dme:-the:] 'he was tamed,' [dmo:-s] 'slave,' [da'ma-o:] 'I tame,' [hip'po-dam-o-s] 'horse-tamer.' Our whole description of Greek morphology, including even the distribution of derivatives into primary and secondary types, will depend upon our initial choice of a basic form for roots of this sort. In the Germanic languages,
modification of the root, with or without affix-like determinatives, occurs in words of symbolic connotation, as flap, flip, flop. If we take flap as the basic form of this root, we shall describe flip, flop as derivatives, formed by substitution of [i] ‘smaller, neater’ and by substitution of [ɔ] ‘larger, duller.’ Similar cases are, with substitution of [i]: snap : snip, snatch : snatch, snuff : sniff, bang : bing, yap : yip; of [ij]: squall : squeal, squawk : squeak, crack : creak, gloom : gleam, tiny : teeny, of [ʌ]: mash : mush, flash : flush, crash : crush. At first glance, we should describe these forms as secondary derivatives, since the word flap can be said to underlie the words flip, flop, but it is possible that a detailed description of English morphology would work out better if we viewed words like flip, flop as primary modifications of “the root flap-,” instead of deriving them from the actual word flap.

The roots of a language are usually quite uniform in structure. In English they are one-syllable elements, such as man, cut, red; many of them are free forms, occurring as root-words, but many, such as [spajd-] in spider, [hem-] in hammer, and, especially, foreign-learned roots like [-sijv] in conceive, perceive, are bound forms. Some of these bound roots end in clusters that do not occur in word-final, as [lʌmb-] in lumber or [liŋ-] in linger. In Russian, the roots are monosyllabic, with the exception of some that have [l] or [r] between vowels of the set [e, o], as in ['golod-] ‘hunger,’ ['gorod-] ‘city.’ We have seen an example of the variability of a root in ancient Greek; for this language, as well as, apparently, for Primitive Indo-European, we probably have to set up roots of several different shapes, monosyllabic, such as [do:-] ‘give,’ and disyllabic, such as [dame:-] ‘tame.’ In North Chinese, all the roots are monosyllabic free forms consisting, phonetically, of an initial consonant or cluster (which may be lacking), a final syllabic (including diphthongal types with non-syllabic [j, w, n, n]), and a pitch-scheme. The Malayan languages have two-syllable roots, with stress on one or the other syllable, as in the Tagalog root-words ['ba:haj] ‘house’ and [ka'maj] ‘hand.’ In the Semitic languages the roots consist of an unpronounceable skeleton of three consonants; accordingly, every primary word adds to the root a morphologic element which consists of a vowel-scheme. Thus, in modern Egyptian Arabic, a root like [k-t-b] ‘write’ appears in words like [katab] ‘he wrote,’ [ka:tib] ‘writing (person),’

In a few languages, such as Chinese, the structure of the roots is absolutely uniform; in others, we find some roots that are shorter than the normal type. It is a remarkable fact that these shorter roots belong almost always to a grammatical or a semantic sphere which can be described, in terms of English grammar, as the sphere of pronoun, conjunction, and preposition. In German, which has much the same root structure as English, the definite article contains a root [d-], for in the forms der, dem, den, and so on, the rest of the word (-er, -em, -en, and so on) is in each case a normal inflectional ending, appearing also in the inflectional forms of an adjective like 'red': rot-er, rot-em, rot-en. The same applies to the interrogative pronoun 'who?' with forms like wer, wem, wen. In Malayan and in Semitic, many words in this semantic sphere have only one syllable, as, in Tagalog, [at] 'and,' or the syntactic particles [arj] 'sign of object-expression,' [aj] 'sign of predication,' [na] 'sign of attribution.' This semantic sphere is roughly the same as that in which English uses atonic words.

14. 9. Perhaps in most languages, most of the roots are morphemes. Even in cases like English sing : sang : sung : song or flap : flip : flop, a relevant description will view one of the forms as basic and the others as secondary derivatives or as primary derivatives with phonetic modification of the root. In other cases, however, we find clearly-marked phonetic-semantic resemblances between elements which we view as different roots. The pronominal words of English are probably best described as containing monosyllabic roots that resemble each other, especially as to the initial consonants:

[θ-]: the, this, that, then, there, thither, thus.
[hw-]: what, when, where, whither, which, why; modified to [h] in who, how.
[s-]: so, such.
[n-]: no, not, none, nor, never, neither.

Complex morphologic structure of the root is much plainer in the case of English symbolic words; in these we can distinguish, with varying degrees of clearness, and with doubtful cases on the
border-line, a system of initial and final root-forming morphemes, of vague signification. It is plain that the intense, symbolic connotation is associated with this structure. Thus, we find recurrent initials:

- [fl-] 'moving light': flash, flare, flame, flick-er, flimm-er.
- [fl-] 'movement in air': fly, flap, flit (flutt-er).
- [gl-] 'unmoving light': glow, glare, gloat, gloom (gleam, gloam-ing, glimm-er), glint.
- [sl-] 'smoothly wet': slime, slush, slop, slobb-er, slip, slide.
- [kr-] 'noisy impact': crash, crack (creak), crunch.
- [skr-] 'grating impact or sound': scratch, scrape, scream.
- [sn-] 'breath-noise': sniff (snuff), snore, snot, snot.
- [sn-] 'quick separation or movement': snap (snip), snatch (snatch).
- [sn-] 'creep': snake, snail, sneak, snoop.
- [ç-] 'up-and-down movement': jump, jounce, jig (jog, jugg-le), jangle (jingle).
- [b-] 'dull impact': bang, bash, bounce, biff, bump, bat.

In the same vague way, we can distinguish finals:

- [-ej] 'violent movement': bash, clash, crash, dash, flash, gash, mash, gnash, slash, splash.
- [-eə] 'big light or noise': blare, flare, glare, stare.
- [-awns] 'quick movement': bounce, jounce, pounce, trounce.
- [-im], mostly with determinative [-ə], 'small light or noise': dim, flimmer, glimmer, simmer, shimmer.
- [-amp] 'clumsy': bump, clump, chump, dump, frump, hump, lump, rump, stump, thump.
- [e-ɛt], with determinative [-ə], 'particled movement': batter, clatter, chatter, spatter, shatter, scatter, rattle, prattle.

In this last instance we see a formal peculiarity which confirms our classification. In English morphology there is no general restriction to the occurrence of [-ə] or [-l] as suffixes, and, in particular, they are not ruled out by the presence of [r, l] in the body of the word: forms like brother, rather, river, reader, reaper or little, ladle, label are common enough. The symbolic roots, however, that contain an [r], are never followed by the determinative suffix [-ə], but take an [-l] instead, and, conversely, a symbolic root containing [l] is never followed by [-l], but only by [-ə]: brabble and blabber are possible as English symbolic types, but not *brabber or *blabble.
The analysis of minute features, such as the root-forming morphemes, is bound to be uncertain and incomplete, because a phonetic similarity, such as, say, the [b-] in box, beat, bang, represents a linguistic form only when it is accompanied by a semantic similarity, and for this last, which belongs to the practical world, we have no standard of measurement.
15. 1. Having surveyed sentence-types (Chapter 11) and constructions (Chapters 12, 13, 14), we turn now to the third type of meaningful grammatical arrangement, substitution (§ 10.7).

A substitute is a linguistic form or grammatical feature which, under certain conventional circumstances, replaces any one of a class of linguistic forms. Thus, in English, the substitute *I* replaces any singular-number substantive expression, provided that this substantive expression denotes the speaker of the utterance in which the substitute is used.

The grammatical peculiarity of substitution consists in selective features: the substitute replaces only forms of a certain class, which we may call the domain of the substitute; thus, the domain of the substitute *I* is the English form-class of substantive expressions. The substitute differs from an ordinary linguistic form, such as *thing, person, object*, by the fact that its domain is grammatically definable. Whether an ordinary form, even of the most inclusive meaning, such as *thing*, can be used of this or that practical situation, is a practical question of meaning; the equivalence of a substitute, on the other hand, is grammatically determined. For instance, no matter whom or what we address, we may mention this real or pretended hearer in the form of a substantive expression by means of the substitute *you* — and for this we need no practical knowledge of the person, animal, thing, or abstraction that we are treating as a hearer.

In very many cases, substitutes are marked also by other peculiarities: they are often short words and in many languages atonic; they often have irregular inflection and derivation (*I : me : my*) and special syntactic constructions. In many languages they appear as bound forms and may then be characterized by morphologic features, such as their position in structural order.

15. 2. One element in the meaning of every substitute is the class-meaning of the form-class which serves as the domain of the substitute. The class-meaning of the substitute *you*, for example,
is the class-meaning of English substantive expressions; the class-meaning of *I* is that of singular substantive expressions, and the class-meaning of the substitutes *they* and *we* is that of plural substantive expressions.

Some substitutes add a more specific meaning which does not appear in the form-class, but even in these cases a set of several substitutes systematically represents the whole domain. Thus, *who* and *what* together cover the class-meaning of English substantive expressions. In the same way, *he*, *she*, and *it* together cover the class-meaning of singular substantive expressions; within the set, *he* and *she* cover the same sub-domain as *who*, and *it* the same sub-domain as *what*, but the distinction between *he* and *she* implies a further and independent subdivision. Our selection of substitutes, then, divides English substantive expressions into the sub-classes of *personal* (replaced by *who* and *he-she*) and *non-personal* (replaced by *what* and *it*), and it subdivides the personal singulars into the sub-classes of *male* (replaced by *he*) and *female* (replaced by *she*).

