Letters

Brain Drain from Midwest

As a manpower economist, I am concerned with the long-range impact on the Midwest of substantial losses of professional talent. The Millett-Jerison-Mulholland letters (19 May, 1 Sept., and 10 Nov.) all relate to National Science Foundation contracts and grants. Their impact is probably negligible in comparison with that of research and development funds stemming from other federal agencies. The NSF study of the "Geographic Distribution of Federal Funds for Research and Development, Fiscal Year 1965" breaks down the federal R&D dollar by agency of origin as follows (by percentage): Defense, 47; NASA, 34; AEC, 9; HEW, 6; Agriculture, 1; NSF, 1; and all others, 2. The dollar total is $14.4 billion.

Without minimizing the importance of the NSF penny as "seed money," the quantitative impact of defense-space funds on mobility of professional manpower is probably seven to nine times as great. Concern, furthermore, extends far beyond Ohio. The East-North-Central region especially (Ohio, Indiana, Illinois, Michigan, and Wisconsin) could suffer serious long-range consequences due to widely disproportionate allocation of federal R&D funds. The NSF study above-cited indicates that this region accounts for 23.7 percent of the Ph.D.'s awarded in science and engineering; 19.7 percent of the nation's population; and pays 25.6 percent of all federal taxes. Without arguing that the relationship between these proportions and total federal R&D allocations by region should be precise, the disparity is so wide as to suggest that national interests may also be harmed. The East-North-Central states were awarded only 6.4 percent of total federal R&D funds.

Industrial Research (September 1967) notes that among various activities in which professional manpower is employed, "R&D Pays Best." It reports higher salaries as a major reason for job changes. With only 6.4 percent of federal R&D expenditures going to the East-North-Central region, substantial net losses of such manpower can be expected. The reasons for moving should be assessed—by state and region—taking into account "before" and "after" employment as well as salary and fringe advantages.

The fact that a region with less than one-fifth of the nation's population awards nearly one-fourth of the science and engineering Ph.D.'s suggests fairly solid support for higher education. But this enthusiasm could well be dampened when the region finds itself indefinitely financing the training of scientists, engineers, and other professional manpower for distant wealthy regions, through state as well as federal taxes. It should not be too much to urge that more research be devoted to the regional "brain drain," by state within the United States, especially since 1960.

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Reserve of Physics Teachers

A recent newsletter of the Commission on College Physics indicates that 66 percent of the nation's high school physics teachers have inadequate preparation in physics (adequate preparation was defined as 18 or more credits in physics) (*1*). It was also reported that only 500 persons are graduated annually who are certified to teach physics, and of these, only 350 actually enter teaching. It was conservatively estimated that each year 800 people leave physics teaching, forming an annual deficit of 450 teachers. Hence, much of high school physics education is left to teachers with little knowledge of the subject. The newsletter further states that fewer than ten schools in the nation graduate more than five physics teachers per year. Obviously, something must be done to counteract this teaching deficiency since high school physics is probably the most important physics course offered. Indeed, it is usually the only course taken in this area by the majority of the population.

Having worked in industry, I can attest that there are a large number of scientists with many years of professional experience who desire to teach, but who are prevented, not only by their lack of education credits but also by the indifference of the public toward the quality of secondary-level teaching. A further deterrent is their reluctance to perform nonprofessional tasks such as hall duty or lunchroom duty.

However, I believe these industrial scientists could be attracted to high school teaching if they were employed by local colleges and universities, given full professional status, and then "loaned" on a part-time basis to high schools. Many schools don't require a full-time physics teacher, so that a "consultant" on the faculty would not be expected to teach the more elementary science courses. He could also conduct in-service science courses for the regular faculty and thus upgrade their science preparation. (Actually this arrangement would have reciprocal benefits because the consultant would learn teaching methods in the process.) This proposal would be instrumental in freeing the consultant from the nonprofessional aspects of teaching.

Such a consultant should spend approximately 25 percent of his time teaching at his college. A bridge of communication would be built between college and high school; and it is possible that the consultant's own prestige in the classroom could positively motivate more students toward a career in science. If the various administrative hurdles could be overcome in establishing such a teaching program, I feel this scheme would be most useful in attracting more industrial scientists to the high school classroom.

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Reference

1. *Commission on College Physics Newsletter No. 13* (May 1967).