SCIENTIFIC PAPERS

MONDAY, 18 JULY. MORNING

FIRST SESSION FOR GENERAL LINGUISTICS AND PHONOLOGY

Chairman : Prof. DANIEL JONES.

1. Prof. DANIEL JONES (London) : *Concrete and Abstract Sounds.*

In most books on phonetics it is stated or assumed that a „sound" is a certain kind of acoustic quality (timbre) which has length, loudness and pitch. But an able psychologist, H. S. PERERA of Colombo, remarked to me recently that in his opinion we ought not to say that a „sound" *is* a quality ; we ought to say that a „sound" *has* quality. Mr. PERERA evidently considers a „sound" as a sort of non-physical object which possesses or can possess certain physical characteristics, quality (timbre) among them, in much the same way as we may regard a man as a non-physical being which *has* a physical body ; people do not as a rule say that a man *is* a body.

But as it is difficult for ordinary people to form any clear idea as to what kind of being the possessor of the body is, so it is difficult for ordinary people to conceive what kind of object it is that *possesses* audible quality. It is nevertheless possible for us to think about these abstract things (even if only somewhat vaguely), and to do useful work on the supposition of their existence. At the same time, even though we may have notions about them, we are necessarily in a difficulty in regard to expressing any views on them in spoken or written words, since non-physical things cannot be adequately described in terms of physical things ; verbal or written descriptions of non-physical things can perhaps be compared to projections of three-dimensional objects into two dimensions.

In what I have to say I must assume that non-physical things do exist — objects or states which are conceivable to us but which cannot be adequately expressed in terms of physical things or perceived by our physical senses. Without such an assumption it does not seem possible to me to think about the nature of things at all ; and I think it will be found that most people tacitly admit the existence of such things even though they may not formulate any definite opinion about

them. The emotional states furnish a simple example. We all know for instance what anger is, but we cannot express the conception in terms of physical objects. When a man is angry, we cannot say that his body or any parts of it are angry. It is the man himself — the possessor of the body — that is angry. So when we say that a man is angry we admit the existence of two non-physical things, anger and the man apart from his body.

In considering the nature of sounds I will therefore start from Mr PERERA's hypothesis that a sound is a non-physical „thing" which possesses or can possess certain physical attributes, namely quality (timbre), length, loudness and pitch. If we look into matters, we find that most people use the term „sound" in some such sense without knowing it.

This is well seen if we examine the distinction that has been drawn between „concrete" and „abstract" sounds. The theory of concrete and abstract things is no doubt to be found in books on psychology and philosophy, but it was, I believe, first propounded in the phonetic field by Professor K. JIMBO of Tokyo, and was elaborated and turned to practical use by Dr. H. E. PALMER (1). What these authorities have called a „concrete sound" is that which is audible during a single utterance. If I perform the action which we call „pronouncing the vowel *u*" *once*, I make a concrete sound which is audible to me and to others who may be near. If I perform the action on another occasion I make another concrete sound ; if I perform it 20 times, I make 20 concrete sounds. If there are hearers present on those occasions, they can hear those 20 concrete sounds. People who are not within earshot do not hear them, but the concrete sounds are there all the same. They are known to exist by those who hear them ; they are not known to exist by other people. But you will readily see that a concrete sound is not what people generally mean when they talk about „a sound". If I utter the vowel *u* 20 times in the same manner, ordinary people will say that I have produced *the same sound* 20 times — that it is *one* sound repeated. When they say this, they mean presumably that the second concrete sound had a similarity to the first, and that all the others had similarity to the first and to each other. They are not „the same" since they are separated in time. Two different tennis-balls may look exactly like each other, but they are not the same ball : they are separated in

(1) See his *Principles of Romanization* (Maruzen, Tokyo, 1930). Much of what I have to say is a re-statement of what is said in that work, through in some respects the views I am expressing differ from those of JIMBO and PALMER.

space. But they are both tennis-balls : the term „tennis-ball" does not as a rule mean one particular ball. So also „the vowel *u*" does not as a rule refer to one particular utterance : it is something common to all utterances — the general conception of „quality" or „timbre" which this vowel has. This is an abstraction ; it may be called an „abstract sound" : it is the quality „*u*-ness" which distinguishes every concrete *u* that I make from every other concrete sound.

Most people can quite easily think about „abstract sounds" such as *u*-quality ; they can picture it to themselves. I can write about it, and readers can understand what I mean. They recognize the quality when they hear it in a concrete sound ; they can say „That concrete sound had exactly this quality ; that other concrete sound had a slightly different quality" (1).

