

mathematics. The object of phonometry remains the comparison of languages.

And here it takes a different direction from that of experimental phonetic science, which now seems to be physical acoustics, now physiology, now psychology, and now linguistic science, and likes to call itself a boundary science, a term by which it expresses the uncertainty of its mission.

Experimental phonetic science since the researches of ROUSSELOT has never made a difference between the standard word that has descended from generation to generation, and the word or sound which is made use of in a conversation. It has never considered that the first only is the object of linguistic science and that it only succeeds in dealing with the second.

For where speech is heard and registered, the occasionally used word of a speaker is registered and phonetic science can register also a second and third word from different speakers, but it never succeeds in getting the customary pronunciation, which does not consider the individual differences of the speakers.

It has been shown in what cases one is justified in disregarding the endless variations of pronunciation: for instance, if one compares the usual pronunciation, if one takes intelligibility as a matter of course. But he that works with curves, and is obliged to measure and analyse the curves, must not overlook these variations, the determination of which is his task.

Through such considerations the aim of experimental phonetic science is destroyed to the advantage of descriptive phonometry, an ambition which it has had since Hofrat WOLFGANG VON KEMPELEN in 1791 described his talking machines, the ambition to construct sounds of speech analogous to physics. Since GALILEO, analysis has existed for a phenomenon of nature, if its conditions are thoroughly examined. But the sound of speech is no phenomenon of nature in this sense. To be sure, it will be formed with organs, and certainly it will be conveyed by the movement of the molecules. But not every tone and not every noise made by the organs of speech is a sound of speech. The babbling of a baby is as little speech as coughing, sneezing, whistling, and as the word combinations of a sensoric aphasic patient, who after the destruction of his speech centres can only express himself by unintelligible sounds. One can only speak of language and of language sounds when the historically fixed and classified norms of a community are fulfilled for the purposes of personal communication.

The objections made by experimental phonetic science are always the same. It says, that one could recognize a stop, a nasalized vowel or a non-nasalized vowel by curves that are registered by a funnel, a nasal olive or a larynx recorder, and the problem would be gradually to recognize all sounds in this way. But what is meant here by recognizing? I will not mention here the physical technical lack of these registering methods, which are altogether out of date. I will not consider that one binds the mouth of the speaker with the funnel in accordance with the proverbs of Salomo. It is enough to show

that there is nothing but a vague analogical conclusion, a conclusion which is not strong enough to found a science. We have shown on several occasions that the curves gained by registration are never identical. If a sound is recognized by its curves as a stop, it is because the curves are similar to others, which are already known as curves of stops. And in point of fact one knew this, because the speaker had said that he had spoken a stop, that is on account of the uncontrollable muscle sensation of a speaker. And further similarity between such curves has not yet been defined and never will be. To speak of similarity between two angles in mathematics is clear from a mathematical point of view. It is quite correct to speak of the identity of two curves from which the one can be transformed into another according to a rule, even if these curves look very dissimilar. But a similarity, which is only justified by an optical impression, has from a scientific point of view absolutely no sense. In addition to this comes the linguistic uncertainty of a statement like that of a stop.

No linguistic realities correspond to these ideas, as they lack the historical classification that is necessary for every language. And if the recognition of speech curves is founded on nothing else but on similarity of impression, then no scientific criterion can be given, as to whether we have the pronunciation in one or another dialect—differences which can be noticed with certainty by the ear, and which are necessary for communication as well as for linguistic science.

As surely as language exists, if the speaker uses the customary language of a community to express himself by, just as surely is there a possibility of examining the variation of speech, if the highest aim of this research is the positiveness of language. The research of speech by measurement and number must have an historical purpose.

54. Prof. R. H. STETSON (Oberlin, Ohio): *The relation of the phoneme and the syllable.*

The current phonology has always defined the "phonemes" (sounds) for the experimental phoneticians. It is the experimentalists, however, who have given the more consideration to the syllable. For an adequate account of speech both phonologists and phoneticians must recognize the interaction of the traditional phonemes and the chain of syllables.

The recent consideration of the phoneme makes it an articulation, or an image of an articulation. It may be an ideal or type articulation, but the basis is always a movement pattern. The properties which are often emphasized in the special case of the phoneme hold for the simplest possible movement which can be defined or indicated. A circular movement, a ballistic movement, a posture are all of them Gestalten, and can be considered with Prof. BRØNDAL as "Platonic Ideas"; they can be transposed, they show endless variations from a type. In fact *all* habits, human and animal, have the attributes so often claimed for the movement pattern of the phoneme. Whatever is peculiar to the phoneme must be due to its social function,



as a symbol or signal. But meantime as a movement pattern it is subject to the conditions of rate and combination which hold in the co-ordination of all serial movement patterns.

