

ON THE IMPORTANCE OF THE PHONEMIC PRINCIPLE IN THE DESIGN OF AN ORTHOGRAPHY

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Introduction

IN A previous article in this journal (*Arctic* 12:203-13) the fundamental importance of the phonemic principle in the devising of a standard spelling for the Eskimo language spoken in Canada was referred to, but without elaborating its meaning and function. The main purpose of the present paper is to show the validity of this basic principle by giving a more detailed explanation of its role in language writing. This would be unnecessary if the creation of a system of writing concerned linguists only, since they generally agree that a phonemic description not only reveals the basic functional sound structure of the language in question but also acts as a practical orthography. However, though the linguist has a leading role to play, such a vast and complex project demands the attention of groups of people of widely diverse background and training, namely, administrators, missionaries, anthropologists, teachers, linguists, and native leaders. In the initial stages the main responsibility rests on the linguist who must act as architect and draw a master plan which can serve as a framework around which the contributions of all others can be consolidated. Therefore, the first step to be taken is to make a scientific analysis of the phonological or sound structure of the language in question and to establish on this basis a spelling that is simple, accurate, and efficient; in a word, economical. The purely scientific aspect of the question offers many problems in itself; however, because of the human factors involved, the successful realization of such a plan in a socio-political situation is far more difficult. A free exchange of views from all quarters is essential, and this can best be realized if there is a common understanding of the theoretical basis of the linguist's recommendations. What then is the phonemic principle?

The phonemic principle: definition and application

The phonemic principle can obviously not be understood without first defining the term phoneme. This, in turn, can best be explained if the concept of language as a structure or a hierarchy of structures is made clear at the outset. Structuralism is a point of view that revolutionized linguistic research and gave birth to linguistics as a science pursuing goals quite distinct from traditional philological studies. This movement began

some forty years ago with Ferdinand de Saussure's brilliant idea that language is a dual reality, which he termed *langue* and *parole*. To avoid certain misleading connotations of these two terms, they will be replaced by *code* and *message*, respectively, in what is to follow. For de Saussure, what is heard in every day speech is but the realization of a system of rules which exists in the mind of the speaker independently of the substance or content used to actualize them. This is the *code*, which can function, or better, which has a potential function, irrespective of the quality of its material units. For example, the code or rules of the game of chess would remain unchanged even if we replaced a set of ivory chessmen by small pyramids of different sizes, colours and substances. The modifications of various aspects of the code of languages in contact that are taking place for instance in bilingual Greenland show how one code can influence another without any reference to substance. The morphological and syntactic structures of the Greenlandic spoken by some bilingual natives bear the mark of certain rules of Danish morphology and syntax. A case in point: one of my Greenlandic informants, who is well educated in both his native language and Danish, gave two translations of the Danish sentence *du gaar ud ikke* "you do not go out", namely, *aníngilatit* and *ivdlit anivoq nâmik*. The first translation is the characteristic Eskimo word-sentence literally meaning "go out not you" whereas the second is essentially a Danish construction literally meaning "you go out not". Apparently this particular foreign construction first manifested itself about a generation ago and seems to be gaining ground.

What are the precise Danish structural elements in the sentence *ivdlit anivoq nâmik*? First, the personal pronoun *ivdlit* "you" normally only an emphatic form as in *ivdlit aníngilatit* "you, you do not go out", is simply a literal translation of the non-emphatic Danish pronoun *du* that would ordinarily be translated by the suffix *-tit* in such word-sentences as *aníngilatit*. The influence of the morphological and syntactic structures of Danish is illustrated by the change of nature and position of the suffix *-tit* "you" transformed to *ivdlit*, an independent word in pre-verbal position like the Danish personal pronoun *du* "you". Secondly, in standard Greenlandic, the suffix *-voq* of *anivoq* "he, she, it goes out" corresponds to the three pronouns. In the sentence in question this suffix has lost its pronominal meaning and consequently, *anivoq* plays a purely verbal role equivalent to the Danish verb *gaar ud* "go out". Furthermore, *anivoq* like *gaar ud* remains unchanged in the three persons singular and plural. Finally, the negative *nâmik* found only in pre-verbal position in standard Greenlandic, here follows the verb *anivoq* like the Danish negative *ikke* follows *gaar ud*.

