Letters

The Ph.D. Market

I am disturbed about the attitudes toward doctoral programs and doctorate holders expressed in the article "The future market for Ph.D.'s" by Dael Wolfle and Charles V. Kidd (27 Aug., p. 784). Wolfle and Kidd propose that the national need for persons trained to the doctoral level has been met and that there is now a surplus of people with doctorates. Moreover, it appears that the production of doctorates will continue to increase for some years, as will the disparity between the number of jobs and the number of doctorate holders. The implicit assumption is that such a situation is bad, one to be avoided at some cost.

One major ideological strand subsumed in manpower studies is what might be called the licensing approach to higher education. A degree is viewed both as a license to practice a particular trade or profession and, especially for the Ph.D. holder, a near guarantee of a job.

Clearly, from this point of view, the number of people who hold doctorates must be commensurate with the number of positions available. Since the number of available positions is determined by factors outside the universities, nonacademic agencies often attempt to change the content of academic programs. These are, in effect, attempts to make the university more responsive to external economic pressures. We have seen the gross abundance which resulted from the infusion of federal funds in massive quantities. Now we feel the pinch. Wolfle and Kidd hint (p. 792) that our own self-interest and other intangibles will make the problem worse.

Another strand of ideas that has always been implicit in the American approach to higher education was made explicit by Stephen K. Bailey, a regent of the State of New York, when he noted that the purpose of higher education is not so much to prepare people for occupations as it is "to make joyful persons" (*1*). In other words, there are reasons for earning an academic degree that may be quite unrelated to those assumed in manpower surveys.

Graduate faculties have an obligation to let students know what the job market is like, so they can make wise decisions about pursuing advanced degrees. But the decision ought to be left to the student. There is little reason why graduate departments should function as filters for the professions. There are good reasons for limiting enrollment, but a shortage of positions, it seems to me, is not one of them. Nor is it a good reason for limiting the number of graduate programs available in the nation.

Some students who are now entering graduate programs seem to understand the situation. One of our new students explained that if he had not gone to college, he would have retired to the mountains of Pennsylvania and become a cabinetmaker. Now he expects to have a Ph.D. when he opens his cabinetmaking business in the Pennsylvania mountains. My guess is that both he and the rest of us will be better off for his having a doctorate.

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Reference

1. S. K. Bailey, address delivered at the inauguration of Marvin A. Rapp as third president of Onondaga Community College, Syracuse, N.Y., November 1968.

Because I received my Ph.D. last June and was fortunate enough to find a good job, I may have something to add to the article by Wolfle and Kidd.

A large part of the overproduction of Ph.D.'s is due to a disease, now quite widespread in the professional community, known as "publish or perish." Most professional scientists are pressured to publish so that they may secure salary and status raises. To publish a scientific paper requires research, analysis of data, and organization of the data into a form suitable for publication. These tasks should be done by professionals in laboratories, but they are usually too time consuming and too expensive. The only answer is to hire more and more graduate students to collect the data and write a large percentage of the papers.

A lot of graduate students are nothing more than glorified technicians. After years of dedicated work and trying to live on salaries that approach poverty levels, they are awarded the highest academic degree, a Ph.D. I wonder how many of the new Ph.D.'s have a real love for science and scientific investigation. Advisers to graduate students should ask themselves whether they are producing professional scientists or professional technicians.

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The main purpose of our article was to present and compare the forecasts of supply and demand of Ph.D.'s that have been made by the most competent people. Our intent was to help all who are concerned with graduate education to consider the adjustments that must be made when the number of Ph.D.'s is increasing more rapidly than the number of positions generally considered suitable by Ph.D.'s. Neither Pia nor Rolek considers this point. Our article was intended to supply information that would help students and others make those decisions.

Clearly the graduate student is not the only person whose decisions are or should be involved. Pia's example of the cabinetmaker quite overlooks the legitimate question of how much society wishes, or can afford, to share the cost of the most expensive level of education. Pia makes earning a Ph.D. wholly a consumer good, desired by the recipient but of no value to society. Desire by the recipient is certainly one legitimate value of the Ph.D., but if it is all that is involved, society might well ask the recipient to pay all of the costs.

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Environmental Quality Standards

In his article "Sanity in research and evaluation of environmental health" (12 Nov., p. 662) H. E. Stokinger calls for a "realistic" evaluation of environmental problems and suggests seven "commandments" to guide us. Many unfortunate statements by overzealous

environmentalists would certainly be avoided if they abided by Stokinger's first and second "commandments": "Standards must be based on scientific facts . . ." and "All standards, guides, limits, and so on, as well as the criteria on which they are based, must be completely documented."

However, in his great zeal to prevent excesses in environmental conservation, I wonder if Stokinger does not himself violate his own "commandments." He implies that excessive (but presumably politically possible) antipollution expenditures could lead to ". . . economic upheaval approaching disaster." I would call this an undocumented fear. Reasonable arguments could probably be made that large antipollution expenditures could *aid* our economy almost as much as the same amount of defense spending.

Stokinger tells us that "Already a number of small manufacturing plants have been forced to close, unable to bear the burden of meeting pollution standards." He does not present evidence (or even *state*) that a significant fraction of these closings were unjustified when economic and environmental considerations were balanced. His argument seems a bit like the "scare tactics" used by overzealous antipollutionists.

