The Development of Phonemic Theory

by

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Introduction

In modern linguistics the term "phoneme" attracted many students of linguistics, and much work was carried out on phonological aspects of language. The concept of the phoneme differs from one linguist to another, depending on his linguistic training or background. In this paper an attempt will be made to review briefly the development of the phonemic theory.

When we look back on the development of phonemic theory, we can divide it into three periods, each with its own characteristics. The first period covers the later 19th century and the early 20th century when phonemics was not yet an independent field in linguistics; the second period covers the 1920's and 1930's when various views and principles were formulated; and the third period covers the 1940's and 1950's when further discussion was carried on and a new approach was presented by Jakobson and his colleagues.

1. The first period

1.1. According to J. R. Firth the term "phoneme" was first employed as distinct from "phone" or "sound-speech" by Kruszewski, one of Baudouin de Courtenay's students, in 1879. But the term had not been in great use until, later, the so-called Prague school and British linguists adopted it in their works. Although phonemic theory had not yet taken shape, the idea was "implicit in the work of all phoneticians and orthographists who employed broad transcription."[1] In particular, the distinction between "broad" and "narrow" transcription employed by Henry Sweet in his *Handbook of Phonetics* (1877), and International Phonetic Alphabet in 1888, made use of the idea; namely, those sounds which may correspond to differences of meaning must be distinguished from all other differences which are not significant and cannot alter meaning.[2]

1.2. Baudouin de Courtenay is said to have been the first person that established a definition of "phoneme." He distinguished two kinds of phonetics, "physio-phonetics" and "psycho-phonetics," the former to denote the study of sounds actually uttered, and the latter to denote the study of "mental images" which uttered sounds are intended to represent. Thus, to him, phonemes are "mental images or sounds" which the speaker aims at.[3]

De Saussure states in *Course in General Linguistics* (First Original Edition

1915) that "a phoneme is the sum of the auditory impression and articulatory movements, the unit heard and spoken, each conditioning the other."[4] "Auditory impressions," he says, "exist unconsciously before phonological units are studied."[5]

In England, although the term "phoneme" was known to phoneticians round about 1916, it did not become current in books for some little while. The theory was in the process of being clarified, and the terminology was not complete yet.[6]

It may be said that the conception of the phoneme in this period was formed from a "psychological" or "mental" point of view; that is, a phoneme is a single "abstract sound" or "sound image" which the speaker can bring to mind and manifest concretely when he speaks. This conception is represented by Baudouin, and the Prague school in its earlier stage.

2. The second period

2.1. In the 1920's and 1930's linguists appeared with various views of the phoneme. This period may be regarded as the one when most substantial arguments in the phonemic principles were carried out. We may classify those various viewpoints roughly into four groups: (1) those that regard the phoneme as a mental reality, (2) those that regard it as a physical reality, (3) those that regard it as a fiction, and (4) those that regard it as a function.

2.2. In the United States, Edward Sapir had a mentalistic view of the phoneme. In 1925, Sapir wrote an article titled "Sound Patterns in Language," which is often referred to as the one which marks the beginning of the recent structural approach to linguistics in the United States. In this article he uses the term "fundamental sound (point of the pattern)," which must mean phonemes regarded mentalistically. He says that these sounds are more real to the native speaker of the language than the objective sounds.[7] He stresses the psychological point of view as follows:

> Each member of this system is not only characterized by a distinctive and slightly variable articulation and acoustic image, but also--and this crucial--by a psychological aloofness from all other members of the system.[8]

He also says that "a complex psychology of association and pattern is implicit in the utterance of the simplest consonant or vowel."[9] And again,

> A place is intuitively found for a sound (which is here thought of as a true "point of the pattern," not a mere conditional variant) in such a system because of a general feeling of its phonetic relationship resulting from all the specific phonetic relationship (such as parallelism, contrast, combination, imperviousness to combination, and so on) to all other sounds.[10]

At the end of this article,

> The whole aim and spirit of this paper has been to show that phonetic phenomena are not physical phenomena *per se*, however necessary in the preliminary stages of inductive linguistic research it may be to get at the phonetic facts by way of their physical embodyment. The present discussion is really a special illustration of the necessity of getting behind the sense of data of any type of expression in order to grasp the intuitively felt and communicated forms which alone give significance to such expression.[11]

It is noteworthy that he considers morphological alternations such as *wife*: *wives, breath*: *to breathe*, and *mouse*: *to mouse* help to give the sounds *f*, *θ*, *s* an intuitive pattern relation to their voiced correlates *v*, *ð*, *z* which is specifically different from the theoretically analogous relation *p*, *t*, *k*: *b*, *d*, *g*.