Much the same story can be told in the realm of phonology or the structure of the basic functional sounds of the code. The Eskimo phoneme /j/ occurs only intervocally but under the pressure of English loanwords of high frequency such as *Jesus*, *Johnny*, *Jacobie*, etc., this rule of phonemic distribution is changing for the native pronounces /j/ (equivalent

phonetically to the *y* of English *yes*) at the beginning of such new words in his vocabulary.

These systems of rules or linguistic structures, namely, the phonemic structure (the nature and behaviour of phonemes or basic functional sounds), the morphological structure (the distribution of affixes, for example, such as *-ness* in English which can only occur at the end of words but in some words can be followed by a plural suffix) and the syntactic structure (the order of words in a sentence) constitute the three main structures of the code of a given language. The phonemic structure will be the only one of these dwelt on in the main body of this paper. As opposed to these structures or code is the *message* which is the MEANINGFUL expression of these structures in the concrete form of speech. The code, therefore, with its hierarchy of structures is a well-ordered system of rules with potential functions that have practical use only when a given set of phonemes known to more than one person are utilized for the purpose of communicating meaning. The code—the invisible reality of linguistic structures existing independently of substance and meaning—is acquired by all of us in the long process of learning our mother tongue by dint of constant repetition. Even the most unlettered are in possession of this hidden reality, for we all learn to speak before we learn to write. Illiterate people are still in the majority in the world today and even though they may not be able to give the enquirer a complete picture of the code they use, simply because they never felt the need to make a detailed analysis of it, they nevertheless use it effectively in every-day speech contrary to the opinion of many who think that a language cannot function adequately without a heavy dosage of formal bookish grammatical training. The code, which is passed on from generation to generation through the medium of the message (the meaningful content), is the invisible property of everybody before it becomes, in book form, the visible property of grammarians, school teachers, and other linguistic norm-makers.

For evidence that the various structures of the code exist independently of content one only needs to turn to Lewis Carroll's *Jabberwocky* with its profusion of nonsense words. Here are the first few lines:

*'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And the mome raths outgrabe.*

This is English and not Greek, although because of the nonsense words the meaning is rather obscure, if not completely lacking. Of course, had Carroll so chosen, he could have excluded all intelligible English words from this poem without affecting the code of the English language one iota. The immense popularity of this nonsense verse among English-speaking people proves its "Englishness", which consists of its following to the letter the rules of English phonemic, morphological, and syntactic structures. Had Carroll written, for example, *rbillig* and *vtose*, instead of *brillig* and *toves*, his English readers would have instinctively rebelled against such

phonological monstrosities for the simple reason that *rb* is inadmissible at the beginning of an English syllable and *vt* is impossible in all positions. The same applies on the levels of morphology and syntax. Had Carroll left out the *-s* suffix of *borogoves* most English speakers would feel slightly uncomfortable in reading and quoting *all mimsy were the borogove*, largely because in 99 per cent of cases a plural morpheme is expected at the end of the subject of the verb *were*, as in *so hot were the stoves* . . . It is true that the existence of *sheep*, *deer*, and *moose* and the other irregular plurals as *man/men* in some very small measure would lessen the doubt of the speaker in using the singular subject with *were* but this factor is negligible owing to the low frequency of these irregular forms. And finally, if the author of these lines had put the verb *did* immediately after *gyre* the nonsense value of the verse would have increased. In the same way, if the first *and* had come immediately after *toves* a similar non-English syntactic effect would have been obtained.