Now if you can think about a thing and picture it to yourself, it is difficult to escape from the conclusion that it has some kind of existence in the present. If its existence is not physical (i. e. shown concretely), it must be non-physical — like an emotion or a thought perhaps (though of a different order) or existing in another dimension of time. This consideration of concrete and abstract sounds brings us therefore from another angle to the idea suggested at the beginning of this paper — that the word „sound" is commonly used to denote a non-physical thing which possesses or can possess attributes (quality, length, loudness, pitch) : a non-physical thing which can by certain actions on our part be projected into ordinary physical dimensions, and can be manifested as what may be called a concrete sound. In fact I suggest that the abstract sound of my vowel *u* must be considered as always existing, whether there is any concrete manifestation of it or not.

I have been dealing with the case where a number of concrete *u*'s were pronounced by one person *in the same manner*, so that the quality can be abstracted. JIMBO and PALMER have called this an „abstraction of the first degree". Such an abstraction is what is commonly meant in books by the term „speech-sound". And when the author of a book writes about „making a sound" or „pronouncing a sound", he means producing a corresponding concrete sound — clothing the abstract sound with the physical attribute of audible quality which it is capable of having.

Now JIMBO and PALMER have pointed out that it is possible

(1) It is possible also to picture to oneself or bring to mind a *concrete* sound ; this involves recollecting fairly well the circumstances when that particular sound was uttered. But one does not often want to do this.

to have an abstraction of an abstraction, or what they call an „abstraction of the second degree". You get this by taking a number of different abstractions which have something in common, and eliminating their differences.

If I repeat the English word *food* fu:d several times as nearly as I can in the same manner, there are no perceptible variations in the vowel ; I am justified in saying that the vowel quality is „the same" each time — that the abstract vowel is concretized, or clothed with its concrete sound, in the same manner each time. But the case is different if I pronounce several different words containing what may be called „my English long *u*:", say *food* fu:d, *tune* tju:n, *rule* ru:l. The *u*-sounds heard in utterances of these words are nearly alike, but there are perceptible differences. (The *u* of tju:n is in advance of that in fu:d, while that of ru:l is further back). But in spite of these differences we still look upon these sounds as being essentially „the same vowel", and we are accustomed to regard the differences as incidental modifications due to the nature of the adjacent consonants. The *u* of fu:d is one abstraction, the *u*'s of tju:n and ru:l are other (slightly different) abstractions. These abstractions have a certain relationship : They are the kinds of *u*-ness appropriate to special phonetic contexts according to my English usage (1). I presumably aim (not very consciously) at producing a physical manifestation of my conception of English long *u*: ; the result is that slightly different concrete sounds emerge according to the word uttered : I clothe the abstract sound in different physical forms according to circumstances. (In passing it may be added that this kind of reasoning may profitably be applied to objects other than sounds.)

In many cases of sounds which we are accustomed to think of as „essentially the same" very striking differences in concrete appearance are found. Such are „the English sound *h*" which has very different concrete manifestations in *heat*, *heart* and *hoot*, and „the French *l*", which appears as a voiceless sound in *oncle* ɔ̃:kl̥ (2). Many other examples will occur to you.

These are all abstractions of the second degree, and you will notice that these abstractions are what are called *phonemes* in ordinary phonetic terminology. (*Speech-sounds* are abstractions of the first degree.)

Sounds of higher degrees of abstraction are also found, though it is not always easy to determine the precise degree of abstraction. I have been speaking of my *u-quality*, of the abstract *u*

(1) An abstraction can be made of similarities. What these vowels have in common is that they have a similarity to one sound.

(2) When said in isolation.

corresponding to my utterances of a number of concrete *u's*. Now it seems to me possible to eliminate from this the special quality of my voice — to make an abstraction of „the same vowel" pronounced by several different people (i. e. with different voices). As the total quality (including the special voice-qualities of each speaker) of each person's vowel is already a 1st degree abstraction, it would seem that the vowel-quality considered apart from individual voices must be a 2nd degree abstraction (1).

Then there is a still higher degree of abstraction (presumably a 3rd degree) derived from the pronunciation of various people whose vowels in such a word as *food* are noticeably not identical, people who use a vowel of a different shade from mine or who diphthongize it more or less than I do : fu:d, fuwd, fïüd, etc. From the similarities of these sounds, after making allowance for the qualities of the speakers' voices, we get as a 3rd degree of abstraction that residue of quality which causes all these sounds to have the same semantic function. This abstraction is rather like what I have called elsewhere a *diaphone* (2).

Turning once more to the phoneme, I would point out that, as I understand it, it is a conception relating to the speech of a single person speaking his language in one particular style. As soon as we bring in the pronunciation of other people, or other styles of speaking, we arrive at abstractions of higher degrees than the second. We can, I submit, find many speakers of a language whose phonemes are absolutely similar : people for example whose *u*'s in *tune*, *food*, *rule*, etc. are all exactly the same as mine, apart from the special individual voice-qualities (3). Presumably the „combined phoneme" of all these people is of a higher degree of abstraction than the phoneme of each person. Such a „combined phoneme" would appear to be a non-physical but existing thing (an „ideal sound" of 3rd degree abstraction) appearing to the speakers in the 2nd degree as a set of phonemes differing only on account of voice-quality, and appearing to them in the 1st degree as a set of existing qualities (the same for each speaker except for their voices),

(1) JIMBO, however, makes this out to be a 1st degree abstraction (see PALMER, *Principles of Romanization*, p. 44). H. J. ULDALL also does not agree with my suggestion, on the ground that no two people can be proved to be able to produce „exactly the same vowel". The matter evidently requires further investigation.