In his later work, "*The Psychological Reality of Phonemes*," his definition of the phoneme seems to have been influenced by a functional view. He refers there to the phoneme as a "functionally significant unit in the rigidly defined pattern of configuration of sounds peculiar to a language."[12]

2.3. Meanwhile, Leonard Bloomfield established a phonemic principle stressing the physical reality of the phoneme. In "A Set of Postulates for the Science of Language" (1926),[13] he says,

> Def. A minimum same of vocal feature is a *phoneme* or *distinctive sound.*
> As, for instance, English [b, s, t], the English normal word-stress, the Chinese tones.

In *Language* (1933) he defines the phoneme as a "minimum unit of distinctive sound-features," [14] and says, "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." [15]

He has been called a physicalist since he admits that the phoneme-features are present in the sound-waves.

His introduction of "secondary phonemes" was to lead the American students to take a different way in dealing with the prosody from that of European tradition.

2.4. Daniel Jones is also a linguist who conceives the phoneme in terms of "physical reality." [16] In *The Phoneme*: *Its Nature and Use* (1950), he defines the phoneme as:

> a family of sounds in a language which are related in character and are used in such a way that no one member ever occurs in a word in the same phonetic context as any other member.[17]

And further he states that as a corollary to this "phonemes have a semantic function in languages," that is, "the differences between phonemes are 'significant,' i.e. capable of distinguishing one word from another." [18] According to Twaddell, Palmer expresses the same conception of the phoneme as D. Jones.[19]

2.5. In 1934, Morris Swadesh, one of Sapir's noted students, presented a paper titled "The Phonemic Principle," the earliest of this kind and an attempt necessarily made from his study of the phonemes of Chitimacha. His principle is:

> that there are in each language a limited number of elemental types of speech sounds, called phonemes, peculiar to that language; that all sounds produced in the employment of the given language are referrable to its set of phonemes; that only its own phonemes are at all significant in the given language.[20]

And he goes on:

> The phonemes of a language are, in a sense, percepts to the native speakers of the given language, who ordinarily hear speech entirely in terms of these percepts.[21]

Phonemes are, "perceptive units in the sense that the native can recognize as different, words different as to one of the component phonemes." [22] After discussing "free" and "conditional" variants, the norm of the phoneme, distribution, and phoneme classes, he sets up a set of criteria by which the phonemes of a language can be inductively discovered. They are: consisteney of words, partial identities, constant association, complementary distribution, pattern congruity and the test of substitution. This paper may be regarded as a starting point for the ensuing discussion of rigorous procedures in phonemics characteristic in the United States.

2.6. Following Swadesh's article, appeared Freeman Twadell's *On Defining the Phoneme* in 1935, in which he proposed a new concept of the phoneme. He rejected both "mental reality" and physical reality "of the phoneme explicitly stated by his predecessors. He rejects any "mental" definition, saying that "(1) we have no right to guess about the linguistic workings of an inaccessible mind, and (2) we can secure no advantage from such guesses. The linguistic processes of the mind as such are quite simply unobservable; and introspection about linguistic processes is notoriously a fire in a wooden stove." [23] In rejecting "physical" definitions of Bloomfield and Jones, he states that "the presence of 'phoneme-features' as positive entities in the sound-waves is not demonstratable, and there is no reason to believe that it will be." [24]

Rejecting any "reality" he regards the phoneme as an 'abstractional, fictitious unit.' And his new terms "micro-phoneme" and "macro-phoneme" are defined as follows:

> The relations among the members of a class of phonolongically minimally different forms are minimum phonological differences. The term of any minimum phonological difference among forms is called a *micro-phoneme*.[25]
>
> In articulatorily similarly ordered classes of forms, the differences (i. e. ordering) of the several classes are respectively similar. The micro-phonemes, as terms of these similar and one-to-one differences, are similarly ordered in classes. The sum of all similarly ordered terms (micro-phonemes) of similar minimum phonological differences among forms is called *macro-phoneme*.[26]

Therefore, when he speaks of a (macro-)phoneme he is using an abstraction to describe "the recurrence of similar phonological differentiations among the elements of a language." And he says:

> What occurs is not a phoneme, for the phoneme is defined as the term of a recurrent differential relation. What occurs is a phonetic fraction or a differentiated articulatory complex correlated to a micro-phoneme. A phoneme, accordingly, does not occur; it 'exists' in the somewhat peculiar sense of existence that a brother, qua brother, 'exists' as a term of a relation.[27]

And he compares the differentiated articulatory complex to a fraction of 'la parole' and the phoneme to a term of those relations which comprise the system of 'la langue,' a distinction proposed by de Saussure.