In addition to the class-meaning, every substitute has another element of meaning, the substitution-type, which consists of the conventional circumstances under which the substitution is made. Thus, *I* replaces any singular substantive expression (this domain gives us the class-meaning of *I*), provided that this substantive expression denotes the speaker of the very utterance in which the *I* is produced: this is the substitution-type of *I*. The circumstances under which a substitution is made are practical circumstances, which the linguist, for his part, cannot accurately define. In detail, they differ greatly in different languages; in speaking a foreign language, we have great difficulty in using the proper substitute-forms.

15. 3. Nevertheless, it will be worth our while to leave, for a moment, the ground of linguistics, and to examine the problems which here confront the student of sociology or psychology. We find, at once, that the various types of substitution represent elementary circumstances of the act of speech-utterance. The substitution-types in *I*, *we*, and *you* are based upon the speaker-hearer relation. The types of *this*, *here*, *now* and *that*, *there*, *then* represent relations of distance from the speaker or from the speaker and the hearer. The interrogative type of *who*, *what*, *where*, *when* stimulates the hearer to supply a speech-form. The negative type
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of nobody, nothing, nowhere, never excludes the possibility of a speech-form. These types are remarkably widespread and uniform (except for details) in the languages of the world; among them we find the practical relations to which human beings respond more uniformly than to any others—numerative and identificational relations, such as positive-negative, all, some, any, same, other, and, above all, the numbers, one, two, three, and so on. These are the relations upon which the language of science is based; the speech-forms which express them make up the vocabulary of mathematics. Many of these substitution-types have to do with species and individuals: they select or identify individuals (all, some, any, each, every, none, and so on) out of a species. Perhaps every language has a form-class of object-expressions, with a class-meaning of the type 'species occurring in individual specimens.' Accordingly, the substitutes for object-expressions, pronominals, will usually show the most varied substitution-types. In English, where object-expressions are a special part of speech, the noun, the substitutes for the noun make up a part of speech, the pronoun; together, these two constitute a greater part of speech, the substantive. The pronouns differ from nouns, for one thing, in not being accompanied by adjective modifiers (§12.14).

To a large extent, some substitution-types are characterized, further, by the circumstance that the form for which substitution is made, has occurred in recent speech. Thus, when we say Ask that policeman, and he will tell you, the substitute he means, among other things, that the singular male substantive expression which is replaced by he, has been recently uttered. A substitute which implies this, is an anaphoric or dependent substitute, and the recently-uttered replaced form is the antecedent. This distinction, however, seems nowhere to be fully carried out: we usually find some independent uses of substitutes that are ordinarily dependent, as, for instance, the independent use of it in it's raining. Independent substitutes have no antecedent: they tell the form-class, and they may even have an elaborate identificational or numerative substitution-type—as, for instance, somebody, nobody—but they do not tell which form of the class (for instance, which particular noun) has been replaced.

On the whole, then, substitution-types consist of elementary features of the situation in which speech is uttered. These features are so simple that, for the most part, they could be indicated
by gestures: *I, you, this, that, none, one, two, all,* and so on. Especially the substitutes of the 'this' and 'that' types resemble interjections in their semantic closeness to non-linguistic forms of response; like interjections, they occasionally deviate from the phonetic pattern of their language (§ 9.7). Since, aside from the class-meaning, the substitution-type represents the whole meaning of a substitute, we can safely say that the meanings of substitutes are, on the one hand, more inclusive and abstract, and, on the other hand, simpler and more constant, than the meanings of ordinary linguistic forms. In their class-meaning, substitutes are one step farther removed than ordinary forms from practical reality, since they designate not real objects but grammatical form-classes; substitutes are, so to speak, linguistic forms of the second degree. In their substitution-type, on the other hand, substitutes are more primitive than ordinary linguistic forms, for they designate simple features of the immediate situation in which the speech is being uttered.

The practical usefulness of substitution is easy to see. The substitute is used more often than any one of the forms in its domain; consequently, it is easier to speak and to recognize. Moreover, substitutes are often short forms and often, as in English, atonic, or, as in French, otherwise adapted to quick and easy utterance. In spite of this economy, substitutes often work more safely and accurately than specific forms. In answer to the question *Would you like some fine, fresh cantaloupes?* The answer *How much are cantaloupes?* is perhaps more likely to be followed by a delay or aberration of response ("misunderstanding") than the answer *How much are they?* This is especially true of certain substitutes, such as *I,* whose meaning is unmistakable, while the actual mention of the speaker's name would mean nothing to many a hearer.

15. 4. Returning to the ground of linguistics, we may be somewhat bolder, in view of what we have seen in our practical excursion, about stating the meanings of substitutes. We observe, also, that in many languages, the meanings of substitutes recur in other forms, such as the English limiting adjectives (§ 12.14).

The meaning of the substitute *you* may be stated thus:

A. *Class-meaning:* the same as that of the form-class of substantive expressions, say 'object or objects';

B. *Substitution-type:* 'the hearer.'
The meaning of the substitute *he* may be stated thus:

A. Class-meanings:

1. **Definable in terms of form-classes:**
   
   (a) the same as that of the form-class of singular substantive expressions, say 'one object';
   
   (b) the same as that of the form-class defined by the substitutes *who*, *someone*, say 'personal';

2. **Creating an otherwise unestablished form-class:** *he* is used only of certain singular personal objects (the rest are replaced, instead, by *she*), which, accordingly, constitute a sub-class with a class-meaning, say 'male';

B. Substitution-types:

1. **Anaphora:** *he* implies, in nearly all its uses, that a substantive designating a species of male personal objects has recently been uttered and that *he* means one individual of this species; say 'recently mentioned';

2. **Limitation:** *he* implies that the individual is identifiable from among all the individuals of the species mentioned; this element of meaning is the same as that of the syntactic category of definite nouns (§ 12.14) and can be stated, say, as 'identified.'

15. **5.** Substitutes whose substitution-type consists of nothing but anaphora, are (simple) anaphoric substitutes: apart from their class-meanings (which differ, of course, according to the grammatical form-classes of different languages), they say only that the particular form which is being replaced (the antecedent) has just been mentioned. In English, finite verb expressions are anaphorically replaced by forms of *do, does, did*, as in *Bill will misbehave just as John did*. The antecedent here is *misbehave*; accordingly, the replaced form is *misbehaved*. A few English verb-paradigms, such as *be, have, will, shall, can, may, must*, lie outside the domain of this substitution: *Bill will be bad just as John was* (not *did*). Nouns, in English are anaphorically replaced by *one, plural ones*, provided they are accompanied by an adjective attribute: *I prefer a hard pencil to a soft one, hard pencils to soft ones*. This use of *one* as an anaphoric pronoun differs by class-cleavage from the several attributive uses of the word *one* (§ 12.14), especially in forming a plural, *ones*. The details of this anaphoric substitution will concern us later (§ 15.8–10).

In subordinate clauses introduced by *as or than*, we have in Eng-
lish a second kind of anaphora for a finite verb expression: we say not only Mary dances better than Jane does, but also Mary dances better than Jane. We can describe this latter type by saying that (after as and than) an actor (Jane) serves as an anaphoric substitute for an actor-action expression (Jane dances), or we can say that (after as and than) a zero-feature serves as an anaphoric substitute for a finite verb expression accompanying an actor expression. Another case of an anaphoric zero-feature in English is the replacement of infinitive expressions after the preposition to (as in I haven’t seen it, but hope to) and after the finite verbs which take an infinitive attribute without to (as in I’ll come if I can). Similarly, we have zero-anaphora for participles after forms of be and have, as in You were running faster than I was; I haven’t seen it, but Bill has. Zero-anaphora for nouns with an accompanying adjective occurs freely in English only for mass nouns, as in I like sour milk better than fresh. For other nouns we use the anaphoric one, ones, except after certain limiting adjectives.

While some forms of simple anaphoric substitution seem to occur in every language, there are great differences of detail. The use of one, ones, is peculiar to English; related languages of similar structure use zero-anaphora quite freely for nouns after adjectives, as, German grosze Hunde und kleine ['gro:se 'hunde unt 'klajne] ‘big dogs and little ones’; French des grandes pommes et des petites [de grād pome e de ptit] ‘big apples and small ones.’ In some languages the subject in the full sentence-types can be replaced by zero-anaphora; thus, in Chinese, to a statement like [wo3 ’jun4 i2 khwaj ‘pu4] ‘I need one piece (of) cloth,’ the response may be [’jun4 i4 ’phi1 mo?] ‘Need one roll (interrogative particle)?’ In Tagalog this happens in subordinate clauses, as in the sentence [an ’pu:nu4 aj tu’mu:bu4 haŋ’gan sa mag’bu:ña] ‘the tree (predicative particle) grew until (attributive particle) bore-fruit.’

15.6. Perhaps all languages use pronominal substitutes which combine anaphora with definite identification: the replaced form is an identified specimen of the species named by the antecedent. This, we have seen, is the value of the English pronoun he, as in Ask a policeman, and he will tell you. Substitutes of this kind are often, but misleadingly, called “anaphoric”; a better name would be definite. In most languages, including English, the definite substitutes are not used when the antecedent is the speaker or the hearer or includes these persons; for this reason, the definite
substitutes are often spoken of as third-person substitutes. They usually share various peculiarities with the substitutes that refer to the hearer and to the speaker.

