

THE PERSONALITY OF A PROFESSION*

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I am genuinely proud to be an engineer, and to be part of the engineering profession.

I want to make these attitudes clear at the very beginning. For it is precisely because I regard our profession so highly that I dwell on some of its shortcomings rather than on its accomplishments. There are flaws in the collective personality of our profession, and I would like to suggest some measures that might help to correct these deficiencies.

In the thirty years since I first entered engineering, I have seen our profession confronted with wholly unexpected responsibilities because of our command of a technology which developed with unexpected speed. In works that Shakespeare first made famous, engineers have had "greatness thrust upon them."

We have met the purely technological part of this challenge superbly. But I contend that the engineer of today is not providing a standard of guidance and leadership related to the human effects and social consequences of his technology, that is commensurate with the impact of his work and the importance of his profession.

By virtue of what he knows and his professional application of that knowledge, the engineer is a social force. By reason of the enduring effect of his work, the engineer bears a social responsibility to see that he does not, while solving a technical problem, create a human one.

Because of the increasing technical complexity of our problems the engineer is rapidly becoming someone who works on pieces of a puzzle, and if this trend is carried to its extreme he will ultimately find himself operating in a technological straightjacket—totally confined to executing the means, without being able to discern the ends. Coupled with this trend is the most un-

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fortunate flaw in the engineer's professional personality—his repeatedly demonstrated reluctance to involve himself in the search for solutions to complicated, troublesome, politically oriented questions of public policy.

In my view the engineer is exhibiting a thoroughly disquieting tendency toward withdrawal from the total spectrum of public affairs. Though master of technology, the engineer seems to be willingly isolating himself from a view of the social consequences of his acts.

One of the engineers who took part in our survey commented on this disturbing trend quite bluntly:

"Despite their training in solving problems," he said, "despite their ability to combine hard facts with intuitive judgments, despite their intelligence, engineers are generally ineffective in public affairs because they are not interested in people." Another remarked that many engineers "are living within a technical shell. They are afraid to live with people."

These are harsh words. Is it really true that engineers like numbers more than they like people? I think not; and I believe that the engineer's reluctance to come to grips with public problems as a citizen and leader—instead of serving solely as a technical consultant—is rooted in his own misconception of his proper function

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in society. Somehow the engineer has come to believe that professionalism and participation are mutually exclusive, and this attitude has been grafted onto the personality of our profession.

In his preoccupation with technology, and with the outward trappings of professionalism, I am afraid that the engineer is neglecting the one activity that, in the long run, will do the most to assure him unquestioned professional respect: *service* to his community, his city, his state and nation. One of our survey respondents put it this way:

"Neither the public welfare nor the engineering profession can hope to benefit from a meager engineering participation in the public forums where vital government policy is developed, and where decisions are made that will affect our way of life for years to come."

Another problem is inherent in this hardening attitude of withdrawal into the narrow comforts of technical expertise. This is the distinct danger that the younger engineers now in the profession, and the next generation of engineers now in the colleges, will be led by example to believe in this idea of isolation from the ferment of society.

So I believe that we as professionals have a dual responsibility. First, we should guide the thrust of our profession's energies toward increased participation in public questions, so that engineers can be of increased service to society. Second, we should marshal our experience and our efforts in behalf of the coming generations of engineers so that they are well prepared for the demands of the profession, as well as being qualified in the tools of our trade.

To expose problem areas in our profession is one thing; to come up with solutions is quite another. Quite obviously I cannot recite the ultimate answers to these problems. But I do want to suggest some specifics which might point the way toward improvement.

- It is in the sphere of public service that I feel the Texas Society of Professional Engineers performs one of its most valuable functions. For example, there is TSPE's record of accomplishment in working with state boards and commissions. The activities of TSPE in helping formulate progressive state policies toward the use and conservation of water are well known. And I am most encouraged to hear that the Society is now putting together a group called "PERT"—an acronym for Professional Engineers Recommendations for Texas. As I understand it, "PERT" will be composed of en-

gineers of the highest competence who will provide counsel and advice on broad public issues in the state.

Much has been made of the fact that few engineers run for public office, and more should be encouraged to do so. But an engineer does not have to be in public office to serve the public interest. Engineers should *take positions* on public issues, both as individuals and on an organized basis—either through their professional society, or in some other manner if that is not possible. And these positions should then be *communicated* to public officials and to the public at large. This will inevitably involve the utilization of publicity through mass communications media—an activity which many engineers seem to regard with horror. But publicity is a legitimate way to insure that the views of engineers are known to the public.

