

So as to stimulate further discussion on this topic, the Editors invited the two preceding Presidents of the Association to add their comments on the future of phonetics. This article is written by John Ohala, President of the IPA 1995-1999.

Phonetics in the free market of scientific ideas and results

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Introduction

Klaus Kohler has presented a thoughtful account of the history of the development of phonetics and proposals for the consolidation of phonetics pedagogy (Kohler 2001). As a student of the history of phonetics (Ohala 1992; Ohala, Bronstein, Busà, Lewis, & Weigel 1999) I very much appreciate his contributions.

My own reading of the history of phonetics and of other scientific disciplines gives me a somewhat different perspective on how our field has developed and what factors will influence its future development. I advocate a kind of bottom-up or "free market" of ideas, methods, and theories as the main influence on our field.

Questions Define a Discipline

The starting point and the definition of any study are the *questions* it asks. Whether motivated by idle curiosity or by a need to understand how things work in order to achieve some benefit, a question is the desire to penetrate the 'known' / 'unknown' barrier. Here (by my reading) are some of the enduring questions that have been raised about speech throughout history and which occupy individuals in the field:

What is the nature of speech? How is it produced and perceived? This is the question that has received attention in medicine from the time of the Greco-Roman physician Galen (131-201) and from physicists and engineers, psychologists, and linguists up to the present time. Successful answers to this question can be regarded as the base that enables us to address the remaining questions.

What is the origin of speech? Many cultures' most ancient traditions have myths concerning how humans came to have the power of speech. For example, for the Greeks, Hermes was the patron of speech, for the Hindus, Sarasvati. This question has renewed interest today (Hurford, Studdert-Kennedy, & Knight 1998).

How is speech represented in the brain?

How are language and speech acquired?

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How can we ameliorate communication disorders?

What is the basis for the link between sound and meaning? This is a question pondered by Plato in his work *Cratylus* (360 BCE) and still pondered today (Hinton, Nichols, & Ohala 1994).

Why do different languages exist? What is the history of a language and its parts? How do regional and stylistic variants in pronunciation of words arise? This question was implicitly asked by the author of the Tower of Babel story in the Old Testament and was given worthy (partial) answers by the classical grammarians at the turn of the 19th century.

How can we amplify the functions of speech – e.g., make speech less ephemeral, convey speech over longer distances, communicate via speech to animals or inanimate objects? Poetry, which made speech more memorable, writing which made it more lasting, printing which permitted writing to be disseminated more widely, the telegraph and telephone which made it possible to convey written and spoken speech over great distances, and modern speech technology, constitute answers to this question.

This list is similar to Kohler's except that I have divided up his category of 'signal analysis' which strikes me as rather too heterogeneous. It doesn't matter that some of these questions do not have widely-accepted answers (e.g., no. 2, what is the origin of speech?).

These questions are situated in a 'market', so to speak, of a myriad of other questions and candidate answers to the questions. Examples of other questions are: What is the nature of sound? What determines the paths of the planets and other celestial bodies? What is matter and what determines the different properties of different physical substances such as rock, water, wood? How does the brain control movement? Continuing this metaphor, consider those who have questions as the consumers. Disciplines, the 'vendors', provide the answers. The consumers shop around for those vendors that can provide satisfactory answers to their questions. Occasionally, some disciplines merge with others when the answers they give can be shown to answer the questions that were originally the product of other disciplines. This happened in the 17th century when Newton demonstrated that the orbits of the movable celestial bodies could be covered by the same principles that governed free fall on the surface of the earth. Another merger happened in the middle of the 19th century when physiologists such as Claude Bernard (1783-1855), Friedrich Wöhler (1800-1882), and Hermann Helmholtz (1821-1894) showed that many of the activities and processes of living being could be explained by reference to the established principles of physics and chemistry. A merger between chemistry and physics occurred when it was demonstrated that many of the properties of different substances could be explained by reference to their atomic structure.

Physics and chemistry are widely regarded as mature scientific disciplines not only because of the rigor of their methods but also because they have been successful in “selling” their methods and answers to a very large market.

