LETTERS

Health Records

As one interested in occupational and environmental carcinogenesis, I would like to comment on the article "Cancer from chemicals: DuPont and congressman in numbers slugfest" by Philip M. Boffey (News and Comment, 17 Dec. 1976, p. 1252). All researchers in this field require data such as are apparently contained in the DuPont Company's cancer registry. In fact, the biggest problem in studying occupational carcinogenesis is that in most cases the data are simply not available. It is clearly advantageous for society if companies maintain follow-up records on the health of all present and former employees.

Unfortunately, it appears to me that when a company has maintained such records it is more likely to receive bad publicity than companies that do not bother to maintain any records at all. This system of rewards is inconsistent with the goals of society. If we are to control occupational disease, we must give encouragement to large organizations that maintain information that is helpful in relevant research.

We must learn to separate comments about the keeping of records from the uses to which the records are put. I believe in this case all sides and all persons concerned should applaud DuPont for maintaining their registry for two decades. Then if anyone wishes to dispute analyses of those records, let them clearly differentiate the analysis issue from that of maintaining records. In this way, perhaps we can convince more large organizations to establish and maintain adequate employee health records.

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The "Tenure" Problem

Harrison Shull, in his editorial "The university tenure 'problem' " (8 Oct. 1976, p. 137), states that we have "passed through most of the years of few or even no academic retirements." We have not. Allan Cartter (*1*, p. 119) has written that "the actual retirement rate in 1970 is estimated to have been 0.93 percent, or about 3400 teachers. Because of the rapid growth of college faculties in the 1960's and early 1970's, the projected retirement rate will continue to decline until the early 1980's when it is expected to reach 0.65 percent. After that time, as the median age begins to rise, the retirement rate will rise again to about 0.92 percent in 1990 under current retirement practices." The 1980 and 1990 retirement rates translate, respectively, into about 3000 and 4000 faculty members per year, using Cartter's projections of full-time instructional staff in institutions of higher education (*1*, p. 117, tables 6 and 7). It is worth noting that Cartter's projection of a total faculty of 456,000 ± 10,000 in 1984 is in accord with the projection of 451,000 made by the National Center for Educational Statistics (NECS) (*2*, p. 67).

The need for faculty is determined not only by the need to replace those who retire, die, or migrate out of academe, but also by student enrollments, if a constant faculty/student ratio is assumed. On this point, Shull writes, "undergraduate enrollments have increased and will probably remain high throughout much of the next decade. As a result, new positions are being created. . . ." The implication is that this need for faculty will add to the need for replacement. But that is most unlikely. The population of 18- to 22-year-olds (the nominal college-age population) will peak in the period 1978 to 1980 at 17.1 million and drop steadily throughout the 1980's to about 14.2 million in 1991. As a consequence, Cartter (*1*, pp. 117 and 123), the NCES (*2*, p. 68), and the National Science Foundation (NSF) (*3*, p. 35) project a diminishing faculty size. Cartter (*1*, p. 123) projects that the net faculty needs for the period 1981 to 1985 will be two-thirds of the replacement needs.

As for the present, Shull observes that "Even now, hiring in the research universities is about commensurate with that expected on the average for an even faculty age distribution." That observation does not approximate reality. A study by the Higher Education Panel of the American Council on Education (*4*) shows that, in the 15 science and engineering fields surveyed, the percentage of "young" faculty (those who received their Ph.D.'s less than 7 years earlier) declined from 30.1 percent to 27.9 percent in 1975. This drop is a continuation of the steady decline since 1968, when 42 percent of these faculties were "young" (*5*). And the 1100 departments in these fields expect that only 25 percent of their faculty will be "young" in 1980. The average faculty age in most science and engineering departments is increasing by 0.3 to 0.5 year each calendar year.

Cartter projects that 17 percent of the total doctorate output in the period 1981 to 1985 will be needed in academia if his prognosis of early retirement and increased out-migration takes place; only 3 percent will be needed if it does not (*1*, p. 239).

The NSF projections for faculty needs in the physical sciences and in engineering are equally alarming (*3*, p. 36).

Academia needs young faculty, and young scientists need the opportunities of teaching positions. The courses of action proposed by Shull are worthy and will help. But if we do not do a great deal more, the university tenure "problem" will be increasingly visible for the next decade.

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References

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2. K. A. Simon and M. M. Frankel, *Projections of Educational Statistics to 1984–1985* (NCES 76–210, National Center for Educational Statistics, Department of Health, Education, and Welfare, Washington, D.C., 1976).
3. *Projections of Science and Engineering Doctorate Supply and Utilization 1980 and 1985* (NSF 75–301, National Science Foundation, Washington, D.C., 1975).
4. F. J. Atelsek and I. L. Gomberg, *Young Doctorate Faculty in Selected Science and Engineering Departments, 1975 to 1980* (Higher Education Panel Report No. 30, American Council on Education, Washington, D.C., 1976).
5. *Young and Senior Science and Engineering Faculty, 1974* (NSF, 75–302, National Science Foundation, Washington, D.C., 1975).