- It is of particular importance that the engineering profession take a more aggressive stance on issues which fall into our general area of expertise, such as mass transit, urban renewal, and city planning. Our most formidable problems today are in the cities; yet, perversely, it is here that the engineer's voice is becoming ever more faint.

With hardly a struggle the engineer has abandoned the field of city planning and urban renewal to a new group of planning consultants with different training and orientation. In so doing, he has become less and less a voice in the decision-making process. His influence is being consistently overshadowed in the deliberations where the future of the cities is being decided.

I am convinced that if these difficult urban problems are to be solved enduringly, and with the most effective utilization of our financial resources, the engineer must reassert his capabilities in a leading rather than a supporting role. We must re-establish in our profession the obligation of leadership on these—and other—public problems, and rediscover the concept of selfless service.

- This concept of service must embrace not only our own concerns; it must also look to the next generation of engineers as well. The lines of contact between the practicing professionals and the campuses should be even stronger than they are today.

- Time and again, the replies in our survey emphasized the need for more interchange between the practical and the academic. We had

asked these experienced engineers to give us the benefit of their hindsight. Their words differed widely, but their ideas focused on two major areas which they deemed worthy of more emphasis in the engineering curriculum:

—Fundamentals of business management and business practices.

—Development of communications skills, both verbal and written, by the student engineer.

Measures should be taken to correct these deficiencies; steps that place emphasis on action. Why not, for example, have an interchange between an engineering professor and a practicing professional—have them actually switch jobs for a specified period?

• There is growing evidence that many young engineers are already taking additional time to prepare themselves, by extending their education to the graduate level. A report by the ASEE states that only ten years from this date, two out of three bachelor's graduates will go on to a master's degree, and one in seven will go on to a doctorate.

The increasing number who go to the doctoral level may run afoul of what I feel is an anomaly in our system of engineering education. I refer to the preoccupation with research found in many advanced curricula. In no way do I demean the idea of research; but I do feel that the present emphasis on it is to some extent incompatible with the historical function of the engineer.

Throughout time, the engineer's role has remained essentially unchanged: he takes existing knowledge and does something useful with it for the benefit of society. In this process he often extends knowledge, or exposes blank areas where new knowledge is needed; but primarily he applies that which is known.

With this in mind, **I am convinced that there is need to restructure graduate programs so as to allow those who are not primarily research-oriented to obtain advanced training more suited to their field of interest.** Many engineers seeking advanced degrees are interested in preparation for such functions as design, development, and management; I think they deserve the opportunity to obtain such training. I do not suggest that we abandon the engineering laboratory; only that we redefine it. Where could there be more challenging laboratories than our great urban complexes, with their needs for imaginative and original engineering solutions?

• I suspect that we may also have to be prepared to redefine the word "engineer." It is

becoming obvious that the traditional dividing lines of the educational disciplines are proving inadequate in producing people qualified to practice certain specialties. Recent developments combining engineering and medical skills are illustrative of this point. We may shortly be producing engineers of a hybrid nature—for example, a "social engineer" who applies engineering knowledge, systems analysis, and new tools such as the computer, telecommunications, and teaching machines to the solving of social problems.

I can envision the day when a student will go through three to four years of basic engineering training, and then will supplement this with two to three years of additional training in non-engineering fields to qualify him for a particular specialty. In such a way, for example, we might produce an "urbanologist" who combines knowledge in the basic sciences, the social sciences, and the humanities and uses this knowledge to cope with urban problems. Such an individual would combine some of the qualities of the engineer, the city planner, the educator, the sociologist—and, perhaps, the politician.

Obviously the field of engineering education, like the field of public service, offers endless challenges to the engineer. To anyone who takes these challenges seriously, it must seem at times as if the professional engineer is expected to be all things to all men.

We can't be, of course; but we can set ourselves the highest professional goals and work toward them. Where technology is concerned, we have remarkable new tools to work with. Our difficulties are likely to be nontechnical—as they are now—and within the realm of the intangible. We must reshape our professional personality so that we are more sensitive in the areas of human understanding and social awareness.

Early in these remarks I suggested that engineers have had "greatness thrust upon them." Those latter words, originally, were Shakespeare's, and the full quotation from his play *Twelfth Night* reads as follows: "Some are born great, some achieve greatness, and some have greatness thrust upon them."

I sincerely hope that subsequent events will prove that my choice of words was mistaken; that it can be said of the engineer, not that he is "born great," not that greatness is "thrust upon him," but that he is among those rare few who "achieve greatness."