2.7. In Europe, in 1928, druing the first International Congress of Linguistics at the Hague, a proposition was submitted by N. Trubetzkoy, R. Jakobson, and S. Karcevsdy, which aimed at laying the foundations of phonemics as an independent branch of linguistics, thus forming the starting point of much of phonemic work carried on by the so-called Prague school.[28]

In 1929 the Cercle Linguistique de Prague defined the phoneme as "image acoustico-motrices," that is, they took a mentalistic viewpoint of the phoneme. But in 1931 they shifted emphasis to a functional characterization.[29]

2.8. Trubetzkoy was the first to establish a systematic study of the phoneme on the basis of de Saussure's distinction between "parole" and "langue." He says, in *Principles of Phonology* (translated from *Grundzüge der Phonologie* 1939), as follows:

> The phoneme can be defined satisfactorily neither on the basis of its psychological nature nor on the basis of its relation to the phonetic variants, but purely and solely on the basis of its function in the system of language. Whether it is considered as the smallest distinctive unit (L. Bloomfield) or as "Lautmal am wortkorper" (vocal mark on the body of the word) (K.

Bühler), the result is the same: every language presupposes distinctive (phonological) oppositions. The phoneme is a member of such an opposition that cannot be analyzed into still smaller distinctive (phonological) units.[30]

Then he states four rules for the determination of phonemes:

Rule Ⅰ.—Two sounds of a given language are merely optional phonetic variants of a single phoneme if they occur in exactly same environment and are interchangeable without a change in the lexical meaning of the word.

Rule Ⅱ.—If two sounds occur in exactly the same position and cannot be interchangeable without a change in the meaning of the words or without rendering the word unrecognizable, the two sounds are phonetic realizations of two different phonemes.

Rule Ⅲ.—If two sounds of a given language, related acoustically or articulatorily, never occur in the same environment, they are to be considered combinatory variants of the same phoeneme.

Rule Ⅵ.—Two sounds that otherwise meet the conditons of Rule Ⅲ can still not be regarded as variants of the same phoneme if, in a given language, they can occur next to each other, that is, if they are part of a sound sequence in those positions where one of the sounds also occurs in isolation.[31]

The first three rules correspond to those in general use in the United States, namely, free-variation, minimal pair contrast and complementary distribution.

Although a high degree of similarity in setting up the rules for identification of phonemes exists in the Prague and American schools of linguistics, there is one concept which is in much use in the Prague school but not in the American school. That is "neutralization of oppositions," and it is considered one of the basic principles of the theory of phonemic system by Trubetzkoy. "In those positions in which a neutralizable opposition is actually neutralized, the specific marks of an opposition member lose their distinctive force, and only those features which are common to both opposition members remain relevant, one member of the opposition thus becoming the representative of the "archiphoneme" of the respective opposition in the position."[32] Later, the concept of neutralization is to be utilized in describing the phonological component in the transformational generative grammar.

3. The third period

3.1. In 1942, Charles F. Hockett presented "A System of Descriptive Phonology" and brought the concept of phonemics based essentially on Bloomfield's work to its logical conclusion, at the same time trying to integrate the works by Sapir,

Trubetzkoy, and their followers. Having defined α-phonetics (in which physiological and acoustic procedures are used in analysis) and β-phonetics (in which distinctive features are concerned), he says that "phonemics is the analysis of β-phonetic material into phones and classification of the phones into phomemes."[33] Then he states that a phoneme is a class of phones determined by six criteria : similarlity, non-intersection, contrastive and complementary distribution, pattern congruity and economy. At the end of this article, he rejects mentalism and circularity, stating that since phonological analysis is assumed for grammatical analysis no part of the latter may be assumed.[34] This article, later, leads Pike to present "Grammatical Prerequisites to Phonemic Analysis" (1947), where he says that "if a language structure is to be described realistically, the interweaving of grammatical and phonemic facts must not be ignored."[35] And also, "A language system represents a structural whole which one cannot compartmentalize mechanically without doing violence to the facts."[36]

And it was by B. Bloch and in his article "A Set of Postulates for Phonemic Analysis" (1949) that methodological specifications in phonemic analysis were further set forth in essentially Bloomfield's line.