The movement patterns of speech have a social function, a meaning; this is the reason for our interest in them. And in the running pattern of actual speech both the prescribed meanings and the physiological conditions of the movement system play a part.

There is not space in which to define "prescribed meanings", but one may say that they are not things in a special mental world; they are actual physical and physiological tensions, which may have values and may be accompanied by mental images if you will, but which are quite as objective as the "system of movements" with which they react. Meaning lies in the whole situation, static as well as dynamic. Cf. MALINOWSKI's discussion of the function of language.

Speech is not a single series of events; speech cannot be reduced to a single line of "sounds", or of "phonemes", as we often assume. The early formulation of the alphabet has misled phonetics and phonology. It would have been better perhaps for the scientists, if a phonetic syllabary had prevailed in Europe; at least we should have been compelled always to consider the syllable. But the syllabary on the other hand would have failed to individualize the vowels and consonants.

There are two different and essential series of movements in speech:

### I. *The chain of syllables which is the fundamental series of movements*

This series of pulses functions for certain meanings which are independent of the vowels and consonants. The rhythm, important to all languages, the word stress, important in many languages, do not depend on the vowels and consonants. Any series of tones may be made to function for the beats and stresses.

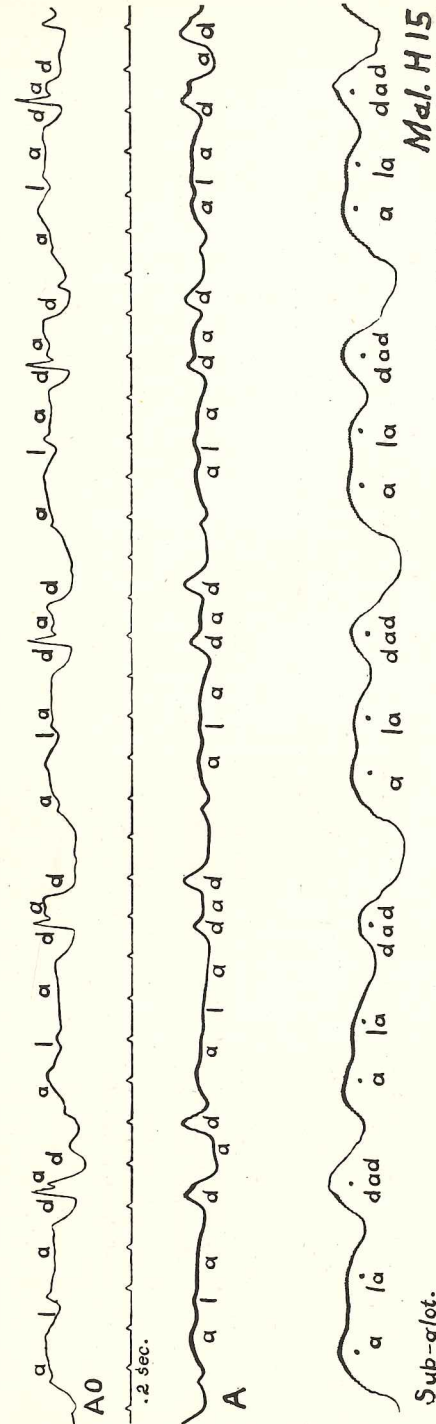
The second type of meaning which figures in the chain of syllables is the intonation of the phrase; in the European languages the phrase has a melody and the syllables are the notes; intonation is an attribute of the group of syllables.

Thus rhythm, word stress, intonation do not depend on vowels or consonants. Nonsense syllables or a child's babbling or even the tones of a violin cleverly played may function for the emotional and volitional meanings involved in the chain of syllables.

It is possible to call the groupings, the rhythms, the word stresses, and the intonations "phonemes", and this is occasionally done. *But they are not the same type of phoneme as the vowels and consonants, and they figure in the fundamental chain of syllables.*

### II. *The dependent series of vowels and consonants*

In most phonetic notations the vowels and consonants are counted the phonemes. The vowels and consonants cannot exist without the syllables. Everyone assumes that the vowels cannot be uttered separately except as syllables. To utter a single consonant also



#### Sub-glott.

Fig. 1. The syllable group *aladad*. Accent on the third syllable. Spoken by a laryngectomized subject with artificial larynx so that the air pressure changes in the chest (Sub-glott.) marking the syllable pulses are recorded directly. Shows the influence of rhythmic grouping of the syllables on the vowels and consonants.