The English definite or third-person pronouns, he, she, it, they, differ for singular and plural replaced forms, and, in the singular, for personal and non-personal antecedents: personal he, she, versus non-personal it. We have seen that the difference of singular and plural is otherwise also recognized by the language (as, for instance, in the inflection of nouns: boy, boys), and we shall see that the same is true of the difference of personal and non-personal. Within the personal class, however, the distinction between he used with a male antecedent, and she, with a female antecedent, is otherwise imperfectly recognized in our language (as, in the use of the suffix -ess, § 14.7). The distinction, then, between the pronoun-forms he and she, creates a classification of our personal nouns into male (defined as those for which the definite substitute is he) and female (similarly defined by the use of the substitute she). Semantically, this classification agrees fairly well with the zoological division into sexes.

In languages with noun-genders (§ 12.7), the third-person pronouns usually differ according to the gender of the antecedent. Thus, in German, masculine nouns, such as der Mann [der 'man] 'the man,' der Hut [hu:t] 'the hat,' have the third-person substitute er [e:r], as when er ist grosz [e:r ist 'gro:s] 'he, it is big,' is said of either a man or a hat, or of any other antecedent that belongs to the "masculine" congruence-class;

feminine nouns, such as die Frau [di: 'fraw] 'the woman,' die Uhr [u:r] 'the clock,' have the third-person substitute sie [zi:], as in sie ist grosz, 'she, it is big';

neuter nouns, such as das Haus [das 'haws] 'the house,' or das Weib [vajp] 'the woman,' have the third-person substitute es [es], as in es ist grosz.

This distinction, unlike that of he and she in English, accords with a distinction in the form of noun-modifiers (such as der : die : das 'the').

The meaning of definite identification — that is, the way in which the individual specimen is identified from among the species named by the antecedent — varies for different languages and would probably be very hard to define. It is important to notice, however, that in languages which have a category of "definite"
noun-modifiers (such as, in English the, this, that, my, John's, etc., § 12.14), the definite pronoun identifies the individual in the same fashion as a definite modifier identifies its head noun; thus, a he after the antecedent policeman is equivalent in denotation, except for the peculiar value that lies in the use of a substitute, to the phrase the policeman. We need mention only a few widespread peculiarities, such as the case, not very common in English, that the definite pronoun is spoken before its antecedent: He is foolish who says so. If the antecedent is a predicate complement after a form of the verb to be, the definite pronoun is normally it, regardless of number, personality, or sex: it was a two-storey house; it's he; it's me (I), it's the boys. Instead of an infinitive phrase as an actor (to scold the boys was foolish), we more commonly use it, with the infinitive phrase following in close parataxis (§ 12.2): it was foolish to scold the boys. An actor-action phrase, such as you can't come, does not serve as an actor; but does appear in close parataxis with it as an actor: it's too bad you can't come. This anticipatory use of the definite pronoun extends, in German, to almost any actor, with the restriction that the pronoun comes first; thus, beside ein Mann kam in den Garten [ajn 'man 'ka:m in den 'garten] 'a man came into the garden,' there is the form es kam ein Mann in den Garten, where the use of es resembles the English use of the adverb there. If the noun in parataxis is plural, this German es accompanies a plural verb: beside zwei Männer kamen in den Garten [tsvaj 'mener 'ka:men] 'two men came into the garden,' there is the form es kamen zwei Männer in den Garten.

In French, the definite pronoun replaces an adjective: êtes-vous heureux? — je le suis [es:tw vu a:ʁo? — ʒə l suː] 'Are you happy? — I am.' A step beyond this, we find definite pronouns in marginal uses without any antecedent, as in English slang beat it 'run away,' cheese it 'look out,' he hot-footed it home 'he ran home,' let 'er go. We use they as an actor for people in general: they say Smith is doing very well. The commonest use of this sort is the pseudo-impersonal use of a definite pronoun as a merely formal actor, in languages that have a favorite actor-action construction: it's raining; it's a shame. This may occur alongside a genuine impersonal construction (§ 11.2). Thus, in German, beside the genuine impersonal mir war kalt [miːɐɐ ˈvaːɐ ˈkalt] 'to-me was cold; I felt cold,' hier wird getanzt ['hiːɐ virt ɡəˈtants] 'here get danced; there is dancing here,' the definite pronoun es may appear as an
actor, provided it comes first in the phrase: *es war mir kalt; es wird hier getanzt*. In Finnish, the impersonal and the pseudo-impersonal are used for different meanings: *puhutaan* ‘there is talking’ is a genuine impersonal, but *sadaa* ‘it’s raining’ contains a definite substitute actor ‘he, she, it,’ just as does *puhuu* ‘he, she, it is talking.’

15.7. The definite substitutes in most languages are not used when the replaced form designates the speaker or the hearer or groups that include these persons; in this case a different type, the personal substitute is used. The *first-person* substitute *I* replaces mention of the speaker, and the *second-person* substitute *thou*, of the hearer. These are independent substitutes, requiring no antecedent utterance of the replaced form.

In addition to the *I* and *thou* substitutes, most languages use also forms for groups of people that include the speaker or the hearer or both. Thus, in English, for a group of people which includes the speaker, the substitute is *we*; if the speaker is not included, but the hearer is, the substitute is *ye*. Many languages distinguish all three of these possibilities, as, Tagalog, which, beside *[a'ku] ‘I’* and *[i'kaw] ‘thou,’ has the plural-like forms:

- speaker only included (exclusive first person plural): *[ka'mi] ‘we’*
- speaker and hearer included (inclusive first person plural): *[ta'ju] ‘we’*

hearer only included (second person plural): *[ka'ju] ‘ye’.*

Similarly, languages which distinguish a dual number, allow of five combinations, as in Samoan: ‘I-and-he,’ ‘I-and-thou,’ ‘ye-two,’ ‘I-and-they,’ ‘I-and-thou-and-he (-or-they),’ ‘thou-and-they.’ A few languages distinguish also a *trial* number (‘three persons’) in their personal pronouns.

The English forms *thou, ye* are, of course, archaic; modern English is peculiar in using the same form, *you*, both for the hearer and for a group of persons that includes the hearer.

Many languages use different second-person substitutes according to different social relations between speaker and hearer. Thus, French uses *vous* [vu] ‘you’ much like English, for both singular and plural, but if the hearer is a near relative, an intimate friend, a young child, or a non-human being (such as a god), there is a special intimate singular-form *toi* [twa]. German uses the third-person plural pronoun ‘they’ for both singular and plural second person: *Sie spaszen* [zi: 'ʃpa:sen] is both ‘they are jesting’ and ‘you (singular or plural) are jesting,’ but the intimate forms, used much
like those of French, distinguish singular and plural: *du spaszt*
[du: ʃpa:səst] 'thou art jesting,' *ihr spaszt* [iːɾ ʃpa:st] 'ye are jesting.'

The meaning of second-person substitutes is limited in some languages by the circumstance that they are not used in deferential speech; instead, the hearer is designated by some honorific term (*your Honor, your Excellency, your Majesty*). In Swedish or in Polish, one says, for instance, 'How is *Mother* feeling?' or 'Will the gentleman come to-morrow?' where the terms here italicized denote the hearer. Some languages, such as Japanese and Malay, distinguish several substitutes for both first and second persons, according to deferential relations between speaker and hearer.

The personal substitutes and the definite ('"third-person"') substitutes in many languages group themselves, by virtue of common features, into a kind of closed system of *personal-definite* substitutes. In English, both sets *he, she, it, they* and *I, we, you* (*thou, ye*), are atonic in the phrase; most of them have a special accusative case form (*me, us, him, her, them, thee*); most of them derive their possessive adjectives irregularly (*my, our, your, his, her, their, thy*), and some of these adjectives have a special form for zero anaphora (*mine*, etc., § 15.5). In French, the personal-definite pronouns have special (conjunct) forms when they serve as actors or goals of verbs (§ 12.12); these have case-inflection for different positions, which is otherwise foreign to French substantives; moreover, they underlie possessive adjectives, as *moi* [mwa] 'I,' *mon chapeau* [mɔ̃ ʃapo] 'my hat,' while other substantives do not: *le chapeau de Jean* [la ʃapo d ʒɑ̃] 'the hat of John; John's hat.' Very commonly the personal-definite substitutes have special syntactic constructions. Thus, in English, German, and French, the finite verb has special congruence-forms for different persons as actors: *I am : thou art : he is;* French *nous savons* [nu savɔ̃] 'we know,' *vous savez* [vu savɛ] 'you know,' *elles savent* [el sa:vɛ] 'they (feminine) know,' *ils savent* [i sa:vɛ] 'they know.'

The personal-definite pronouns may even have a fairly systematic structure. Thus, in the Algonquian languages, an initial element [ke-] appears in the forms that include the hearer; if the hearer is not included, [ne-] denotes the speaker; if neither is included, the initial is [we-], as, in Menomini:

KENAH ‘thou’
KENA? ‘we’ (inclusive)
KENUL? ‘ye’

NEAH ‘I’
NEA? ‘we’ (exclusive)

WENAH ‘he’

WENUL? ‘they.’
Samoan, with a distinction of dual and plural numbers, has:

[a'uu] ‘I’  [ima:ua] ‘we two’ (excl.)  [ima:tou] ‘we’ (excl.)
[ita:ua] ‘we-two’ (incl.)  [ita:tou] ‘we’ (incl.)

[?oe] ‘thou’  [?oulua] ‘ye two’  [?outou] ‘ye’

[ia] ‘he’  [ila:ua] ‘they two’  [ila:tou] ‘they.’