Just as in the real commercial market, in this scientific market, different vendors are themselves consumers of the products of other vendors. In the same way that Microsoft buys computers from computer manufacturers and computer makers may buy software from Microsoft, so do many disciplines “buy” products (answers) from other disciplines for the fruitful pursuit of their own interests

Pursuing this metaphor further, what is the status of phonetics in the scientific market? Obviously, those wondering about planetary orbits don't buy from the offerings of phonetics. But phonetics, exploiting the wares of a number of other disciplines (physics, engineering, physiology, mathematics, biology, psychology, ethology, history, etc.), is itself a viable purveyor of information useful in a number of pursuits, namely, those in the eight questions given above. Over the centuries there have been disciplinary mergers between phonetics on the one hand and linguistics, language teaching, communication disorders, physiology, physics, engineering, archeology, history, forensics, anthropology, ethology, etc., on the other. These mergers have come about due to self-interest. Those interested in language history realize that a study of the physical nature of speech can provide useful answers to their questions.

An example of this and one that adds to but predates Kohler's examples of linguistics embracing phonetics comes from the year 1876. The famous French physiologist, E. J. Marey, pioneer in measuring rapid time-varying physiological movements by using the kymograph and photographic techniques, had just set up his laboratory shortly before and in 1875 started publishing the laboratory's ‘working papers’. The second volume (1876) contained an article by Ch.-L. Rosapelly, a representative of the Société de Linguistique de Paris, who undertook a study in Marey's laboratory on intervocalic clusters in nonsense words such as *abma*, *apma*, etc. Such phonetic studies were motivated, he wrote, by a desire not only to understand speech disorders but also to understand sound change:

L'importance de ces études semble grand au point de vue des linguistes, dont la science chaque jour plus précise tend a prendre pour point de depart une étude expérimentale. L'étude comparée des différentes langues et celle des transformations successives que chacune d'elles a subies dans sa formation ont permis, en effet, de saisir certaines lois qu'on pourrait appeler physiologiques et qui ont présidé a l'évolution du langage.

It is noteworthy that even at this stage, the veritable birth of experimental phonetics, it was intended to serve the needs of both linguistics and communication disorders.

Furthermore it was the linguist, armed with specific questions, who ventured into the physiological laboratory.

I think this illustrates how our discipline should work: it is our *questions* that define us, not what administrative unit we find ourselves in nor what methods we may use to get answers to these questions. There is no need to worry about whether phonetics is in danger of being subordinated to other fields and it is not profitable or practical in most situations to propose that independent departments of phonetics should be established. We have enough of a history and we have enough of a “base” in our professional organizations (including especially the IPA), our journals, our presence in widely dispersed research centers around the world, and in our professional meetings (especially the International Congress of Phonetic Sciences), such that we do not have any immediate threat to the identity of phonetics. In my university, phonetics is studied primarily in linguistics but some phonetics is also offered in psychology, electrical engineering-computer science, and the various modern language departments. There is a fair amount of interdepartmental exchange of ideas, students enrolling in classes outside their home departments and other forms of cross-department interaction. A greater problem than the continued independent existence of phonetics is finding ways to increase communication with sister disciplines that include some phonetics or that serve phonetics.

For this reason I think Ladefoged’s remarks at the 11th ICPHS were quite appropriate. Phonetics and the ICPHS is populated by people of widely different backgrounds and expertise but driven by one or more of the above-listed questions. It is necessary to recognize, as he said, that no one has all the answers but “every four years we can get together and pool our knowledge.” How else could we encourage communication and cooperation between the linguist, the psychologist, the language teacher, and the communication engineer?

If, as Kohler mentions, phonetics in some administrative environments is ‘misunderstood’ and thus neglected by funding agencies, then this calls for an effort at educating those administrators and, for that matter, the public as a whole. It would be appropriate, then, for the IPA to promote greater public awareness of the activities of phonetics. This would be more likely to further the interests of the field rather than advocating the establishment of separate departments of phonetics in universities.

Conclusion

In sum, I believe our history and our present practice illustrate the need for phonetics to seek further integration with any and all fields that can help us get answers to our questions. In parallel with this, it would be worthwhile to educate the public about the goals and the accomplishments of phonetics.

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