

valuable part of the educational process has been lost. I cannot argue against the utility of the computer in education to help convey more information in less time. The transmission of facts and their storage in student memory is a part of the educational process, but the development of judgment must be included if the process is to have its highest value. Since computers are finite machines, and programs for their use are even more limited, it is unlikely that programs that go substantially beyond the purveyance of facts will be numerous. Rational strategies for dealing with the anomalous, the unexpected, and the "variant normal" are what we hope our students will develop. I fear that, when the computers hold the questions, the immediate question suggested by material the student is working on—highly individual material, since specimens are never strictly "normal," whatever normal is—will never be asked. The unforeseen cannot be taken into account at the time it occurs if computers are entrusted with too large a share of course control. I plead strongly for a restriction of computer-assisted education to exactly that: computer assistance, not computer operation. It is my strong impression that canned courses are being delivered into the memory banks of machines, and that students are thereby being deprived of the chance to develop mature judgment along with their store of facts because instructors are out of sight and removed from participation in the learning process. When it is left too wholly to the machine, machine teaching tends to be a low-common-denominator style of hack work.

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Preclinical Medical Education

I agree with John C. Rose (20 Sept. 1974, p. 1022) in his concern over the possible fate of the preclinical departments in medical schools, but I disagree with many of his conclusions.

There can be no doubt that preclinical education can be best served by a faculty whose members are good teachers, experts in their discipline, and who have a fair knowledge of the clinical significance of their discipline. However, I believe that the medical research

being performed in preclinical departments must be considered as important as the teaching. While the present of medicine is in the clinic, the future still lies in the research laboratory.

Unfortunately, an M.D. has received no training in teaching or research, nor is he qualified as an expert in any discipline. Equally unfortunately, I recognize the widespread existence of the preclinical faculty member who has a Ph.D. degree but little knowledge of the medical significance of what he is expected to teach, even though his degree has provided him with training in both teaching and research.

It is my opinion that the Ph.D. can much more readily acquire the limited medical knowledge necessary for teaching than can the M.D. acquire the training necessary for teaching and research. I therefore recommend that the Ph.D. faculty member make use of some of the clinical teaching in his medical school and attend courses in pathology, pharmacology, and perhaps an introductory course in medicine. It would behoove the medical school's administration to provide some worthwhile incentives for such a plan, as it would not only improve the effectiveness of preclinical teaching, but would also improve the significance of preclinical research.

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Steinrauf makes this an "all-or-nothing" proposition. It is not. My point (and that of the British preclinical department chairmen) is that both M.D. and Ph.D. faculty members are needed to fulfill well the educational objectives of the medical school.

The M.D. degree does not confer an inability to teach or investigate. Full-time M.D. faculty members, and especially those in preclinical departments, have served as postdoctoral research fellows. Were Steinrauf to wander among the other departments of his school, he would find clinicians doing basic research.

What "incentives" could medical school administrations provide to get Ph.D. faculty members to attend clinically oriented courses? Even were this device feasible, it would result in a thin icing, perhaps enough to keep the teachers a few months ahead of the students. It would be better, by far, to

foster an appropriate mix in preclinical departments of M.D. and Ph.D. faculty members who talk to each other and who work together on curriculum and in the laboratory. (The "significance" of the research done in such a setting will be related more to talent than to degrees.)

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Biochemistry Registry

The American Society of Biological Chemists has established a computerized Registry of Women and Minority Group Biochemists that includes Ph.D.'s with all levels of experience. It is hoped that this registry will aid women and minority group biochemists and simultaneously help chairmen of departments and other administrators find qualified individuals from these groups to consider for job vacancies and appointments to advisory groups.

Eligible individuals can obtain curriculum vitae forms from Registry-Forms, American Society of Biological Chemists, 9650 Rockville Pike, Bethesda, Maryland 20014. Some of the items on the completed forms are computerized and the remainder are filed. We would like eligible individuals to fill out a form even if they are not looking for a job. Those who are not considering leaving their current job can indicate this preference on the form; however, they might be interested in serving on a committee, editorial board, or in holding a similar honorific post.

Employers and administrators can use the registry to obtain the curriculum vitae of individuals with certain specifications. For instance, a department chairman seeking to hire an associate professor with a minimum of 10 years experience who is working on the replication of animal viruses could be sent the curriculum vitae of those who qualify. Detailed information on the use of the registry is available from Biochemistry Registry, c/o Information Engineering, 3401 Market Street, Philadelphia, Pennsylvania 19104.

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