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The goal of phonetics, its unification and application  
(Summary)

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THE GOAL OF PHONETICS, ITS UNIFICATION AND APPLICATION

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When we compare the phonetics of today with that of the past we see progress. Looking ahead some of us may envision a glorious future for our discipline, others stagnation or even crisis.

Present-day phonetics differs in several ways from that of nineteenth century pioneers such as Passy, Sweet, Rousselot and others. We can point to the technological sophistication of our computers, speech synthesis or other experimental equipment, the development of an acoustic theory of speech or to the practical use that our understanding of human speech might be put to in various technological, educational and medical applications. It is also instructive to contrast past and present by recalling how classical phonetics dealt with the still current, fundamental problem of finding a universal phonetic framework for spoken language. This task is essentially that of describing phonetically an arbitrary utterance in any language (analysis) and to represent it in such a way that the description can be reproduced in audible form (synthesis) and with the linguistically relevant features (the original native accent) preserved.

The solution of classical auditory phonetics was the concept of the universal phonetic alphabet and the use of skilled phoneticians for the "recording" and "playback" of phonetic facts. However, this proposal fails. Its inadequacies cannot be remedied by invoking the insights contributed later by functional phonemic analysis and distinctive feature theory to define the terms "alphabet" and "universal" more precisely. Nor would it matter if the quest for the ultimate phonetic framework could be brought to a successful close and if suddenly phoneticians became capable of using it ideally. Contemporary phonetics rejects this solution since the scientific description of speech sounds must necessarily aim at characterizing explicitly and quantitatively - rather than merely skillfully imitating - the acoustic events as well as the psychological and physiological processes that speakers and listeners use in generating and interpreting utterances. Phoneticians accordingly construe their task of speech sound specification as a physiologically and psychologically realistic

modeling of the entire chain of speech behavior.

Experimental and theoretical progress up to now thus makes it possible to embed phonetics within a much broader intellectual context than previously. We might reasonably expect it to enjoy a favored position in future research on the forms and uses of spoken language in acquisition, production and perception. After all, why should it not be possible, on a long-term basis at least, for phoneticians to extend their inquiry into the sounds of human speech to ever deeper physiological and psychological levels using the speech signal as a window to the brain and mind of the learner, talker and listener? Why should we not expect more complete, theoretical models and computer simulations to be proposed for speech production, speech understanding and speech development that match the present quantitative theory of speech acoustics in rigor and explanatory adequacy? There seems to be particularly good reason for such optimism in the area of language universals where phonetics in fact has a privileged position. Linguistic behavior presumably arises, both ontogenetically and phylogenetically, as the result of an interplay between the (communicative, cognitive, social) functions that language is to subserve, biological prerequisites (brain, nervous system, speech organs, ear, psychological mechanisms such as memory etc.) as well as environmental factors. Languages thus evolve the way they do because of the body, the mind and the linguistic environment. They are the way they are on account of the functions they serve and owing to the properties of both innate and acquired mechanisms of learning, production and perception. This view assigns a novel and important future role to phonetics whose contents appears capable of offering general linguistic theory a great deal of explanatory force - a novel role at least to those who assign one major responsibility to phonetics in linguistics *viz.*, the instrumental analysis of the phenomena below the level of narrow phonetic transcription in grammars.

Looking back and ahead we see phonetics transform from more or less an art into a natural science. This development has yet to be completed but it is no doubt an inevitable consequence of the very nature of the subject matter of phonetics and the natural ambition of any discipline to attain scientific maturity. This trend has been and no doubt will be further stimulated by the

prospect of applying phonetic theory to practical needs such as pedagogical methods and technical aids for the deaf, handicapped, second language learners, the diagnosis and treatment of patients with phonetic symptoms as well as the automatic analysis and synthesis of speech for various technological purposes.

It may of course be objected that the program suggested above is entirely premature and unrealistic. It might be argued that, although it may be true that phonetics both could and should be pursued along such lines the practical difficulties must not be underestimated. At present it is far from a unified field. Progress so far seems often to have occurred in the form of fortuitous secondary spin-off effects from other adjacent fields with different goals rather than as a result of premeditated planning on the part of phoneticians and linguists. And by the way who is a phonetician these days? The heterogeneity of educational backgrounds in our field is striking. Recruiting researchers across disciplines has demonstrably had an extremely vitalizing influence. However, to meet the future challenge of developing a more comprehensive, unified phonetic theory will such heterogeneity be satisfactory? Will scientists coming into phonetics as basically faculty of arts students have the adequate training in mathematics and physics? Conversely will people trained in science and medicine have a chance to acquire the necessary background in linguistics and psychology and so forth? Who could claim the breadth and depth of competence that the present goals seem to imply? Perhaps we should accept that inevitably both applied and theoretical progress in our field has to occur on a basis of "mutual consultation" among a diversity of specialists. Science is a machine that develops very slowly under the influence of many forces and possibly more according to an open-loop mechanism than under the constraint of foresight and negative feedback. The problem boils down to that of adjusting research goals to the competence of the researchers or of adjusting the competence of the researchers to the research program. The former occurs easily enough. The latter requires more effort.

Although the preceding considerations are relevant and may serve to temper the optimism expressed earlier we shall conclude this summary on a positive note. Clearly there are active steps that can and should be taken to achieve a match between the

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training for a research career in applied or theoretical phonetics and the long- and short-term objectives of the field. There are also ways of achieving a greater unification of phonetics and eventually it is the questions asked that determine the future of a discipline.