AO: Air pressure just outside the mouth; the *l* interrupts the flow but slightly.

A: Air pressure within the mouth; the *l* is barely noticeable.

Sub-glott.: The air pressure is recorded directly from the trachea and shows the syllable pulses very clearly.

The grouping of the syllables for the rhythm is clear. An increase in the rate of utterance will eliminate the second *a*, whereupon the *l* will about the *d* in a modified form *al'dad*.



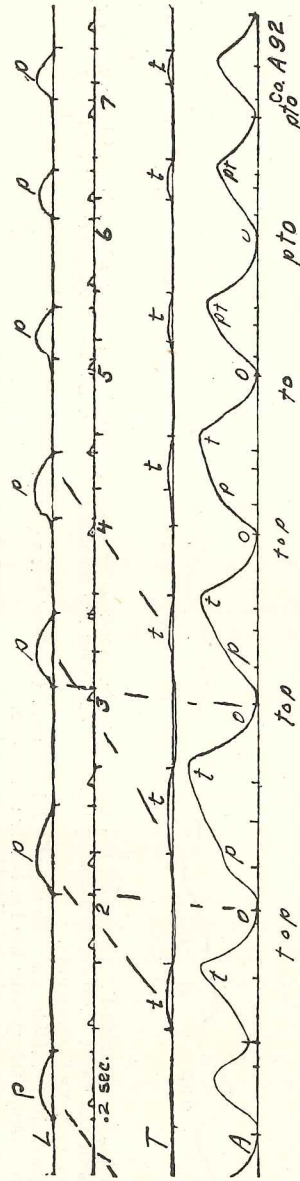


Fig. 2. "Top, top..." repeated at increasing speed. The increasing rate of the syllable chain modifies the consonants.  
 L: Lip contacts of the p's.  
 A: Air pressure in mouth showing the abutting forms, syll. 2-5, and the combining forms, syll. 5, 6, ... of the frontier consonants.

Syll. 1 has the p distinct from the following syll. 2. As the rate increases, syll. 2-3-4-5 show the abutting form of the air-pressure curve. At syll. 5 the p has been shifted to syll. 6, where it combines to the compound form pt not recognized in English. Syll. 5 to and 6, 7, ... pto are no longer closed syllables.

requires a syllable. And each consonant and each vowel functions in some one syllable.

But this series of vowels and consonants is not fused and lost in the syllables; it remains a well-defined series of articulations.

The vowels colour the syllables and make them audible and they interact with the consonants and with each other.

The consonants release or arrest the syllable pulse. They combine to form compound consonants, or they decompose into two single consonants; they abut and double at the syllable frontier; in certain cases they shift from one syllable to another.

To determine these vowel- and consonant-phonemes and their inter-relations, and to record such observation and classification, is often considered the great task of phonetics and phonology.

But there remains another great task, to consider the influence of the fundamental chain of syllables on the vowels and consonants, and the influence of the prescribed vowels and consonants on the chain of syllables.

The emotional and dynamic meanings prescribe the stresses, rhythms, intonation and to some extent the rate of the fundamental series of syllables.

The conceptual and indicative meanings prescribe the actual pattern of the vowels and consonants.

The rate and stress and rhythms of the syllables may lengthen, diphthongize, or shorten, change the quality, and even obliterate the vowel. The forms of stammering which involve a forced utterance of the syllable pulses cause striking changes of the vowels, and give us the clue to some types of vowel change. If the syllable drops, the vowel will go with it.

Changes of rate and stress and rhythm may force the consonants to shift position and function from one syllable to another, to combine into compound consonants, to decompose into simple consonants and in some cases to drop. But it does *not* follow that the dropping of a syllable eliminates the consonant, which may shift to another syllable.

On the other hand, the pattern of the prescribed consonants and vowels may limit the rate of the syllables and modify the rhythms. Syllables with arresting consonants must have more time; and if the arresting consonant is essential to the meaning it will not shift or drop, instead the rate and rhythm of the syllables must conform.

Therefore the syllable division may be important in phonology, as Prof. SOMMERFELT points out. The difference of maximum rate of the various speech organs which Dr KAISER has discussed in a recent article may have much to do with the historical changes of sounds. If the back of the tongue and the velum cannot move as rapidly as the blade and tip of the tongue, a back sound may be forced forward as the rate of utterance is increased.