To summarize, it can be seen that the structuralist views language as a dual reality — the code and message — where order, system, and structure predominate, that is, where every piece fits into an ordered whole that in turn fits into a larger whole; in a word, where everything hangs together in place. In this connection it is pertinent to state the point of view of André Martinet, a leading structuralist: "The . . . fundamental aspect of the phonological discipline and those related to it, is the concept of language as a structure, or better as a structure of structures, in the sense that each of the linguistic elements is not conceived as autonomous, but as interdependent with other elements belonging to the same functional type, in such a way that language must not be viewed as a simple conglomerate of independent units whose nature and behaviour might be studied independently of that of their neighbours." (*Lingua* 1, p. 39. Translation mine.).

If the chief aim of language is to communicate meaning between individuals through the medium of vocal sounds, similarly the chief aim of a system of writing is to communicate meaning through the medium of visible symbols. Of course, the written text cannot be an exact copy of the infinite variety of sounds produced in speech, that is, in the message. On the contrary, it should as much as possible be a replica of a definite and limited number of basic functional sounds, that is, of the phonemic system of the language as it exists in a more or less ideal state in the mind or nervous system of the speaker. Linguists view the phoneme as an abstract entity existing on the level of the code, having the possibility of multiple realization in speech according to its immediate phonetic environment, the mood of the speaker, and the physiological make-up of his vocal organs. Laboratory experiments have demonstrated that the number of potential sounds in a language approaches infinity. With the application of the phonemic principle this complexity of non-functional sounds can be reduced to a small number of functional signals or phonemes (25 on the average) that make up the units of the phonemic structure of the code.

Not only is the speech of a given individual varied, uneven, and irregular but also, as sensitive measuring instruments show, every sound in his utterances is unique, even when he is repeating the same words. Fortunately, this complete chaos is more apparent than real, for it contains an ordered system of basic functional sounds or phonemes whose function is to distinguish meanings between words. For example, when *p* and *b* are opposed in similar phonetic environments in *pill* and *bill* it is evident that the meaning of these two English nouns is distinguished only by their initial sounds. Since these have a function they are called phonemes. Each phoneme has a fairly wide range of realization, the limits of which must not be exceeded without danger of ambiguity. A *p* which receives too much voice ceases to be a voiceless stop and becomes a *b*, that is, a voiced stop. Of course, if the voiced/voiceless opposition has no function in the sound system of a given language it means that the bilabial stop will double its range of realization. It will be heard sometimes as a voiced stop and at other times as a voiceless stop. At this point it might be well to mention that the term *phonetic* is used by structuralists to refer to speech sounds aside from their function. For example, the aspirated sound following the *p* of *pill* plays no role in distinguishing meanings in English. The term *phonemic* always refers to functional sounds such as the *p* and *b* in *pill* and *bill*. It is very important to note that these two bilabial stops — *p* and *b* — are not necessarily phonemes in other languages. In some Amerindian languages these two English phonemes are heard but do not have the function of distinguishing meanings between utterances. They occur in free variation, since their only distinctive feature — their voiceless/voiced opposition — is not relevant to keep meanings apart; in such a language it would not matter whether *pill* were pronounced *bill* or vice versa, since they would be merely variants of the one word with the same meaning. In certain languages *p* and *b* occur in complementary distribution or according to their phonetic environment. For instance, *p* would occur only before other voiceless sounds in such words as *ipfi*, *ipsa*, etc., and *b* only before voiced sounds in such expressions as *ibvi*, *ibza*, etc. In such a language *p* and *b* would not be phonemes, that is, separate sounds with distinct functions, but rather, they would be different members of the same family of sound or phoneme, which might be written either as *p* or *b* or any other symbol for that matter. These two sounds that vary according to their phonetic environment would be called allophones, because they do not oppose each other in the same phonetic context in the way they do in *pill* and *bill* in English. What would keep the meanings of *ipfi/ibvi* apart in such a language would be the /f/ and /v/ phonemes, which would have been observed to occur in functional opposition in other contexts such as in *afo/avo*, whereas *p* and *b* would never be found to oppose each other in similar environments in such non-existing pairs as *ipfi/ibfi* or *tapso/tabso*, for example.

