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Too Much Chemical Engineering

Research Is Dull . . . Dull . . . Dull

Chemical engineering educators pride themselves on the broad basic character of their research interests. Unlike some other disciplines, chemical engineering does not encourage narrow specialization but lends itself to a wider, comprehensive outlook. After all, chemistry is a major component of reasonable solutions to most of the crucial problems facing our society, is it not? Yet, unlike any other major discipline, two-thirds of all work done in chemical engineering departments across the entire country is supported by a single funding agency, the National Science Foundation. Evidently we have either not been successful or not tried very hard to convince people in the AEC, in the many offices of DOD, EPA, OCR, NASA, or even in industry of the relevance of the concerns of most chemical engineering educators to the particular mission-oriented interests of those agencies.

Can it be that the community of chemical engineering educators has been too heavily involved in intellectual exercises, stimulating perhaps to them, but to very few others? The *Journal* contents are a good representation of work in our academic departments, yet judging from both the comments and subscriptions of practicing engineers, their predominant attitude toward the *Journal* seems to be one of overwhelming disinterest and even obliviousness. More bubble phenomena, more applied math, more thermodynamic data, more rheology, more transport phenomena—all in the classical vein—just are not calculated to excite anybody. We have too much emphasis on analysis and too little concern for synthesis, or creativity, or innovativeness.

On the other hand, committees of the NAS, the granting agencies, and distinguished leaders of chemistry are calling for chemists to make their work more "relevant"—to direct their efforts more towards real-world problems. This admonition is pertinent for all of us, pure, applied, and in between, for our opportunities are too great and our times too crucial for merely more basic research. But chemistry applied to the needs of man is by definition chemical engineering; thus the chemists are being admonished to become more like chemical engineers. The only reason for the existence of chemical engineering as a separate discipline is our knowledge of and facility for applying chemistry to better the lot of mankind. If our educators concentrate on exercise and ignore our reason for existence, our profession will disappear and our society will be the poorer.

Certainly we will need to know more about bubbles, more PVT and C_p data, more transport coefficients, and the like; and we hope some research programs will continue to collect these data and to develop correlations and insights. But please let us have more work in chemical engineering departments that is provocative and on the cutting edge of new science. Chemical engineers are concerned with synthesizing compounds, so let us have more emphasis on plasma chemistry, on electrochemistry, and on high pressure and high temperature chemistry. Kinetics and the specificity of reactions are at the heart of our concerns, so let us have more emphasis on surface chemistry, crossed-beam scattering, and enzymology. We are interested in materials, so why not more emphasis upon hydrogels or the boron nitrogen isoelectronic analogs of all of the common carbon based polymers? Academic research in cryobiological preservative procedures, in enzymatically catalyzed synthetic chemical procedures, and in the applications of lasers in chemical synthesis and processing are all exciting process-oriented activities.

This listing is clearly not encyclopedic and probably does not even contain the most promising ideas that one might imagine. However, the ideas do constitute a class or tone of activity that is now all too rare in chemical engineering academic activities. Shouldn't we move more briskly into this kind of "gee whiz" research and development?

HENRY A. MCGEE, JR.

EDITOR'S NOTE: This editorial was written by Editorial Board member Henry A. McGee, Jr., Head of the Department of Chemical Engineering at Virginia Polytechnic Institute and State University, Blacksburg, Virginia.