The speech apparatus is an important working model. The fundamental syllable chain and the series of vowels and consonants are bound together in a physiological mechanism. The working of this mechanism is of primary importance in phonology and phonetics.

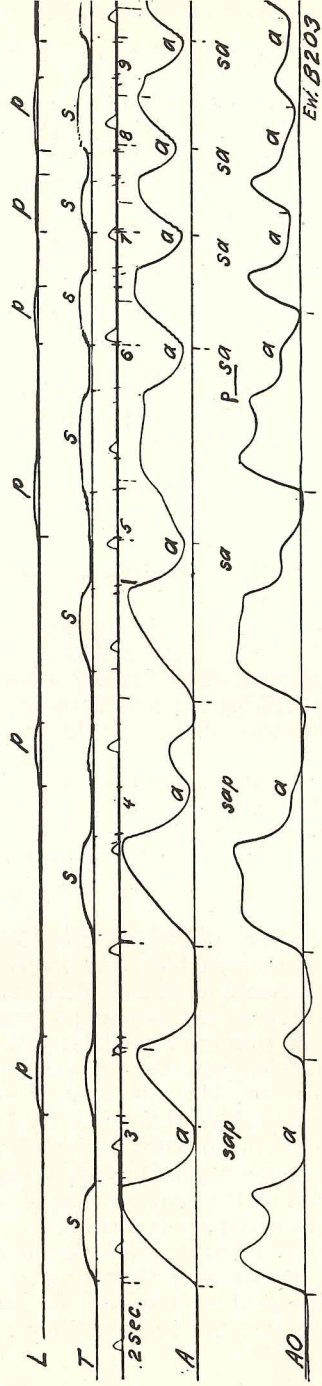


Fig. 3. "Sap, sap..." repeated at increasing speed. The increasing rate of the syllable chain modifies the consonants.

L: Lip contacts of the p's.

T: Tongue contacts of the s's.

A: Air pressure in mouth showing the abutting form, syll. 5-6.

AO: Air pressure just outside mouth. The continuant s of syll. 3-4 reduces to a mere stroke, syll. 7-9.

The increasing rate of the syllable chain forces the combination *psa*, syl. 6. In syll. 6-9 the s has completely overlapped the p, which "drops".

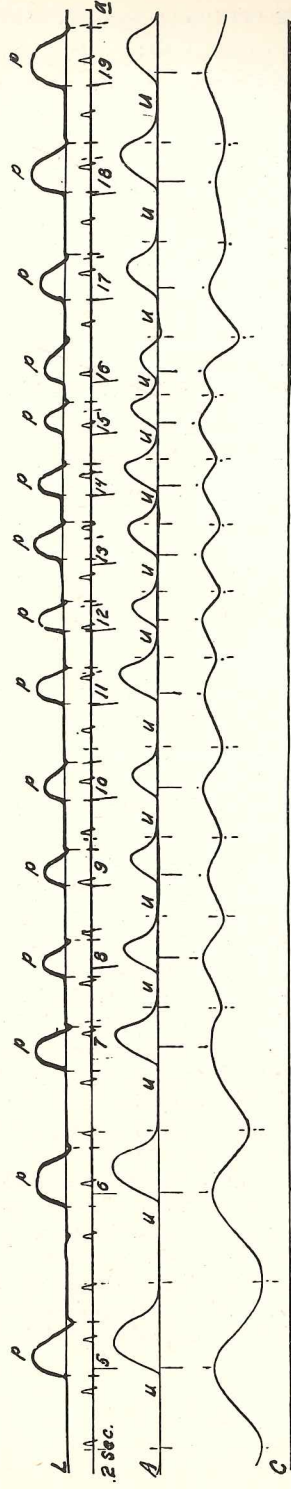


Fig. 4. "Up, up..." spoken at increasing speed and then at decreasing speed by tracheotomized subject. Shows the influence of the syllable rate on the consonants, and the influence of the consonants on the syllable rate.

L: Lip contacts of p's.

A: Air pressure in mouth.

C: Air pressure in trachea recorded directly.

With the increase of rate the p shifts from arresting position in syl. 10 to releasing position in syl. 12. Syl. 11 is left without a consonant. The syllable chain is fairly regular to syl. 10-17 when, as the rate slows, the introduction of the arresting consonant of *puu* in the change from *pu* to *up* disturbs the syllable chain.



