A new role for science—II

We are entering a period of change in the very styles of science

Just as we find it hard to put new concepts of a field of science into teaching, so we run into similar frustrations in trying to gear our research effort for entry into a new era. In a sense, we are handicapped in moving ahead by the very excellence of what we have done in the past. If our past record were rotten, we would be justified in cutting off old programs.

The problem is intensified by the current contraction in federal support for science. We see a dilemma arising. There are good reasons for the public to ask, "What has science done for us recently?" However, the act of contraction takes a form that tends to perpetuate the present styles of science. For example, there is no convincing indication that the National Science Foundation has worked out any viable scheme for emphasizing support of work because it may become the science of the future. Recently one of my colleagues put the problem well when he said, "I just can't get new work supported. It is always judged naive, and it may be. But, I do get support for more of the stuff I have been doing for the past 10 years. That isn't naive, but I am getting bored with it."

A strong stimulus toward scientific renascence is being supplied by pressure to turn the power of science to solution of society's pressing problems, such as environmental pollution. There is some danger that well-meaning scientists will charge into the arena and create all kinds of havoc because of habits developed within science. We are trained to define problems and objectives so that we can seek *the* answer.

We are going to have to change our analytical methods a great deal to make an effective contribution to problems such as atmospheric pollution where we must find, not a single solution, but families of technical solutions because of the unknown course of events in the socio-economic sphere. It is already well known that currently fashionable scientific education is not stunningly successful in preparing people to face even the complexity of problems encountered in technological industries; at least we hear considerable complaint about the science graduate who tries to turn every problem into a subproblem as elementary as the one on which he did his graduate research.

Actually, the greatest benefits may derive from the fact that we will have to think carefully about the relationships between the simple and the complex. I see chemistry, with its direct relationship to the complexities of biology and engineering, as a place for especially fruitful action. I hope that chemists will begin to learn more about the field of systems analysis and predict that by 1980 there will be a growing number of people who call themselves "systems chemists."

To return to teaching, I believe we are entering a period when curriculums in science will be rolling programs with no permanently fixed form. The time may come when freshmen will not ask seniors what courses they should take, but will instead ask for predictions as to what courses will be around in four years. I even wonder if we should speak of the future of chemistry at all.

Another 20 years may see emergence of a new set of academic disciplines built around a new grouping of unifying concepts.

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