

## Pure or Applied?

IT seems that in the general desire to acknowledge and recognize the contributions of science to our present society, there is a tendency to glamorize the basic sciences at the expense of their engineering counterparts. It is almost as if a descending hierarchy has been established between theory at one end and practice at the other. Perhaps this is not the case, but articles on the danger of neglecting pure research in the interest of its applications and lamenting the distribution of research and development funds are a familiar sight, while it is seldom noted that only rarely can pure research proceed faster than the engineering technology on which it rests. Such articles foster the idea that research is reserved to pure science while the design engineer is relegated to the role of skillful computer.

This editorial permits me the opportunity to state the case for engineering; for utility must be the gauge. Even those who decry our lack of interest in basic science ultimately justify it by pointing to the many contributions which have been made to our technology by seemingly irrelevant investigation. Of course, usefulness is a broad term and includes much of human activity. In the mathematical fraternity in which I traveled for a time, it was not unusual to encounter a certain pride in research having no foreseeable application. But isn't curiosity itself a fundamental hunger? And who can say that knowledge for its own sake may not become man's principal justification for his scientific efforts, or even, for that matter, tell what mathematical theorem is useless?

Clearly then, the curve of worth cannot continually slope upward as the research effort recedes from its applications without our concluding that the useless work is the most valuable.

Applied or Pure, all research is a quest for knowledge. Both are equally interesting, equally difficult and, when progress is made, give equal pleasure. Pure research is so vital to us, not because it is "pure," but because it is basic to the engineering sciences. The engineering sciences are equally important because without them, our basic knowledge would effect our lives in only a minor way.

Society is enormously indebted to those who work without the satisfaction of seeing their efforts immediately put to use but, as one draws farther and farther from the application, the special requirements of a problem become less onerous. The path in some ways is easier. Projects can be selected at the frontier of knowledge, often in a virgin field, on the basis of interest and solvability rather than immediate need. The design engineer, on the other hand, who works at a "nerve-fraying" problem with constraints that are given in terms of rigid specifications, bounded by definite limits on time and money, has, in general, a more frustrating task and is entitled to every credit and consideration.

After all, it is not a question of pure research vs developmental engineering, because neither can proceed far without the other; but rather, where they should devote their time working together as a team.

—HENRY J. RIBLET

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