The events cannot be expressed adequately in a single line of symbols, and the mechanical relations of the speech apparatus are significant for explanatory purposes. In physics progress has come both by manipulations of symbols as with JEANS and EDDINGTON, and also by the construction of a working model through experimentation as with RUTHERFORD. And so in phonetics and phonology: everything possible is to be done by logical classification and analysis, which will become more complex; and the study of the working model of the speech apparatus is quite as essential.

FRIDAY, 26 JULY. MORNING

#### BUSINESS MEETING OF THE PERMANENT COUNCIL

On Friday, 26 July, at 9.15, a Business Meeting of the Permanent Council took place to formulate proposals regarding:

- (a) The Personnel of the Permanent Council.  
It was resolved to invite Prof. CHATTERJI of Calcutta and Prof. WESTERMANN of Berlin to become members of the Council.
- (b) The publication of the Proceedings of the Second Congress.
- (c) The place of meeting for the next Congress.  
(See Business Meeting of the Congress below.)

#### BUSINESS MEETING OF THE CONGRESS

At 9.45 the Business Meeting of the Congress was held under the chairmanship of Prof. VAN GINNEKEN.

Dr L. KAISER, Secretary of the Permanent Council, read the following report:

To me falls the very agreeable duty of giving you a brief report on the Second International Congress of Phonetic Sciences.

Without any doubt the Organizing Committee as well as the Permanent Council should be well satisfied. This Second Phonetic Congress may be considered as a complete success.

The underlying cause of this success was undoubtedly the wish to remedy a lack of mutual understanding still persisting among the various groups of workers in the fields of Phonetic Sciences (I remind you of the "cri de cœur" of Prof. SELMER). A more obvious cause of the success is to be found in the devotion and the ability that Prof. DANIEL JONES and his collaborators have shown towards the Congress.

If I may be allowed to mention a few other persons whose presence has proved to be very important, I should like to mention in the first place the psychologists, because it was the hope of the Permanent Council that Psychology might take a central place in this Congress. I should like to mention in particular Prof. STETSON, representing the American psychologists, who pointed to the general properties of movements, Prof. BÜHLER, whose brilliant paper and

keen discussion were a satisfaction to all who heard them, Prof. VENDRYES, who confirmed the relation between phonology and the other phonetic sciences. It goes without saying that the presence of Prof. TRUBETZKOY and several other phonologists who expounded phonological principles in several papers contributed much to the success of the Congress. Further, the relation with the International Society of Experimental Phonetics was also very helpful, the whole Council and several members being present and giving papers.

Then again the spiritual atmosphere of England contributed largely to the character and the success of our meetings. It brought us members from very distant countries. It was through this spirit too that the papers on practical and aesthetical phonetics were on a very high level and did honour to the Congress. I remind you especially of the papers of Miss STOREY and Mrs NORMAN.

As to the demonstrations, I must mention the outstanding demonstration of the Röntgen-Tonfilm by Prof. MENZERATH, who has succeeded in doing what so many others have tried to do during the last few years. The demonstration by Prof. FLATAU was also a very interesting one.

It is with regret that I have to mention the absence of Italian papers and of Italian congressists; the cause appears to lie in a mistake of administration by the Italian Government, a letter concerning three Italian delegates having been received by the Organizing Committee no earlier than Monday, the first day of the Congress.

It again appeared very difficult to interest musicologists in these congresses. Perhaps the next congress will find a way of overcoming this difficulty.

During the Congress, Prof. HORN invited the Third Congress to meet in Berlin.

After this report had been read, the following resolutions were passed by the Meeting:

1. That the sincere thanks of the Congress be conveyed to the Authorities of University College, London, for their hospitality to the Congress and for all the facilities extended to the members.
2. That the sincere thanks of the Congress be conveyed to His Majesty's Government for the Reception given to the members on Wednesday, 24 July.
3. That the sincere thanks of the Congress be conveyed to the Lord Mayor of London for the Reception given to the members at the Mansion House on Tuesday, 23 July, to the Port of London Authority for the Excursion provided for the members on Thursday, 25 July, and to the Royal Academy of Dramatic Art, for arranging the performance of *Pygmalion* on Monday, 22 July, for the benefit of the members of the Congress.
4. The question of the place of meeting of the next Congress was discussed and various proposals were put forward. It was eventually resolved that enquiries be made as to the possibility of holding the Third Congress in the U.S.A. in 1938, and that failing the U.S.A., Poland and Sweden should then be considered, in that order, as