(2) I have previously (perhaps wrongly) defined the *diaphone* as the sum of all the sounds used by the different speakers, e. g. the sum of *u:*, *uw*, *ïü*, etc., heard from different speakers in the word *food*. See my *Outline of English Phonetics*, Chap. XI.

(3) This supposition will probably be contested by some.

and manifestable by them as a set of concrete sounds (the same for each speaker except for their voices).

But besides such speakers there are others whose phonemes differ somewhat from each other and do not manifest concretely in the same way. There may be different sound-qualities or different usages as regards the variants. But as long as the divergences are not wide enough to interfere with intelligibility, we get higher degrees of abstractions which might be termed *diaphonemes* ; they are presumably of the 4th and higher degrees.

You may perhaps now be asking : „What is the use of this enquiry into abstract sounds?" I suggest that it has at least the following three uses.

(1) It helps to clarify the functions of various branches of phonetics and phonology. For instance, *experimental phonetics* deals with concrete sounds, a great deal of *ordinary phonetic theory* is concerned with abstract sounds of the 1st degree („speech-sounds"), while *phonology* is concerned chiefly with certain abstract sounds of the 2nd and 3rd degrees („phonemes" and „combined phonemes").

(2) Different systems of writing are based on these categories. Concrete sounds are hardly ever written at all ; it would be immensely difficult to symbolize them, and it is hard to imagine any case in which such a symbolization would be useful. Writing representing abstract sounds of the 1st degree is what is called *„narrow" phonetic transcription*. Writing representing the abstract sounds of the 2nd and 3rd degrees called „phonemes" and „combined phonemes" is known as *„broad" phonetic transcription*. And then an *„orthography"* is a system of writing based on abstract sounds of the 4th and higher degrees.

(3) Lastly, the categories have, in my view, an importance for the development of the general theory of sound. I have put before you the suggestion that abstract sounds (at any rate those of the 1st degree) are really in perpetual existence. We are not perpetually perceiving them objectively, but this is because most people are only conscious of one dimension of time. We have, however, means of projecting these perpetually existing sounds into our one dimension (by „making concrete sounds"). Perhaps in the distant future the human race may develop a faculty of consciousness in two or more time-dimensions. There appear to be in fact already a few people who have some sort of conception of such dimensions. And besides it is to me, and no doubt to others, very unsatisfactory to envisage an eternity of time in a single dimension ; it seems to me that one gets a much more hopeful view of life

if one expects some ultimate expansion of consciousness which will include other dimensions of time, and in which therefore abstract sounds will be concrete. Of course in such a state of existence communications by sound would be carried on in some new way, and there would doubtless be a science of superphonetics which we need not speculate about at the moment.

However this may be, we see that one aspect of phonetics leads in the direction of metaphysics into regions which merit profound exploration.

DISCUSSION :

Prof. W. DOROSZEWSKI (Warsaw) :

Le prof. JONES présente l'opposition du son concret au son abstrait comme l'opposition de deux espèces *d'objets* : d'un objet physique et d'un objet non-physique (a non-physical object). Le problème est important, et on peut dire sans exagération que la manière dont on résout ce problème du son du langage détermine l'attitude du linguiste à l'égard des questions les plus fondamentales de linguistique générale.

Voici mon point de vue. Ce que l'on appelle „son du langage" n'est autre chose qu'un *comportement* (behaviour) du sujet parlant et du sujet (des sujets) qui écoute(nt). Aussi bien l'articulation que la perception acoustique constituent des actes des sujets parlants et ces actes-là justement pris dans la totalité de leurs phases sont des „sons du langage". Le „son concret" est un acte physiologique (articulation et audition), le „son abstrait" — un acte psychique, car la *notion* du son a les caractères d'un tel acte. Ne pouvant entrer dans le détail, soulignons seulement que le raisonnement esquissé ici permet de surmonter certaines antinomies foncières (bien que souvent inaperçues) du problème langue-parole (vues avec une justesse remarquable p. ex. par SCHUCHARDT, de qui les tendances „monistes" pourraient s'avérer utiles pour le problème qui nous préoccupe en ce moment, c'est-à-dire le problème du son du langage).

Dr. HAROLD E. PALMER (East Grinstead) :

It might be appropriate to divide each degree of abstraction into two parallel divisions, *a* and *b* ; *a* standing for the *phonemic* and *b* for the *diaphonemic* aspects of the abstraction, or, in other terms, *a* the utterance of one single *sujet parlant* and *b* the further abstraction represented by the utterances of an unlimited number of *sujets parlants*.