The dual-trial-plural distinction appears in the language of Annatom Island (Melanesian):

[ainjak] ‘I,’ [aijumrau] ‘we two’ (excl.), [aijumtai] ‘we three’ (excl.), [aijuma] ‘we’ (excl.),
[akamjau] ‘we two’ (incl.), [akataij] ‘we three’ (incl.), [akaija] ‘we’ (incl.),


In many languages, personal-definite substitutes appear as bound forms. Thus, Latin had definite-personal actors or goals in the finite verb-forms:

amo. ‘I love,’ amas ‘thou lovest,’ amat ‘he (she, it) loves,’ amamus ‘we love,’ amatis ‘ye love,’ amant ‘they love,’
amor ‘I am loved,’ amaris ‘thou art loved,’ amatur ‘he (she, it) is loved,’ amamur ‘we are loved,’ amin ‘ye are loved,’ amantur ‘they are loved.’


Likewise, in Cree, the possessor of an object appears in a bound form: [nitastutin] ‘my hat,’ [kitastutin] ‘thy hat,’ [utastutin] ‘his hat,’ and so on. In all these cases, the third-person bound form may stand in cross-reference with a noun antecedent: Latin pater amat ‘father he-loves; the father loves’ (§ 12.9).

The personal-definite system may be elaborated by distinctions of identity and non-identity, such as the difference of me and myself, where the latter form implies identity with the actor (I washed myself, § 12.8), or the Scandinavian hans ‘his’ and sin ‘his (own).’ These differences appear also in bound forms, as in the obviative forms of Algonquian (§ 12.8); similarly, ancient Greek, beside an ordinary bound actor, as in [’elowse] ‘he washed,’
had a *middle-voice* form, where the actor is at the same time affected by the action: [e'lösato] 'he washed himself' or 'he washed for himself.'

Other specializations are less common; thus, Cree, beside a verb with actor and goal, such as [ninituma:w] 'I ask for him, call him,' [ninitute:n] 'I ask for it,' and a form with actor and two goals, [ninitutamawa:w] 'I ask him for it,' has also a form with actor, goal, and interested person [ninitutamwa:n] 'I ask for it with reference to him,' that is, 'for his use' or 'at his behest.'

15. 8. *Demonstrative* or *deictic* substitution-types are based on relative nearness to the speaker or hearer. In English we have two such types, for nearer and for farther away; they coincide with the values of the limiting adjectives *this* and *that* (§ 12.14). Demonstrative substitutes may be dependent (that is, they may refer anaphorically to an antecedent speech-form that names the species), or independent. In either case, however, they identify the individual object within the (named or unnamed) species. Demonstrative pronoun substitution, in English, is made by the pronouns *this* (*these*), *that* (*those*), which differ, by class-cleavage, from the limiting adjectives, or by phrases consisting of these limiting adjectives plus the anaphoric *one* (§ 15.5). These forms are not ordinarily used to replace personal nouns — for the anticipatory use in *This is my brother; these are my brothers* cannot be viewed as personal. The dependent substitutes in the singular are *this one*, *that one*, and the independent *this*, *that*; hence we have the distinction between, say, *of these books, I like this one better than that one*, but, of unnamed objects, *I like this better than that*. In the plural, however, *these* and *those* are in either case used without the anaphoric *ones*.

In French we can see a more differentiated system. There are three types of demonstrative limitation and substitution: a general type from which two special types are differentiated by the addition of the adverbs *ci* [si] for nearer position and *là* [la] for farther away. The forms of the limiting adjective, the dependent pronoun, and the independent pronoun, are distinct:

<table>
<thead>
<tr>
<th>ADJECTIVE</th>
<th>DEPENDENT PRONOUN</th>
<th>INDEPENDENT PRONOUN</th>
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<tbody>
<tr>
<td>singular</td>
<td></td>
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<tr>
<td>masculine</td>
<td><em>ce</em> [sə]</td>
<td><em>celui</em> [saļqi]</td>
</tr>
<tr>
<td>feminine</td>
<td><em>cette</em> [set]</td>
<td><em>celle</em> [sel]</td>
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<tr>
<td></td>
<td><em>ce</em> [sə]</td>
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Thus: cette plume-ci [set plym si] ‘this pen,’ de ces deux plumes, je préfère celle-ci à celle-là [de se dø plym, se prefr: se si a se la] ‘of these two pens, I prefer this one to that one’; but, of unnamed things, je préfère ceci à cela [se si a se la] ‘I prefer this to that.’

The pronouns without ci and là are confined to certain constructions: de ces deux plumes, je préfère celle que vous avez [sel kə vuz ave] ‘of these two pens, I prefer the one you have’; independent: c’est assez [set ase] ‘that’s enough.’

Demonstrative substitution-types are not always fully distinct from definite, and, similarly, demonstrative limiting modifiers may merge with mere definite markers of the type ‘the.’ In German, more than one dialect has only a single paradigm whose forms are used proclitically as a definite article, der Mann [der ‘man] ‘the man,’ and with accent as a demonstrative limiting adjective, der Mann [‘de:r ‘man] ‘that man,’ and as a pronoun, der [‘de:r] ‘that one.’ This last use, in German, is but slightly distinguished from that of the definite pronoun er [e:r] ‘he’; the chief difference, perhaps, is the use of der (not er) in the second of two paratactic full sentences: es war einmal ein Mann, der hatte drei Söhne [es ‘va:r ajn,ma:l ajn ‘man, de:r ‘hate ‘draj ‘zø:ne] ‘there was once a man, he (literally, ‘that-one’) had three sons.’

Many languages distinguish more types of demonstrative substitution; thus, some English dialects add yon, for things farthest away, to the distinction of this and that. Latin had hic for things nearest the speaker, iste for those nearest the hearer; and ille for those farthest away. The Kwakiutl language makes the same distinctions, but doubles the number by distinguishing also between ‘in sight’ and ‘out of sight.’ Cree has [awa] ‘this,’ [ana] ‘that,’ and [o:ja] ‘that recently present but now out of sight.’ Eskimo has a whole series: [manna] ‘this one,’ [anna] ‘that one in the north,’ [qanna] ‘that one in the south,’ [panna] ‘that one in the east,’ [kanna] ‘that one down there,’ [sanna] ‘that one down in the sea,’ [inŋa] ‘that one,’ and so on.

Outside of pronouns, we have the adverbial forms here : there, hither : thither, hence : thence, now : then; the th-forms, however,
merge with simple anaphoric use, as in Going to the circus? I'm going there too. Similarly, so (and archaically also thus) is both demonstrative and, more usually, anaphoric (I hope to do so). Forms like (do it) this way, this sort (of thing), this kind (of thing) are on the border between substitutes and ordinary linguistic forms.

15.9. Interrogative substitutes prompt the hearer to supply either the species or the identification of the individual; in English, accordingly, interrogative substitutes occur only in supplement-questions. Of pronouns, we have the independent who? (accusative whom?) for personals and what? for non-personals; these ask for both species and individual. For non-personals only we have also the independent which? asking for identification of the individual object from a limited field, but not for the species. The dependent substitutes, asking for the identification of the individual from a limited field, are which one? which ones?

Outside the pronouns, we have the interrogative substitutes where? whither? whence? when? how? why? Interrogative verb-substitutes occur in some languages, as in Menomini [we' se:kewi] 'what sort is he?'

The limitation of interrogative forms to certain syntactic positions is quite common. Frequently we find them restricted to positions in the predicate of a binary sentence-type. The word-order and the plural verb-form in who are they? what are those things? are features of this kind. In present-day French, the non-personal quoi? [kwai] 'what?' is scarcely ever used as actor or goal, but instead, figures as a predicate complement, appearing in the conjunct form que [ka], as in qu'est-ce que c'est? [k e s k e s e] 'what is it that this is? what's this?' and qu'est-ce qu'il a vu? [k e s k il a vyu] 'what is it that he has seen? what did he see?' In some languages the interrogative substitutes are always predicates of equational sentences, as, in Tagalog, ['si:nu an nagbi'gaj sa i'ju] 'who the one-who-gave to you? who gave it to you?' or, in Menomini [awe:pc:muhneti] 'who the-one-walking-by? who is walking there?'

15.10. The various possibilities of selecting individual objects from a species are represented by all manner of substitute-forms, especially of pronouns. In English, nearly all forms of this sort consist of limiting adjectives with the anaphoric one, ones (§ 15.5) or of substantive uses, by class-cleavage, of the same words. There
are many distinctions, not always rigidly carried out, between dependent and independent substitution, and in the latter, between personal and non-personal classes. The various limiting adjectives differ in treatment; these differences add another line of classification among them (§ 12.14).

(1) Some limiting adjectives are, like ordinary adjectives, followed by one, ones to form anaphoric substitutes. We have seen that this is the case of the singular this, that and, under certain conditions, of which? what? It is true also of each, every, whatever, whichever, and of the phrasal expressions many a, such a, what a. Thus, we say he was pleased with the children and gave each one a penny. As independent substitutes we use this, that, which, what, whichever, whatever of non-personals only; corresponding to every, we have personal everybody, everyone and non-personal everything; each has no independent form.

(2) We have both simple pronoun use or combination with the anaphoric ones, one, in the case of either, former, latter, last, neither, other, such, and the ordinals, first, second, etc. The variants differ chiefly in connotation. Thus, we say Here are the books; take either (one). The word other forms a special sub-class, in that it has a plural form, others: You keep this book and I'll take the others (the other ones). In independent use these words serve chiefly as non-personals.

(3) The remaining limiting adjectives are peculiar in not taking the anaphoric one, ones. Thus, we say: Here are the books; take one (two, three, any, both, all, a few, some, and so on). The independent substitutes show great variety. Thus, all is used as a non-personal: All is not lost; That's all. On the other hand, one, as an atonic, is personal: One hardly knows what to say. Several form compounds for independent use, such as the personal somebody, someone, anybody, anyone and the non-personal something, anything.