I agree with Stokinger that increased costs for pollution control will be passed on to the consumer, but this in itself is not a negative aspect of pollution control. This factor should ordinarily have little relevance in determining whether or not a given antipollution action is justified. We should expect to pay for a cleaner environment, as we pay for improved automobile safety and more advanced medical care.

I quote, without comment (but with my italization), a part of Stokinger's conclusions on ". . . unnecessarily severe pollution standards." "It should thus be evident that such actions, with their unbearable consequences, should only be taken when it is clear *beyond a shadow of scientific doubt* that human health is in *imminent* danger. . . ."

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Stockinger elevates pollutants to superhuman status by stating that antipollution "actions . . . should only be taken when it is clear beyond a shadow of scientific doubt that human health is in imminent danger. . . ." Such clarity, of course, is rarely attained.

Chemicals are not "innocent until proven guilty"; they do not have human rights. Unless we treat them as guilty until proven innocent, they will deprive real human beings of their rights to health. The burden of proof must be on the chemicals and their makers—not on the human population.

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The incomplete, seven-point decalogue of H. E. Stokinger can be brought closer to the needed "ecologue" by adding three commandments, since his strictly anthropocentric concept of environmental health gives short shrift to the health of the environment itself.

8) *Remember the planetary ecosystem, to keep it whole.* The most important system in which people function is not a medical system, but the planetary ecosystem; its own healthy operation is basic to human health and survival. The "scientific facts, realistically derived" of Stokinger's commandment 1 must not be limited to piecemeal facts derived from specialized "in vitro" laboratory science, but should also encompass an integrated understanding of the nature of the natural ecosystem and the limits of its tolerance to insults.

9) *Look upon short-term effects and actions as meaningful chiefly as they influence long-term effects and results, so that man may be long upon the earth.* To "determine trends" includes reasonable efforts at projection; the causes of the degradation and attrition of environment have been shown, by and large, to be increasing *exponentially*. "Osprey, bald eagle, and other fowl" may not be important to the "environmental health" discipline, but they are good indicators of the state of the biospheric life-support system. Concentrating too exclusively on direct, immediate effects of poisons on human health can be extremely short-sighted. Stokinger's claim to sanity and scientific objectivity would be more convincing if he had bothered to learn what is the consensus among ornithologists regarding the "questionable" harm from chlorinated hydrocarbons to other species at the top of the food chain. Perhaps unknowingly, Stokinger is disregarding much pertinent evidence from scientific (not "popular") ecology.

The ruinous concept "shoot first and ask questions afterward" has brought

on a pollution syndrome that present-day "banning" cannot cure for decades, even if such restraint operated effectively anywhere and were being applied worldwide. Neither proviso holds true. The main point of Stokinger's article is the need for restraint against restraints, a half-truth that, like a half-brick, can be thrown quite a distance in this year of ecologic backlash.

10) *Honor both economic and ecologic facts and principles, since a viable future for man depends on gradually but surely bringing human ecology into the functional respect presently accorded economics.*

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Stokinger calls for the setting of standards for noxious agents in food and environment that are based on scientific facts, with the qualifications that "provisional, tentative, or best judgment standards" may be used when there is "definite need." He states that in the absence of definite need "it is better to withhold [standards] until such time as the facts are in." He apparently overlooks two points.

The first point, emphasized by Alvin M. Weinberg (Letters, 5 Nov., p. 546), is that in many situations (especially with carcinogens and mutagens) practical considerations prevent complete scientific answers, and thus trans-scientific judgments are required for standard setting. The notion that scientific research can provide absolute and definitive data before permissible standards are set for all noxious agents is a relic from the days when toxicologists were concerned only with acute toxic effects in situations where "no-effect levels" could be readily established. Weinberg points out that for some agents a "no-effect level" cannot be determined.

The second point is that although Stokinger modifies his commandment 1, "Standards must be based on scientific facts," to permit "provisional, tentative, or best judgment standards . . . ," it is possible that he could seem, to the casual reader, to be advocating the extensive use of human beings as guinea pigs. This, in fact, is what often happens when there is a practice of permitting widespread use or dissemination of any potentially toxic agent until a "definite need" for its control is demonstrated from studies on animals or humans. This is no longer a tenable public health practice. Prudence often demands action as soon as potential human injury is indicated; prudence will not countenance waiting to take action until the potential injury or harm is in fact an actuality. In addition, if one were to wait for hard scientific data before restricting the use of toxic agents, unconscionably long delays might occur because of limited research resources.

The "seven commandments," to be widely applicable, should be modified to mean that once an agent has been found to be a *potential* hazard to man, the setting of a "realistic level" for control must be based on available scientific facts, and *also* a reasonable interpretation of relevant governmental regulations, wise consideration of epidemiologically revealed trends, and use of a reasonable "safety factor" when scientific data are incomplete.

I do not mean to minimize the need for scientific data when permissible standards are being set for noxious agents in food or environment, but hard scientific data are rarely available (and if available are incomplete) when a potential human hazard is first perceived. Our society cannot always wait for such data before acting but must frequently set "provisional, tentative, or best judgment standards" on the basis of potential hazard, rather than demonstrated "definite need."

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"Scientists of North America"

Dora B. Goldstein (Letters, 17 Sept., p. 1080) is right to complain about titles as *American Men of Science*, which imply, however inadvertently, that scientists are always men and never women. The old rule that "the masculine includes the feminine" seems uncalled for here. It is only fair that we male scientists recognize such slights and try to eliminate them. In this case, a title such as *Scientists of North America* would seem to be most appropriate, since Canadians are also listed.

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