The difference between phonemes and allophones can perhaps be more readily seen in examples taken from English. When an Englishman utters

spot and *pot* he is not at all aware that the *p* in each word is different. The *p* in both is a voiceless bilabial stop but the *p* of *spot* is unaspirated whereas the *p* of *pot* is aspirated, that is, it is accompanied by a slight puff of breath somewhat like the *h* sound of English in *help*. The difference in pronunciation of these two stops is not noticed by the native speaker because in the English phonemic system the distinctive feature of aspiration/non-aspiration does not exist to distinguish meanings as it does in the Cree Indian language, for example. Native speakers are not conscious of allophones but usually are of phonemes. It is the foreigner who is capable of spotting easily the allophones of another language when these happen to coincide in phonetic content with the functional sounds of his language. This happens automatically, much to his misfortune, for therein lies the root of the difficulties in learning a foreign language and reducing to writing a language which is not one's mother tongue.

To clarify this point further, it might be well to bring back to the reader's attention that in my last article in this journal I discussed at greater length the phenomena of over- and under-differentiation of phonemes as two of the major obstacles people face when languages are in contact. Each of us tends to interpret the phonemic and other structures of a foreign language according to his own. The Cree Indian learning English would automatically assume that the *p* of *spot* is different from the one in *pot*, in effect, that they are two different phonemes, simply because there is an aspirated *p* phoneme in Cree that stands distinct from an unaspirated *p* phoneme, thus distinguishing such pairs as *pukan* "a nut" from *puk'an* "separate." This is over-differentiation of phonemes, that is, attributing to a language more phonemes than it has in reality. On the other hand, an Eskimo learning English would tend to interpret such pairs of phonemes as *p/b* and *t/d* as being one and the same sound or phoneme respectively, because in his phonemic system only *p* and *t* exist as functional sounds and not their voiced counterparts. As a matter of fact, the voiced sounds *b* and *d* of English would escape his notice and he would pronounce *bill* as *pill* and *do* as *to* until such a time when the resulting ambiguities would oblige him to make an effort to the contrary. This is under-differentiation of phonemes, that is, attributing to a language fewer phonemes than it has in reality. Since writing, ideally speaking, should reflect exactly the phonemic structure of the language in question, the system of writing is bound to suffer when a language is reduced to writing by someone who has not fully or accurately grasped its phonemic reality through a lack of objectivity. The existing Eskimo orthographies all suffer in this way because those who designed them superimposed on the Eskimo phonemic structure certain features of their own phonemic system through the normal, automatic, and unconscious process of the over- and under-differentiation of phonemes when different linguistic structures come into contact. As a result, the phonemic reality of Eskimo was vitiated or, as one critic calls it, mutilated and disfigured. The ideal application of the phonemic principle in the design of a spelling system is that it should never have more symbols than the

number of phonemes found in the language being reduced to writing, that is, that there should be a one-to-one correspondence between the phonemes and their symbols. For example, the use of the five vowels — *a, e, i, o, u* — in almost all alphabetic spellings of the Eastern Eskimo dialect group, which has only three vocalic phonemes, warps the reality of the Eskimo phonemic system that alone should be portrayed in the writing.