(4) Several limiting adjectives show an eccentric treatment. The article the with the anaphoric one, ones forms a dependent substitute, provided some other modifier follows: the one(s) on the table; otherwise it does not appear in pronominal use, and the definite pronoun serves instead. The article a in combination with another adjective does not influence the treatment of the latter: many a one; another (one). Otherwise, the article a is accompanied by the anaphoric one only in the emphatic form not a one. All other pronominal uses show us one replacing a: to
take an apple there corresponds the pronominal take one. The determiner no is paralleled by the dependent substitute none, but ordinarily we use instead the combination of not with any (I didn't see any); the independent substitutes are the compounds nobody, no one, nothing (archaic naught).

Among these substitution-types, the negative is, of course, represented in all languages, and often shows special peculiarities; to it belong also the non-pronominal nowhere, never, and sub-standard nohow. In many languages, as in most forms of sub-standard English, these substitutes are accompanied by the general negative adverb: I can't see nothing. The numerative types (all, one, two, three, and so on) seem also to be universal. As to the selective types, however, there is great room for variety; other languages have substitution-types that are not exactly matched in English. Thus, Russian ['ne-xtö] 'someone' implies that the speaker can (but does not) identify the individual ('someone told me the other day that . . . '), while [xtö-ni- 'but] does not imply this ability ('there's someone at the door'). Still another type, ['koj-xtö] implies that a different individual is selected on different occasions ('now and then someone tries').

15.11. Substitutes frequently are tied up with special syntactic functions; thus, we have seen that interrogative substitutes in English and many other languages are confined to certain positions in the sentence. Some languages have special pronouns for predicative use. Thus, in Menomini, beside such forms as [nenah] 'I,' [enuh] 'that one' (animate), [eneh] 'that' (inanimate), there are parallel forms which occur only as predicates; the normal substitute appears in [kehke:nah] 'he-knows-it that (thing); he knows that,' but the predicative form in [ene? ke:hkenah] 'that (thing) that-which-he-knows; that is what he knows,' or in [enu? ke:hkenah] 'that (person) the-one-who-knows-it; that one is the one who knows it.' These predicative forms vary inflectionally for the same categories as a verb, such as interrogative [enet ke:hkenah?] 'is it that which he knows? is that the thing he knows?' or surprised present [enesa? ke:hkenah!] 'and so that is what he knows!' and so on.

Our relative substitutes belong to a fairly widespread, but by no means universal type: the substitute indicates that the phrase in which it figures is an included (or completive) form. In English, the phrase has the favorite full-sentence structure (actor-action
construction), and is marked by the relative substitute as not constituting a full sentence. Our relatives who (whom), which, where, when, that differ from other substitutes by class-cleavage. They, or their immediate phrase, come first in the clause. We have, firstly, the anaphoric type, that, and personal who, non-personal which: the boy who (that) ran away, the book which (that) he read; the house in which we lived. If the relative substitute fills in its clause the position of verbal goal, prepositional axis, or predicate complement, we have here also a zero-substitute: the man I saw, the house we lived in, the hero he was. In ordinary speech, English relative clauses identify the individual antecedent; in more formal style we have also non-identifying relative clauses with paratactic sentence-modulation: the man, who was carrying a big bag, came up to the gate.

In languages with case-forms, the inflection of the relative pronoun is normally determined by the forms in its clause: I saw the boy who ran away; the boy whom I saw ran away. In Latin, a normal form would be in hāc vītā quam nunc ego dēgō ‘in this life which I now lead,’ where the antecedent, vītā happens to be in the ablative case (as axis of the preposition in), and the relative pronoun, quam ‘which,’ in the accusative case, as goal of the verb dēgō. However, languages with complicated inflection now and then show attraction of the relative pronoun into an inflectional form that belongs properly to the antecedent: the Latin form vītā in hāc quā nunc ego dēgō, with the same denotation as the above normal form, has the relative pronoun quā in the ablative case, concording with the antecedent, instead of the accusative case demanded by its position in the clause.

Independent relative substitutes, having no antecedent, allow the clause to replace an indication of species: take what(ever) you want; ask whom(ever) you like; whoever says so is mistaken. In English such clauses are used also as paratactic modifiers of a full sentence: whatever he says, I don’t believe him. The same difference between dependent and independent use appears in our adverbial substitutes: dependent the time (when) he did it; the house where we lived; independent we’ll see him when he gets here; we visit them whenever we can; we take them where(ver) we find them.
16.1. The meaningful features of linguistic signaling are of two kinds: lexical forms, which consist of phonemes, and grammatical forms, which consist of taxemes (features of arrangement, § 10.5). If we extend the term *lexical* to cover all forms that can be stated in terms of phonemes, including even such forms as already contain some grammatical features (e.g. *poor John* or *duchess* or *ran*), then the parallelism of lexical and grammatical features can be exhibited in a set of terms like the following:

1. Smallest and meaningless unit of linguistic signaling: phememe;
   (a) lexical: phoneme;
   (b) grammatical: taxeme;

2. Smallest meaningful unit of linguistic signaling: glosseme; the meaning of a glosseme is a noeme;
   (a) lexical: morpheme; the meaning of a morpheme is a sememe;
   (b) grammatical: tagmeme; the meaning of a tagmeme is an episememe;

3. Meaningful unit of linguistic signaling, smallest or complex: linguistic form; the meaning of a linguistic form is a linguistic meaning;
   (a) lexical: lexical form; the meaning of a lexical form is a lexical meaning;
   (b) grammatical: grammatical form; the meaning of a grammatical form is a grammatical meaning.

Every lexical form is connected in two directions with grammatical forms. On the one side, the lexical form, even when taken by itself, in the abstract, exhibits a meaningful grammatical structure. If it is a complex form, it shows some morphologic or syntactic construction (*duchess, poor John*), and if it is a morpheme, it may still exhibit morphologic features (a modified morpheme, e.g. *men* or *ran*, § 13.7); in an unmodified morpheme (*man, run*) we may view the absence of grammatical construction as a positive
characteristic. On the other side, the lexical form in any actual utterance, as a concrete linguistic form, is always accompanied by some grammatical form: it appears in some function, and these privileges of occurrence make up, collectively, the grammatical function of the lexical form. The lexical form appears in certain sentence-types or, if it is a bound form, in none at all; it appears in certain positions of certain constructions or, if it is an interjection, in few or none; it appears as replaced form in certain substitutions, or, if it be a substitute, as substitute in certain substitutions. The functions of lexical forms are created by the taxemes of selection which help to make up grammatical forms. Lexical forms which have any function in common, belong to a common form-class.

The functions of lexical forms appear as a very complex system. Some functions are common to a great number of forms and define a large form-class; for instance, the functions which define the English form-class of substantive expressions (serving in the sentence-type of call, filling the positions of actor with a verb, of goal with a verb, of axis with a preposition; underlying a possessive adjective, and so on), are common to an almost unlimited number of words and phrases. Different functions may create overlapping form-classes; thus, the function of filling the actor position is common to substantive expressions and to marked infinitive phrases (to scold the boys would be foolish). Other functions may be limited to a very few lexical forms or to only a single one; thus, phrases with the noun way as center seem to be the only substantive expressions which function as adverbs of manner, with the interrogative substitute how? (this way, the way I do, and so on).

Particular lexical forms may, by class-cleavage (§ 12.14) exhibit unusual combinations of function. Thus, egg is in English a bounded noun, (the egg, an egg) but occurs also as a mass noun (he spilled egg on his necktie). Salt is a mass noun and accordingly underlies a plural only in the specialized meaning 'kinds of,' but, by class-cleavage, there is also a plural salts (as in Epsom salts) with the meaning 'consisting of particles,' in a class with oats, grits, and the like. Man is a (bounded, personal) male noun (a man, the man, . . . he), but by class-cleavage is treated also as a proper noun, parallel in this with God, as in man wants but little, man is a mammal. The word one by a complicated class-cleavage belongs to five form-classes: as a determiner (§ 12.14) it fulfills the requirement that bounded singular nouns be preceded by a
modifier of this class (one house, one mile); as an ordinary numerative it occurs with the definite determiners (the one man, this one book, my one friend); it replaces a with anaphora of the noun (§ 15.10) when no other modifier is present (Here are some apples; take one); it occurs as an independent pronoun for 'any person in general' and in this use is always atonic and underlies the derivatives one's and oneself (one can't help oneself); finally, it is the anaphoric substitute for nouns after an adjective, and in this use forms a plural, ones (the big box and the small one, these boxes and the ones in the kitchen, § 15.5).

16. 2. The grammar of a language includes, then, a very complex set of habits (taxemes of selection) by which every lexical form is used only in certain conventional functions; every lexical form is assigned always to the customary form-classes. To describe the grammar of a language, we have to state the form-classes of each lexical form, and to determine what characteristics make the speakers assign it to these form-classes.

The traditional answer to this question appears in our school grammars, which try to define the form-classes by the class-meaning — by the feature of meaning that is common to all the lexical forms in the form-class. The school grammar tells us, for instance, that a noun is "the name of a person, place, or thing." This definition presupposes more philosophical and scientific knowledge than the human race can command, and implies, further, that the form-classes of a language agree with the classifications that would be made by a philosopher or scientist. Is fire, for instance, a thing? For over a century physicists have believed it to be an action or process rather than a thing: under this view, the verb burn is more appropriate than the noun fire. Our language supplies the adjective hot, the noun heat, and the verb to heat, for what physicists believe to be a movement of particles (molecules) in a body. Similarly, school grammar defines the class of plural nouns by its meaning "more than one" (person, place, or thing), but who could gather from this that oats is a plural while wheat is a singular? Class-meanings, like all other meanings, elude the linguist's power of definition, and in general do not coincide with the meanings of strictly-defined technical terms. To accept definitions of meaning, which at best are makeshifts, in place of an identification in formal terms, is to abandon scientific discourse.