Shull's editorial suggesting that the problem of over-tenured faculties may "disappear quietly" within the next decade will come as cold comfort to many an assistant professor facing an "up-or-out" tenure decision, for Shull overlooks an important "Catch-22." Tenure decisions, he emphasizes, must be made "very selectively," and if "a particular tenure decision is a debatable one, it should be negative." At the same time, to improve age distribution within faculties, Shull urges administrators to fill available positions only at the beginning level. Both counsels may be prudent for the institution, but what is their effect on the bright, energetic, productive, young scholar-teacher who has not, unfortunately, been productive enough to be undebatably tenurable? Terminated by his university after five to seven probationary years, during which he has begun to carve a niche in his field and master the art of teaching, he finds that other universities will not hire him because he is not at the beginning level. In years past, such a person might drop down a prestige level or two to a position in a "teaching univer-

sity" or a college. But the same rule—"hire only at the beginning level"—is being increasingly followed, if not mandated, in such institutions as well, and those so hired but not tenured after their probationary years face the same double bind. If we are satisfied to follow Shull's advice, statistically and institutionally the tenure problem may indeed just go away; but the price will be high in terms of wasted human resources—those who find themselves, in Matthew Arnold's phrase, "Wandering between two worlds, one dead,/ The other powerless to be born."

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Green's "Catch-22" problem is very real indeed. There is no instant solution to the problem of the mismatch between expectations of individuals who fail to receive tenure and the reality of the marketplace. I happen to believe that it is much more important for society to preserve the very best of our research institutions for the benefit of future generations of students, even if at the expense of failing to meet the expectations of deserving individuals caught in the present dilemma. It is not all bad, however, for these individuals to move out into a broader marketplace. Society needs well-educated individuals far beyond the narrow scope of the academic profession. The expectations of individuals and the demands of society for educated individuals must be broadened in the future to provide a better match.

Grodzins' statistics are impressive, probably mostly correct, but not completely relevant. He mixes two separable problems, each important in its own right. I was clearly writing about the "tenure problem" in research universities. Grodzins is writing about the employment problem in a wider context of institutions and fields beyond these. The two viewpoints are not coincident. It is important to dispose of the tenure problem in these research institutions (but not by doing away with tenure). This can be accomplished even while employment prospects in the larger picture remain unsatisfactory. With respect to Grodzins' third paragraph and quotation, simple arithmetic shows that, on the basis of an even distribution of age, one expects about 20 percent of faculty (that is, 7 years out of, say, 35) to have 7 or fewer years' experience. The decrease in observed percentage of young faculty is still commensurate with my estimate that new hiring is already back at the rate required for an even-age distribution, and probably somewhat above that. If hiring continues at this rate, and if new appointments are predominantly at the beginning career level, retirements in the years ahead will reduce the tenure fraction in due time. The situation is not ideal, but it is far from being desperate.

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Writing Posture and Paper Orientation

Levy and Reid (Reports, 15 Oct. 1976, p. 337) show that cerebral lateralization (determined by tachistoscopic tests) can be predicted by hand orientation in writing. Although not the primary focus of their report, it is pointed out by the authors that inverted writing posture is not a learned adaptation to the difficulty of writing from left to right with the left hand. There is, however, another basis for the notion that inverted writing posture is a learned rather than a biologically determined response. As Levy and Reid represent the situation in their figure 1 (reproduced here), inverted writing posture covaries with the orientation of the writing paper. When the vertical axis of the paper is parallel to the long axis of the writing arm, the normal posture is used. When the two axes are nonparallel (when the paper is rotated counterclockwise from vertical by left-handed writers), the inverted posture is used. It is this sinistral writer's experience that beginning writers, regardless of hand preference, are instructed to position their writing paper in the orientation used by normal dextrals (see Fig. 1). The inverted writing posture may be an adaptation by sinistrals to the orientation of their writing paper.

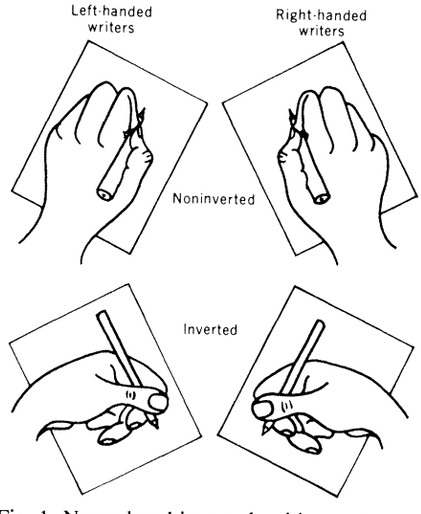

Fig. 1. Normal and inverted writing postures in left- and right-handed writers and the paper orientation adopted by each (as shown in report by J. Levy and M. Reid, 15 Oct. 1976, p. 337).

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Hemmes' comment can be answered by a consideration of some pertinent facts. First, our original results have now been completely confirmed by Reid in 5- and 8-year-old children by means of two entirely different tests of hemispheric lateralization. Further, the human brain is functionally, physiologically (as indicated by electroencephalograms), and anatomically laterally differentiated in human infants at birth, and behavioral asymmetries observed at this time are predictive of handedness at age 10. Also, the neurological literature over the last 50 years leaves no doubt that left-handed writers are a mixed population, some having language functions localized in the left hemisphere and some in the right, some having strong cerebral lateralization and some having weak.

Our research merely revealed that these variations among left-handed writers can be indexed quite accurately by the hand posture variable (also among right-handed writers, although only a small fraction of the latter have language functions in the right hemisphere). Some fraction of adults who used the inverted posture as children come to adopt the noninverted posture at a later time, due either to pressure from parents and teachers or to their own decision from observing how the majority of people write.

In young children (ages 5 and 6) who are classmates with the same teacher instructing them in hand posture, some sinistrals adopt the inverted posture and others adopt the noninverted posture. One of these groups of children simply reorients the paper appropriately. Also, we have observed approximately 30 right-handed writers who use the inverted posture, and these cannot be accounted for on the basis of improper paper orientation, since they are, after all, right-handed.

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