Such words as *vitiated, mutilated, disfigured, and warped* used to describe the inadequate portrayal of the phonemic reality of Eskimo by the present spelling systems may seem strong but the point is crucial. Although certain exceptions to the phonemic principle of a practical nature may exist in a given language, it is nevertheless *de rigueur* to try to achieve in a system of writing the exact image of the phonemic structure of a given language, since they are but the two facets of the same entity or body of meaning that communicates itself by coming to life through the unruly speech continuum. The speech stream is made imperfect by the physical exigencies of the articulatory apparatus that must produce a series of diverse phonemes pressing hard one upon another, by the modifications of each phoneme by its immediate phonetic environment, by the physical condition of the speaker's vocal organs, and finally, even by his mood. The identity of the two facets just mentioned — the phonemic structure and the orthography — might be more easily visualized by comparing the free spontaneous speech utterance of a given individual with his reading the same utterance from a text written in a perfectly phonemic alphabet. In this case the spelling would be the exact image of the phonemic system of his language. Upon making a particular utterance such a person would be translating only imperfectly into audible sounds the inner, invisible, and efficient system of abstract signals (phonemes) that forms one of the structures of the code of his language. Upon reading the same passage written in an economical and efficient alphabet he would be performing exactly the same action as described above for ordinary speech, with one exception that in no way alters the identity of the two facets of the same reality. In spontaneous speech the utterance is the result of an inner and invisible process of arrangement of linguistic units, whereas in reading the arrangement is an outer and visible one that has already been materialized in print and is merely waiting for someone to breathe life into it. In other words, speech, whether prompted by the printed word or the inner processes of thought, is the same imperfect medium of realization of the more or less perfect code. More light can be thrown on this question in the words of Daniel Jones, the renowned British phonetician: "Viewed 'psychologically' a phoneme is a speech sound pictured in one's mind and 'aimed at' in the process of talking. The actual concrete sound (phone) employed in any particular speech-utterance may be pictured sound or it may be another sound having some affinity to it, its use being conditioned by some feature or features of the phonetic context. This was the view taken by BAUDOIN DE COURTENAY and his immediate followers. BENNI told me (about 1913) that they consequently recognized two kinds of

phonetics: one was called by them 'psychophonetics' and related to the pictured sounds; the other was called 'physiophonetics' and related to the concrete sounds actually uttered. Corresponding to these were two types of phonetic transcription: the 'psychophonic' (representing only phonemes) and the 'physiophonic' (representing sounds actually uttered)." (Suppl. to "Le maître phonétique", Int. Phon. Assoc. 1957, p. 7).

Broadly speaking the existing alphabetic spellings of Eskimo represent a "physiophonic transcription" or the sounds actually uttered or thought to be uttered according to the phonemic system of the mother tongue of the designer of the orthography. Everyone who has ever attempted to speak a foreign language knows the difficulty of articulating new phonemes, that is, sounds that do not exist in his mother tongue. The problems that the two *th* phonemes of English as in *thin* and *this* create for non-natives learning English who do not have these phonemes in their language is proverbial. When a French-Canadian pronounces *thank you* as *tank you*, it is because he reproduces the phoneme of his mother tongue which is nearest in sound and point of articulation to the new phoneme; the French /t/ is a voiceless dental stop whereas the English /th/ phoneme as in *thin* is a voiceless interdental fricative and both are articulated in roughly the same area. In the same way, the French-Canadian usually says *dis* for *this*, the same process of mistaken identity taking place.

The /g/ and /r/ phonemes of Eskimo create much the same problem. An English-speaking person most often interprets the Eskimo /g/ (a fricative sound non-existent in English) as the English velar stop /g/ as in *go*. Both are articulated in the same area of the mouth in Eskimo and English, the only difference being that where the back of the tongue touches the soft palate or velum in the English articulation, the tongue merely comes close to the soft palate in the case of Eskimo, leaving a small passage for the friction of air to pass through. It is interesting to note that the French guttural *r* heard commonly in Quebec City and Paris is very close to the Eskimo uvular /r/ phoneme, and consequently, Frenchmen from these regions have no trouble identifying and reproducing the Eskimo /r/. But this is not so with the English person, whose language has neither the Eskimo /r/ nor the French guttural *r*. As a result, the English usually interpret the Eskimo /r/ as their /g/ as in *go* because here again, this is the English phoneme nearest to the point of articulation of the Eskimo /r/. In other words, two separate fricative Eskimo phonemes /g/ and /r/ are bundled together as one English stop /g/ in English ears. For written evidence of this under-differentiation of phonemes, one can refer to the *Eskimo Bulletin* published by the Department of Northern Affairs and National Resources in Ottawa. It will be noticed that in this publication the /k/ and /q/ phonemes of Eskimo also are not distinguished, both being written with the letter *k*.