Class-meanings are merely composites, or, one might say, great-
est common factors, of the grammatical meanings which accompany the forms. To state a class-meaning is to find some formula that includes the grammatical meanings in which the forms occur. An English finite verb expression (runs, ran away, is very kind, scolded the boys, and so on) occurs only in one position of one construction, namely as action in the actor-action construction (John ran away). Even when it is used alone, it appears only as a completive sentence which, accordingly, presupposes an actor. Now, we can state the meaning of the actor-action construction very roughly as 'A performs B,' where A is the nominative expression (John) and B the finite verb expression (ran away). This statement defines for us the meanings of the two positions; the meaning of the actor-position is 'performer of B,' and that of the action-position is 'performed by A.' Therefore, since English finite verb expressions occur only and always in this latter position, their class-meaning is the same as that of their one position, namely, 'performed by an object.' If we define the class-meaning of the larger form-class of verbs as 'action,' then the class-meaning of English finite verb expressions is '(action) performed by an actor.'

When a form-class has more than one function, its class-meaning is harder to state, but is still merely a derivative of the grammatical meanings in which the forms occur. English substantive expressions occur, for instance, in the position of actor in the actor-action construction (John ran), with the positional meaning 'performer of an action.' They occur in the position of goal in the action-goal construction (hit John), with a positional meaning something like 'undergoer of an action.' They occur in the position of axis in the relation-axis construction (beside John), with a positional meaning of, say, 'center from which a relation holds good.' They occur in morphologic construction with the possessive suffix (John's), with the positional meaning of 'possessor.' Without listing all the other functions of English substantive expressions, we can say that the class-meaning common to all the lexical forms in this form-class is 'that which can be the performer of an action, the undergoer of an action, the center from which a relation holds good, the possessor of objects,' and so on. Whether we can sum this up in a shorter formula, depends upon our resources of terminology; for instance, we can sum up the class-meaning just given, under the term 'object.'

These instances suffice to show that class-meanings are not
clearly-definable units which could serve as a basis for our work, but only vague situational features, undefinable in terms of our science. The people who speak English and keep their substantive expressions within the accepted functions, do not guide themselves by deciding whether each lexical form denotes an object. Form-classes, like other linguistic phenomena, can be defined, not in terms of meaning, but only in terms of linguistic (that is, lexical or grammatical) features.

**16. 3.** The form-class of a lexical form is determined for the speakers (and consequently for the relevant description of a language) by the structure and constituents of the form, by the inclusion of a special constituent (a *marker*), or by the identity of the form itself.

(1) A complex form is usually assigned to a form-class by its structure and constituents. An endocentric phrase, for instance, such as *fresh milk*, belongs to the same form-class as its head or center (§ 12.10). An exocentric phrase, such as *in the house*, contains some characteristic constituent (as, in our example, the preposition *in*) which determines its form-class. Thus, the form-class of a phrase is usually determined, at bottom, by the form-class of one or more of the included words. For this reason the speaker (and the grammarian) need not deal separately with each phrase; the form-class of almost any phrase is known if we know the syntactic constructions and the form-classes of words. The form-classes of words are therefore fundamental for syntax. Our school grammar recognizes this: it tries, by a mistaken method, to be sure, to determine the form-classes of words, particularly the most inclusive of these form-classes (*parts of speech*), and then shows how phrases are constructed.

(2) Sometimes the function of a phrase is determined by some special constituent, a *marker*. For instance, in English, a phrase consisting of the preposition *to* and an infinitive expression, belongs to the special form-class of *marked infinitive phrases*, whose function differs from that of unmarked infinitive expressions, since they serve as actors (*to scold the boys was foolish*) and as attributes of nouns, verbs, and adjectives (*a chance to go; he hopes to go; glad to go*). The determining adjectives form noun phrases which are distinguished by closure: *this fresh milk* cannot take adjective modifiers as can *fresh milk* or *milk* (§ 12.10). Whenever a form-class of small extent determines a peculiar function in phrases, we may
regard its forms as markers. Thus, our determining adjectives, our prepositions, our co-ordinating conjunctions, and our subordinating conjunctions, may be viewed as markers; they are small form-classes, and the presence of any of their forms in a phrase determines something about the form-class of this phrase. Other examples of markers are the particles of Chinese or Tagalog (§ 12.13).

(3) Finally, lexical forms may belong arbitrarily or irregularly to a form-class that is indicated neither by their structure nor by a marker. For instance, the phrase in case has the structure of preposition plus substantive and yet serves as a subordinating conjunction: In case he isn't there, don't wait for him. The phrases this way, that way, the other way, the same way have substantive structure, but are used as verb-modifiers of the special sub-class (manner) that has the interrogative substitute how? Similarly, quite a few English nouns and noun phrases serve as verb-modifiers in the when? class, either alone or in phrases: Sunday, last winter, tomorrow morning. The form-classes of English words are largely arbitrary: there is nothing to tell us that man, boy, lad, son, father are male nouns, that run, bother are verbs, that sad, red, green are adjectives, and so on. In particular, of course, the form-class of every morpheme is arbitrarily determined. A complete description of a language will list every form whose function is not determined either by structure or by a marker; it will include, accordingly, a lexicon, or list of morphemes, which indicates the form-class of each morpheme, as well as lists of all complex forms whose function is in any way irregular.

16.4. Form-classes are not mutually exclusive, but cross each other and overlap and are included one within the other, and so on. Thus, in English, the nominative expressions (which serve as actors) include both substantives and marked infinitives (to scold the boys would be foolish). On the other hand, among the substantives are some pronoun-forms which, by over-differentiation, do not serve as actors: me, us, him, her, them, whom. One group of substantives, the gerunds (scolding), belongs to a form-class with infinitives and with other verb-forms, in serving as head for certain types of modifiers, such as a goal (scolding the boys). For this reason a system of parts of speech in a language like English cannot be set up in any fully satisfactory way: our list of parts of speech will depend upon which functions we take to be the most important.
One can often distinguish, however, between great form-classes like the above, and petty form-classes like that of foot, goose, tooth or of ox (with irregular plural-forms). Large form-classes which completely subdivide either the whole lexicon or some important form-class into form-classes of approximately equal size, are called categories. Thus, the English parts of speech (substantive, verb, adjective, and so on) are categories of our language. So are singular and plural substantives, since these two form-classes, of approximately equal size, completely subdivide the form-class of substantives. In general, inflectional forms, what with the parallel occurrence in every paradigm, represent categories — for instance, the various forms of the verb-paradigm, including the congruence-forms of finite verbs (am : is : are or was : were) and, crossing these, the tenses and modes of finite verbs (he is : he was : he were).

Not all categories, however, are inflectional. The selection of the pronouns he versus she divides our personal nouns into the categories of male and female; yet there is no inflection or regular derivation to distinguish these, but only a sporadic use of markers (count : countess, Paul : Pauline, Albert : Alberta) or of entirely irregular derivation (duck : drake, goose : gander) or of composition (he-goat, billy-goat, bull-buffalo) or suppletion (son : daughter, ram : ewe) or merely class-cleavage (a teacher . . . he; a teacher . . . she; Francis : Frances).

Again, some categories are syntactic, and appear not in inflection, but in phrases. Such are the categories of indefinite and definite substantives (a book : the book), or, in our verbs, the aspects (wrote : was writing), completion (wrote : had written), or voice (wrote : was written).

The categories of a language, especially those which affect morphology (book : books, he : she), are so pervasive that anyone who reflects upon his language at all, is sure to notice them. In the ordinary case, this person, knowing only his native language, or perhaps some others closely akin to it, may mistake his categories for universal forms of speech, or of "human thought," or of the universe itself. This is why a good deal of what passes for "logic" or "metaphysics" is merely an incompetent restating of the chief categories of the philosopher's language. A task for linguists of the future will be to compare the categories of different languages and see what features are universal or at least widespread. Thus, a form-class comparable to our substantive expressions, with a
class-meaning something like 'object,' seems to exist everywhere, though in many languages it is not an arbitrary class, like our substantive part of speech, but depends largely upon the presence of markers, as in Malayan or Chinese (§ 12.13).

16.5. Our knowledge of the practical world may show that some linguistic categories agree with classes of real things. It may be, for instance, that our non-linguistic world consists of objects, actions, qualities, manners, and relations, comparable with the substantives, verbs, adjectives, adverbs, and prepositions of our language. In this case it would still be true, however, that many other languages do not recognize these classes in their part-of-speech system. Moreover, we should still have to determine the English parts of speech not by their correspondence with different aspects of the practical world, but merely by their functions in English syntax.

This appears plainly in the circumstance that languages with an elaborate part-of-speech system always contain abstract forms; they have parallel forms with the same lexical meaning for use in different syntactic positions. Thus, a verb like run or an adjective like smooth cannot serve as an actor, but we have for this function the abstract noun forms run (as in the run will warm you up) and smoothness. It is an error to suppose that abstract forms like these occur only in the languages of literate peoples; they occur in all languages that limit different form-classes to different syntactic positions.

Linguistic categories, then, cannot be defined in philosophical terms; having defined them in formal terms, we may have great difficulty in describing their meaning. To show this, we need only glance at some of the more familiar categories.

