Engineering Science

IN SEPTEMBER 1952 the engineering societies of this country celebrated a Centennial of Engineering in Chicago. Among the many themes developed, one session sponsored by the American Society of Engineering Education asserted that "The Modern Engineer is a Scientist." Although this may overstate realities somewhat, it does emphasize that there is a well-earned place for engineering among scientific disciplines.

The engineer is becoming increasingly aware that he must depend not only on the tools of the artisan and technician, but indeed upon all the resources of science. The art of engineering continually applies the results of science to the production of goods and services. Furthermore, it constantly demands of science an increasing understanding of natural phenomena to solve its design and development problems.

In order that this interchange between engineering and science may be active and effective, there must be a sense of obligation to engineering by the scientist and a receptive understanding of science by the engineer. Those scientists whose research increases engineering design information comprise the chief contributors to engineering science. They must appreciate and support the engineering objective, but they draw their special knowledge from the field of science.

In considering current technological development the engineering educator is concerned with the role of the engineer as a scientist. Many of the earliest scientists were engineers as well, but with the evolution of engineering education the role of the pure scientist was somewhat removed from practice, even though his services remained essential in the training of the engineer. Today, the rate of application of science is such that the traditional interpretative function of the educator in converting science to engineering is no longer sufficient. There must be someone to provide this service on the job.

It is only to the extent that scientists have become engineers and that engineers have succeeded in being scientists that our recent technical advances have been successful. Although developments in pure science provided the essential foundations for advances in such areas as nuclear energy, supersonic aircraft propulsion, and petroleum chemistry, the progression from laboratory through development to practice could not have occurred in so short a time without this collaboration. With the commercial availability of helium cryostats, still another scientific pressure is demanding active participation by engineers.

The emergency requirements of recent years have drawn many scientists away from basic background studies and have imposed excessive burdens on engineers, but the engineering scientist has shown that the gap between engineering practice and scientific research can be bridged effectively and continuously. In this field the shortage of scientific talent is unusually acute. It can be relieved by increased engineering training at graduate levels and by greater sympathy among scientists for engineering objectives and viewpoints. Engineering scientists in sufficient numbers will not only raise the quality and effectiveness of design and production but also provide many essential services to the increasingly complex facilities for scientific research.

Fortunately there are many among the engineers who fill this role capably. Recent advances in elasticity and plasticity promise radical changes in design practice for structures and machine elements. Chemical and mechanical engineers are continually increasing their fundamental understanding of heat and mass transfer. The field of communications has been remade by the electrical engineers. These achievements embody scientific contributions in that knowledge of physical phenomena is being extended by observation, analysis, and synthesis. The objective, however, remains design information. To the extent that this function is recognized and accepted, progress in both engineering and science will be promoted.

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