editorial

A new breed of PhD?

A significant difference in opinion has become apparent among physicists over the question of what the demand will be in future years for new physics PhD's. The difference in outlook centers on whether we can expect that large numbers of physicists will be employed by the massive new efforts about to be launched to cope with the problems of the environment and society.

Many of us share the opinion expressed recently on this page that these new programs will require substantial contributions from physicists. But others hold an opposing point of view, as reflected recently in the "Letters" department. Their argument is that we are not justified in encouraging students to take PhD's in physics if they intend eventually to work in these new applied areas. The students are better off, it is asserted, if they do graduate work directly in the field they hope to work in, such as atmospheric pollution, oceanography, urban planning, and so on.

I maintain that this point of view fails to consider that these "large-system" problems are large beyond the scope of any specialized discipline and that research efforts leading eventually to solutions will require the contributions of many disciplines including physics.

To see that this is so, consider our experience with a large-system problem that has been the object of research for many years—namely medicine. Obviously the impressive advances in new knowledge in this field have been generated not predominately by physicians but through the research efforts of many disciplines including such diverse contributions from physics as electron microscopy of viruses and the hydrodynamics of blood clotting in the circulatory system.

A useful thing for physicists to do at this time would be to engage in discussions that define more clearly the special kinds of contributions that physicists can bring to large-system problems. Of course we have our specialized branches of knowledge to offer providing fundamental descriptions of material systems ranging from galaxies to elementary particles. But it is likely that the physicist's most valuable contribution to the interdisciplinary team will be his particular way of approaching problems rather than his specialized factual knowledge. Wouldn't the most meaningful definition of a physicist be that he is someone who has a knack for formulating the description of a system or theory of a process in the most fundamental and most general terms? This special talent is no doubt the reason that physicists frequently proved to be the natural leaders of operations research groups during World War II. And we can expect that this talent will again make the physicist a key man in the new interdisciplinary efforts now just getting started.

At the same time I do not mean to imply that graduate training in physics should remain unchanged. At least one prominent voice in university circles has suggested that some PhD candidates be encouraged to select thesis topics dealing directly with environmental or sociological problems.

Having had the advantage of sharpening their wits on traditional problems in physics and observing first hand how veteran physicists formulate and think about problems, this new breed of physics PhD's would, I predict, soon be found among those leading the way to an understanding of the urgent new problems of our age.

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