Number, as it appears in our singulars and plurals, seems to be close to some universal trait of human response; yet, cases like oats versus wheat, or Epsom salts versus table salt, seem to have little non-linguistic justification.

The categories of gender in English are close to our non-linguistic recognition of personality and sex, but even here some animals (the bull . . . he or it) and other things (the good ship . . . she or it) are variously treated. The gender-categories of most Indo-European languages, such as the two of French or the three of German (§ 12.7), do not agree with anything in the practical world, and this is true of most such classes. In the Algonquian languages,
all persons and animals belong to one category, an 'animate' gender, but so do some other objects, such as 'raspberry,' 'kettle,' and 'knee'; all other objects (including, for instance, 'strawberry,' 'bowl,' 'elbow') belong to the other, 'inanimate' gender. Some of the Bantu languages run up to as high as twenty such classes; distinctions of number, however, are merged with the gender-classification.

Case-categories, ranging from two, as in English (he : him), up to twenty or so, as in Finnish, resemble various situations of the practical world, but never with any consistency. Thus, in German, the goal of a verb is in the accusative case, as in er bat mich [e:r 'ba:t mix] 'he asked me (for something),' but certain verbs have it in the dative case, as er dankte mir [e:r 'dankte mi:r] 'he thanked me'; compare the Latin examples in § 12.8.

The categories of tense have a surface rationality, especially in a language like Latin, which distinguishes present (cantat 'he sings'), past (cantavit 'he sang'), and future (cantabit 'he will sing'), but even here one soon finds that these categories disagree with our non-linguistic analysis: the "historical present" is used in Latin, as in English, of past events, and the meanings of the Latin tense-forms are mixed up with considerations other than relative time.

The English categories of aspect distinguish between 'punctual' action (some grammarians call it 'perfective'), envisaged as a unit (he wrote the letter), and 'durative' action (some call it 'imperfective'), which extends over a segment of time during which other things can happen (he was writing the letter). This distinction is at best hard to define for the practical world, and in English suffers marked dislocations; some verbs, for instance, appear persistently in punctual form (I think he is there; he is funny) and are durative only in special constructions or meanings (I am thinking of him; he is being funny). In Russian, which has much the same aspects as English, certain verbs, such as 'eat' and 'drink,' appear persistently in durative form.

A common verb-category that is lacking in English, is iteration, which distinguishes between an action occurring once and a repeated action, as, in Russian [on be'jl do'moj] 'he was running home' (on one particular occasion) and [on 'begal do'moj] 'he ran home; he was running home' (repeatedly, e.g. every day). 1

1 In English, iteration plays no part in the verb-form: he played tennis every day (punctual) and he was playing tennis every day (durative) are like he played a set of
Perfection contrasts contemporary, 'imperfectic' action with 'perfectic' action, whose effect is contemporary: he writes versus he has written; he is writing versus he has been writing; he wrote versus he had written; he was writing versus he had been writing. The difference is scarcely definable in terms of practical situation, and different languages show different distributions.

English has many modes, distinguishing various approaches of an action to its actual occurrence. Morphologically, English distinguishes between 'real' (he is here) and 'unreal' (if he were here); syntactically, English recognizes a whole series by the peculiarity of certain irregular ('auxiliary') verbs which are followed by an infinitive without to: he will write, shall write, can write, must write, may write. We may observe that in these combinations the infinitive is rather persistently punctual, and only now and then durative (I shall be writing); in Russian, the future tense, which corresponds fairly well to our shall and will phrases, distinguishes aspect just as exactly as do the present and past tenses. The uses of different modes are tied up in many languages with differences of syntactic position and congruence. In English, for instance, the unreal appears only in clauses introduced by if or though, or in combination with the phrasal mode-forms (he would help us, unreal of he will help us). Similar complications appear in the uses of the various modes of other languages, as, in French, je pense qu'il vient [3ə pəs k i vjɛ] 'I think he is coming,' with the verb of the clause in the 'indicative' (actual) mode, but je ne pense pas qu'il vienne [3ə n pəs pa k i vjen] 'I don't think he is coming,' with the verb of the clause in the 'subjunctive' (possible) mode.

16.6. We saw in § 16.3 that the function of some forms is determined by their constituents or their construction. Any function that is so determined is said to be regular, and a function which is not so determined is said to be irregular. Thus, if we know that the words fox and ox are singular common nouns, wavering between non-personal and male personal gender, then we can say that fox has the regular function of combining with the plural-suffix [-iz] in the form foxes (since this function is shared by an unlimited number of singular nouns), but that ox has the irregular tennis (punctual) and he was playing a set of tennis (durative). In Latin, French, and modern Greek, repeated action and durative action are merged in one class: French il écrivait [il ekrive] is both 'he was writing' and 'he wrote (repeatedly); he used to write.' In Russian, repeated actions are classed as durative, but, within the durative class, are distinct, at least for certain verbs, from single actions.
function of combining with the plural-suffix [-ŋ]. Linguists usually apply the terms regular and irregular to the form itself, saying, for instance, that the noun fox is regular and the noun ox irregular; we must specify, of course, the function with respect to which these terms hold good, since in their other functions the nouns fox and ox are quite alike. By another extension of these terms, linguists apply them also to the resultant forms in which the functions appear, saying, for instance, that the plural noun foxes is regular and the plural noun oxen irregular.

The speaker can use a form in a regular function even when he has never heard the resultant form: he may utter a form like foxes, for instance, even when he has never heard this particular plural. He can use a form in an irregular function only if he has heard it used in this function: the form oxen is uttered only by speakers who have heard it from other speakers. In the description of a language, accordingly, regular functions are stated for whole form-classes, in the mass: we can state the regular plural-formation of English nouns without attempting to list all the nouns in the language. Irregular functions, on the other hand, force us to list all the forms of the class: we have to mention the noun ox as taking -era in the plural, and the nouns foot, tooth, goose as taking substitution of [ij] in the plural, and so on.

If we insist on this distinction, we may say that any form which a speaker can utter without having heard it, is regular in its immediate constitution and embodies regular functions of its constituents, and any form which a speaker can utter only after he has heard it from other speakers, is irregular. Strictly speaking, then, every morpheme of a language is an irregularity, since the speaker can use it only after hearing it used, and the reader of a linguistic description can know of its existence only if it is listed for him. The lexicon is really an appendix of the grammar, a list of basic irregularities. This is all the more evident if meanings are taken into consideration, since the meaning of each morpheme belongs to it by an arbitrary tradition. In a language like English, where each morpheme is arbitrarily assigned to some grammatical class, this feature also is an irregularity: the speaker must learn from experience and the describer must list the fact that pin is a noun, spin a verb, thin an adjective, in a preposition, and so on. This task also is customarily assigned to the lexicon; the grammar lists only the kinds of irregularity that are not present in all
the morphemes of a language, and the terms regular and irregular are used only of features that appear in the grammar.

If we make this restriction, it is obvious that most speech-forms are regular, in the sense that the speaker who knows the constituents and the grammatical pattern, can utter them without ever having heard them; moreover, the observer cannot hope to list them, since the possibilities of combination are practically infinite. For instance, the classes of nominative expressions and finite verb expressions in English are so large that many possible actor-action forms — say, a red-headed plumber bought five oranges — may never before have been uttered; by the same token, however, we cannot be sure that this is true of any particular combination which we may chance to hear. A grammatical pattern (sentence-type, construction, or substitution) is often called an analogy. A regular analogy permits a speaker to utter speech-forms which he has not heard; we say that he utters them on the analogy of similar forms which he has heard.

An irregular analogy, on the other hand, may cover a number of forms, but a speaker will rarely utter a new form on the analogy of those which he has heard. For instance, the phrases at least, at most, at best, at worst, at first, at last are built up on the same pattern (at plus adjective in -st), but the analogy is limited to a very few forms. In at all (where the adjective does not end in -st and the sandhi is irregular) or in don't we have a unique analogy. When the automobile came into use, one speaker was as well able as another to form the compound automobile-driver, on the analogy of cab-driver, truck-driver, and so on; a compound like cranberry, on the other hand, with its unique first member, is uttered only by speakers who have heard it. If we take meanings into consideration, we can say the same of a speaker who uses the term blackbird of the species of bird to which it customarily applies, for the compound bears this meaning by an arbitrary tradition. A form like charlestoner ‘one who performs the dance called charleston’ is formed on the regular analogy of dancer, waltzer, two-stepper, and so on; a form like duchess (§ 10.6) is unique. On the border-line we have cases like the feminines in -ess, which on the whole are limited to traditional forms: we say poetess, sculptress, but not *paintress; occasionally, however, a speaker will extend this analogy, uttering such forms as, say, profiteeress, swindleress. Even our root-forming morphemes (§ 14.9) have some flexibility; hear-
ing a form like *squunch* in a meaning 'step with suction-noise on wet ground,' we cannot tell whether the speaker has heard it or is using the analogy of [skw-], as in *squirt, squash,* and [-*ʌŋ], as in *crunch.*

The regular analogies of a language are habits of substitution. Suppose, for instance, that a speaker had never heard the form *give Annie the orange,* but that he had heard or spoken a set of forms like the following:

*Baby is hungry. Poor Baby! Baby's orange. Give Baby the orange! Papa is hungry. Poor Papa! Papa's orange. Give Papa the orange! Bill is hungry. Poor Bill! Bill's orange. Give Bill the orange! Annie is hungry. Poor Annie! Annie's orange. ................*