Perhaps the best way of emphasizing and clarifying the ever-present dangers of deforming the phonemic reality of a foreign language through the superimposition upon it of one's own phonemic structure might be

by reversing the roles. Let us suppose that English were an unwritten language and the task of reducing it to writing were left to the Eskimo people. If the Eskimos in charge of this project were laymen who had no knowledge of linguistic theory, the following are some of the errors they would be likely to make. As mentioned earlier, they would confuse such pairs of phonemes as English *p/b* and *t/d* and symbolize each pair with one letter only, *p* and *t* or *b* and *d*, respectively, probably depending on which set of letters they used to write their bilabial and dental stop phonemes in Eskimo. At first the nine vocalic phonemes of English in contrast with the three Eskimo vowels would create some confusion. It would be easy enough for them to tell the difference between *beet* and *bit* because they too distinguish between long and short or tense and lax vowels. However, the difference between *bit* and *bet* would create more of a problem. These two vocalic sounds exist as allophones or members of the same family of sound — the phoneme /i/ — in Eskimo, and thus do not need to be distinguished in the spelling because they never mark differences of meanings between utterances. The likelihood is that the Eskimo laymen in question would decide not to distinguish the vowels of *bit* and *bet* in the spelling, because they would hear them as one and the same sound. Of course, if the functional yield of these two phonemes were so high that it created many cases of homonymy not clarified by the context, then the two phonemes would have to be symbolized by two different letters, otherwise there would be too much confusion in reading an English text so devised. If in their under-differentiation of English phonemes the Eskimos chose to write the following phonemic pairs — *p/b*, *t/d*, and *i/e* — as *p*, *t* and *i* respectively, it would mean that what we now write as *bed* would be spelled *pit* so that the sentence *I like sleeping in a pit*, for example, would prove strangely ambiguous in the new spelling.

The important thing to remember is that the errors and inaccuracies of the Eskimo spelling systems that are due to the under-differentiation of phonemes, though flagrant enough, did not create insurmountable problems in comprehension (for the natives at least), because of the enormous assistance given to them by the low functional yield of the under-differentiated phonemes in question and the help of the context. In the Eskimo-devised spelling of English just referred to, such an utterance as *I pit Puster pit that pig pad poy*, as odd as it seems to English eyes, could probably be read to mean *I bet Buster bit the big bad boy* by most English-speaking persons, even with so limited a context. For instance, *pit* in the sense of *bed* could not logically fit into the above sentence. Furthermore, it must be noted that in the writing systems of Eskimo that suffer from over-differentiation of phonemes (five vowels instead of three, for example), this over-abundance of symbols did not hinder comprehension, but it severely burdened the written language with unnecessary letters. Everybody knows the difficulties of English and French spelling in this connection, especially for those learning to write. The same problem applies for the Eskimos and they often ignore in their writing the extra letters

symbolizing allophones. For instance, I was shown a letter written by a young Eskimo girl to Father L. Schneider, O.M.I., who had taught her his own five-vowel system. She had sometimes ignored the unnecessary distinctions between the allophones of the Eskimo phonemes /i/ and /u/ that are symbolized by the four letters *i* and *e*, *u* and *o*, respectively in the alphabet she had learned. Of course, she had been taught certain rules for their correct use but since these were superfluous, in that they served no function, it was much harder for her to remember them. Edward Sapir, the eminent linguist, who had a wide experience with the Amerindian languages and peoples, claimed that people possess "phonemic intuitions" which reveal themselves as soon as they begin to write their own language alphabetically or phonemically and that they instinctively ignore the allophones (the variants of one phoneme) in their writing unless taught otherwise, and even then as we have just seen, there is some resistance. These "phonemic intuitions" which come into play when the native is confronted with the task of writing are the concrete manifestations of the existence of that hidden reality — the code — or part of it, the phonemic structure which is firmly rooted in the mind of the speaker from years of constant repetition and practice. Therefore, to the Eskimo who says /imi(q)/ "fresh water" there are really only four sounds (or three if the final consonant is not pronounced as in some dialects) which have a function. When he wants to say "fresh water" he must be sure to select /i/ as the first vocalic phoneme in order to avoid confusion with /ami(q)/ "skin". In the same way, he must choose /m/ in preference to /p/ or /s/ to keep "fresh water" distinct from /ipi(q)/ "dirt" and /isi(q)/ "smoke". Finally, the second vowel /i/ is chosen to distinguish /imi(q)/ from /ima(q)/ "sea, salt water". If the final consonant /q/ has almost disappeared in the pronunciation of certain dialects it is largely because this sound no longer serves a function to distinguish meanings in this position. Therefore, in this so-called automatic selection of sounds, which a native speaker makes, it is a choice of *phonemes* and not of allophones that is made; the native speaker is never conscious of the latter but only of the former, which may be modified in the stream of speech for the reasons mentioned, namely, the exigencies of articulation and the immediate phonetic environment of the phonemes. It might be well to turn to English once again for examples to clarify this notion further.