3.2. In the 1940's a lot of American linguists worked on stress, pitch, juncture, and intonation, trying to determine the phonemic status of these features, and they showed much interest in describing actual languages according to the principles formulated so far. It was also during this period that linguists began to study morphological aspects in the description of language, and this was a natural path they should take after completing phonemic description.

3.3. Meanwhile the study of distinctive features of the phonemes of the languages among the linguists in the Prague school led them to specify those features by using acoustic phonetics. Roman Jakobson, in the United States, worked on the distinctive feature analysis with C. Gunnar M. Fant and Morris Halle and presented *Preliminaries to Speech Analysis, The Distinctive Features and their Correlates* in 1951. According to Jakobson and Halle, phonemes are "bundles of concurrent features, ultimate components capable of differentiating morphemes from each other," and each of the distinctive features involves a choice between two terms of an opposition that displays a specific differential property, diverging from the properties of all other oppositions.[37] Discussing the nature of the relation between phonological (phonemic) entities and sound, they accept Bloomfield's conception that the phonemes are not sounds but merely sound features lumped together which the speakers have been trained to produce and recognize in the current of speech sounds.

They say,

> The speaker has learned to make sound-producing movements in such a way that the distinctive features are present in the sound-waves, and the listener has learned to extract them from these waves. This so-to-speak inner,

immanent approach, which locates the distinctive features and their bundles within the speech sounds, be it on their motor, acoustical or auditory level, is the most appropriate premise for phonemic operations, although it had been repeatedly contested by outer appoaches which in different ways divorce phonemes from concrete sounds.[38]

Thus they reject the mentalist view that the phoneme is a sound imagined or intended, opposed to the emitted sound as a "psychophonetic" phenomenon to the "physiophonetic" fact; and the 'generic' view that the phoneme is a family or class of sounds related through a phonetic resemblance; and the fictionalist view that the phoneme is an abstractional, fictitious unit; and also the algebraic view represented by L. Hjelmslev (which has been precluded in this paper).

Then they list the inherent (as against prosodic) distinctive features which had been discovered in the languages of the world, which amount to twelve oppositions, out of which nine are sonority features, and three are tonality features.

4. Conclusion

We have seen briefly the varieties and changes of the phonemic concept during the past three-quarter century. The rise of the concept was not sudden or unexpected but had been in the mind of the linguists through their works for a long time. The mentalistic view can be attributed to the colse relationship between the human mind and the language; the physical view and also the fictitious view can be attributed to the aspiration for establishing linguistics as a science attestable by rigorous procedures, and the functional view, which affected sometimes the mentalistic, and sometimes physical view was a natural choice from the communicative function the language possesses.

The work done by Jakobson and his colleagues may be ragarded to have marked a great progress in that the features of speech-sounds, distinctive or redundant, could be demonstrated by the spectrographic devices and matched with articulatory or genetical descriptons so far in practice.

However, how to incorporate the phonemic concept in describing a language or languages would pose another problem in the linguistic work, and have to be reserved as another inquiry.

References

1. Firth, pp. 1-2
2. *Ibid.*
3. Jones, p. 213
4. Baskin, p. 40 (Saussure, 1916)
5. *Ibid.*, p. 38
6. Jones, p. 257
7. Mandelbaum, p. 37 (Sapir, 1925)
8. *Ibid.*, p. 35

9. *Ibid.*
10. *Ibid.*, p. 42
11. *Ibid.*, p. 45
12. *Ibid.*, p. 46 (Sapir, 1933)
13. Joos, *R. I. L.* p. 28
14. Bloomfield, 1933, p. 79
15. *Ibid.*, p. 80
16. Jones, 1950, p. 212
17. *Ibid.*, p. 10
18. *Ibid.*, p. 14
19. Joos, *R. I. L.*, p. 66
20. *Ibid.*, p. 32
21. *Ibid.*
22. *Ibid.*
23. *Ibid.*, p. 57
24. *Ibid.*, p. 63
25. *Ibid.*, p. 72
26. *Ibid.*, p. 73
27. *Ibid.*, p. 74
28. Cohen, p. 6
29. Joos, *R.I.L.* p. 60
30. Trubetzkoy, p. 41
31. *Ibid.*, pp. 46-50
32. *Ibid.*, pp. 78-79
33. Joos, *R. I. L.*, p. 100
34. *Ibid.*, p. 107
35. *Word*, Vol. 3. No. 3, p. 169
36. *Ibid.*, p. 170
37. Jakobson and Halle, 1955, pp. 4-5
38. *Ibid.*, p. 8

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