He has the habit, now,—the analogy,—of using *Annie* in the same positions as *Baby, Papa, Bill,* and accordingly, in the proper situation, will utter the new form *Give Annie the orange!* When a speaker utters a complex form, we are in most cases unable to tell whether he has heard it before or has created it on the analogy of other forms. The utterance of a form on the analogy of other forms is like the solving of a proportional equation with an indefinitely large set of ratios on the left-hand side:

\[
\begin{align*}
\text{Baby is hungry} : \text{Annie is hungry} \\
\text{Poor Baby} : \text{Poor Annie} \\
\text{Baby's orange} : \text{Annie's orange}
\end{align*}
\]

\[= \text{Give Baby the orange} : x\]

or

\[
\begin{align*}
dog : \text{dogs} \\
pickle : \text{pickles} \\
potato : \text{potatoes} \\
piano : \text{pianos}
\end{align*}
\]

\[= \text{radio} : x\]

16.7. The power or wealth of a language consists of the morphemes and the tagmemes (sentence-types, constructions, and substitutions). The number of morphemes and tagmemes in any language runs well into the thousands. In every language, moreover, many complex forms carry specialized meanings which cannot figure in a purely linguistic description but are practically of great importance. The linguist can determine, for instance, that English compounds of the type *blackbird, bluebird, whitefish,* or phrases of the type *give out, fall out, throw up,* bear specialized meanings, but he cannot evaluate these meanings, although in practical life they are fully as useful as any sememe.
Popularly, the wealth of a language is supposed to depend upon the number of different words which it uses, but this number is indeterminate, since words are freely formed according to the analogies of morphologic construction. For instance, having counted *play*, *player*, and *dance*, shall we count *dancer* as a fourth word, even though it contains no additional glosseme? If so, then the number of words in any language is practically infinite. When we are told that Shakspere used 20,000 different words in his writings, and Milton in his poems some 8,000, we mistakenly conclude that less eloquent speakers use far fewer. It is an indication of Shakspere's genius that he used so many different words in so small a volume of speech as is contained in his works, but this volume of speech is small compared to the amount which even a taciturn person will utter in the course of a year. The myths about peasants, workingmen, or savages who use only a few hundred words have no foundation in fact; in so far as one can count words (ignoring, for instance, the inflected forms of a language like ours), every adult speaker uses at least somewhere round 20,000 to 30,000 words; if he is educated — that is, if he knows technical and learned words — he uses many more. Everyone, moreover, understands more words than he uses.

The relative frequency of the various lexical and grammatical units (morphemes and tagmemes) in a language can be studied wherever we have copious records of normal utterances. In the next chapters we shall see that our lack of such records is one of the impediments to the historical study of language — for fluctuations in the frequency of glossemes play an important part in the changes that occur in every language.

The frequency of most lexical forms is doubtless subject to a great deal of superficial fluctuation, according to the practical circumstances. A word like *thimble*, say, or *stove*, might not occur at all in long stretches of speech; yet such forms as these are used by everyone when the occasion presents itself. The most frequent forms, on the other hand, both lexical and, especially, grammatical, are constantly demanded by the structure of the language. Such counting as has been done has been confined to words. It is found that the commonest words (*the*, *to*, *is*, etc.) make up a consistently high percentage of what is spoken.

16.8. The practical question as to what things can be said in different languages, is often confused with questions of word-
meanings and of categories. One language will use a phrase where another uses a single word and still another a bound form. A meaning that is categoric in one language (as, for instance, plurality of objects in English) may appear only under particular practical stimuli in another language. As to denotation, whatever can be said in one language can doubtless be said in any other: the difference will concern only the structure of the forms, and their connotation. What one language expresses by a single morpheme will in another language require perhaps a long phrase; what one language says in a word may appear in another language as a phrase or as an affix. Elements of meaning that appear in one language because they belong to some category, even though they are irrelevant to the practical situation, will be absent in another language. In English we say *Pike’s Peak is high* with a present-tense verb; in Chinese or in Russian there would be no present-tense element in a similar message.

It is a striking fact that the smallest units of signaling, the glossemes, of different languages, differ vastly in practical value. This is true even of closely related languages. Where we say *ride*, German says *reiten* ['rajten] for riding on an animal,* but *fahren* ['fa:ren] for other kinds of riding, as in a vehicle. Where we say *on*, German says *auf* when the force of gravity helps the contact, as in ‘on the table,’ but otherwise *an*, as in ‘on the wall.’ Our *morning* matches the French *matin* [matɛ], except when the morning is viewed as a segment of time during which something else can happen, as in ‘I slept all morning’ or ‘during the morning’; in this case French uses a derivative *matinée* [matine]. Even things which are easily defined and classified, receive the most diverse treatment in different languages. Nothing could be more definite than terms for simple biological relationship between persons. Yet, beside words corresponding to our *brother* and *sister*, German has a plural *Geschwister* [ge'vister] that includes both sexes, as in *Wieviele Geschwister haben Sie?* [vi: 'fi:le ge'vister 'ha:ben zi:?] ‘How many brothers and (or) sisters have you?’ Some languages have here one word, regardless of gender, as Tagalog [kapa'tid]; our *brother* corresponds to a Tagalog phrase [kapa'tid na la'la:ki], where the last word means ‘male,’ and our *sister* to [kapa'tid na ba'ba:ji], with the attribute ‘female.’ On the other hand, some languages insist upon relative age: Chinese [*'ko1 ko1*] ‘elder brother,’ [*'tʃjuŋ1 ti4*] ‘younger brother,’ [*'tʃje3 'tʃje3*] ‘elder sister,’
"mej4 mej4" 'younger sister.' An even more complicated terminology appears in Menomini, which we can best elucidate if we use the term sibling to mean 'brother or sister.' In Menomini the terms are [ne?neh] 'my elder brother,' [neme:h] 'my elder sister,' [nehse:h] 'my younger sibling,' [nel-?i:semaw] 'my sibling of opposite sex' (i.e. 'my brother' when a woman says it, 'my sister' when a man says it), [ne:hkah] 'my brother (man speaking),' [ne:teke:h] 'my sister (woman speaking).' The general term [ni:tesjanak] 'my siblings' is used in the plural when the siblings are of both sexes and not all younger than the possessor.

Terms of relationship not only vary as in the above examples, but also are used in situations that one cannot define. The Menomini terms for 'brother' and 'sister' are used also for cousins, provided the related parents are of the same sex: a man says [ne:hkah] of his father's brother's son, and so on. Moreover, these and some other terms are inherited: my father's brother's son's son is also [ne:hkah]. Consequently, the meaning really hinges on the consistency with which these relationships are remembered and recognized.

In the same way, plant-names, for example, are perhaps nowhere used in a way that would be consistent with a botanist's classification — even aside from such vague terms as tree, shrub, bush, herb, reed, grass.

Even in such a sphere as that of the numbers, languages show many deviations. Our system of decimal numbers (twenty-two, thirty-five, etc.) shows traces of a duodecimal or twelves system (eleven, twelve instead of *one-teen, *two-teen). Other irregularities are formal, as two : twenty : second : half, or three : thirteen, thirty, third. Furthermore, the connotation of certain numbers like three, seven, thirteen, and of additional terms like dozen, score, gross, cannot be stated mathematically. In Danish there is an admixture of a vigesimal or twenties system. In French one counts from 'sixty' to 'seventy-nine' without a special word for the intervening multiple of ten: 'seventy' is soixante-dix [swasât-dis] 'sixty-ten'; 'seventy-one' is soixante et onze [swasât e 6z] 'sixty and eleven,' and so on; 'eighty' is quatre-vingt [katra vœ] 'four-twenties,' and then one counts up twenty more to reach one-hundred; thus, 'ninety-two' is quatre-vingt douze [katra vœ du:z] 'four-twenties-twelve.' Peoples who have little use for higher numbers may use very few: the Kham Bushmen are said to count by simple
numbers only to 'three,' and to use 'two and two' for 'four,' and so on.

In other spheres which are subject to scientific analysis, this may still provide no gauge for the linguistic classification. Color, for instance, is a matter of frequency of refracted or reflected light-waves. The visible spectrum is an unbroken scale of frequencies. Different languages use different color-names (such as our red, orange, yellow, green, blue, violet, § 9.1) for different parts of this scale. We should have a hard time deciding at what points on the actual scale the domain of each English color-name begins and ends. If we showed people colors in minute grades of variety, we should find that between the frequencies which were named consistently, say, as yellow and as green, there would be a border-zone, where the naming wavered. If we went outside the European culture-sphere, we should find entirely different distributions.

For most of our meanings we have not even this approach to an external standard. Terms which relate to social behavior, such as love, friend, kind, hate could be defined in terms of ethnology, folklore, and sociology, provided these studies had reached a perfection and accuracy undreamed of today. Terms which relate to states of the speaker's body that are perceptible only to him, such as queasy, qualmish, sad, gay, glad, happy, could be defined only if we had a minute knowledge of what goes on inside a living person's body. Even all this would not suffice for linguistic meanings that have less practical bearing, such as categories of noun-gender or verbal aspect. There seems to be no practical criterion by which the gender of a noun in German, French, or Latin could be determined: to define the meaning of the episememe 'masculine' in such a language would be simply to list the markers of masculine nouns and the nouns that belong arbitrarily to the class, and to say that whatever is common, in the practical world, to all these objects, is the "meaning" of the masculine gender-category. The same is true of the verbal aspects of English: the difference between wrote and was writing is so elusive and differs so much for different verbs and in different phrases, that the definer, after stating the main principles, cannot do better than to resort to a demonstration by means of examples.