Daniel Jones defines the phoneme as: "a family of sounds in a given language which are related in character and are used in such a way that no member ever occurs in a word in the same phonetic context as any other member" or to use Swadesh's terse phrase, where all the members of each family of sounds are in "complementary distribution". Up to now, two levels of language have been spoken of, the ideal structure that exists in the mind or neuro-muscular system of the speaker and the meaningful actualization of that structure in the speech continuum; in other words, the code and the message, respectively. Although the above definition of the phoneme by Jones, inasmuch as it refers to a family of sounds whose

members are realized on the physiophonic level or in speech, might lead us to believe that the phoneme is nothing but the sum total of the members (allophones) of the family of sound, the phoneme nonetheless exists as an abstract entity on the psychophonic level. In a very real sense, the phonemes dwell as abstract and integral sound units on the psychophonic level and never reveal themselves as such on the physiophonic level. When actualized in speech they manifest only different facets of their multiple personality depending largely on their phonetic environment.

When Jones speaks of a family of sounds, the various members of this family are the various facets, found in speech, of the integral psychophonic entity "aimed at" unconsciously by the speaker. For example, when we utter the three English words *kill*, *cool* and *call*, the final *l* sound in each case is different. Experimental phonetics has shown this to be true with the use of sensitive instruments that record the sounds graphically. The native speaker is not aware of these differences because his sole intention is to reproduce vocally the inner reality of the phoneme /l/ which exists in his phonemic system, his intention being forcibly modified by the neighboring sounds. The *l* of *kill* follows a high front vowel and therefore differs from the so-called dark *l* of *cool* which follows a high back vowel (a velar vowel) that in drawing the *l* back gives it a velar or dark quality. In turn, the *l* of *call* preceded by a low back vowel differs from the other two owing to a larger area of resonance brought about by the lowest possible position of the tongue in the production of the vowel *a*. These three varieties of *l* are not phonemes in English because they do not serve to distinguish meanings between words. They are members of the *l*-family of sounds which can be shown to be a phoneme by opposing such pairs as *cool* and *coop*, *kill* and *kid*, *call* and *caught*. In each of these the *l* distinguishes meanings in similar phonetic environments. Therefore, on the psychophonic level *l* exists as a phoneme of English that on the physiophonic level realizes itself in three ways depending on the phonetic quality and point of articulation of the vowel preceding it. These different realizations are allophones or members of the same family of sounds — the phoneme /l/ — the integral entity and ideal sound aimed at in the process of speech.

Conclusion

If we accept the distinction between *code* and *message* (speech) or between *psychophonic level* and *physiophonic level* (speech), and that the speech continuum of a given language is only an imperfect realization of the well-ordered inner reality — the code — and especially of the phonemic structure containing all the necessary elements that permute and combine in opposition to each other to express meaning, it would seem logical that an orthography whose main purpose is to symbolize the same meaning in visible form, should as much as possible be a reflection of the phonemic structure of the code. In other words, if meaning is created by the various permutations and combinations of basic functional sounds or phonemes, these alone and only these need to be symbolized to capture the same

meaning in visible form in a writing system.

It should be pointed out that there are different schools of thought on the subject of phonemic descriptions, but that in spite of this, experience has shown that the actual results of these different applications of the phonemic principle are surprisingly similar.

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