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### **MATHESON**

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next step would seem to be triangles. If NASA would only make our spacecraft a little more pointy, this being well within the range of 20th-century science; we may not have to wait for the 21st century.

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### **Project Hindsight: Basic Research**

There is a significant reason for the apparently small contribution made by basic research toward the development of new military weapons as reported in the Project Hindsight study (News and Comment, 18 Nov., p. 872). The fact is that the points of impact of the basic ideas with the beginnings of weaponry development were not included as "Events" for the stated reason that they were too difficult to identify. The ideas behind design and development were ideas that were born in the educational process or in specialized study—not found in recorded conversations and correspondence. There was no attempt to denigrate the role of basic research, but some end point had to be set in conducting the study.

It would be disturbing, therefore, if the Department of Defense should reach the conclusion from Hindsight that basic research is worth little support. One could map the Mississippi northward to Memphis and, from this, conclude that the Ohio River made no contribution to the flow.

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### **Electronic Network in Hospitals**

The article by Miller on EDUCOM (28 Oct, p. 483) states that "a national electronic network for transmitting hospital records is now feasible." This statement seems to be based, at least in part, on the experiences at the Massachusetts General Hospital with the Hospital Computer Project.

The unwary reader may make the erroneous inference that we have a program at the MGH that is capable of operational participation in such a network. The problems of using a computer to collect and process the information in the medical record are

complex, and the techniques we have evolved in our Laboratory of Computer Science are, in many ways, primitive and inadequate for a total system. There is still considerable developmental effort required in the areas of computer technology and terminal utilization and especially in our understanding and formularization of the problems and methods of solution. Any network capable of functioning in the next few years would contain only very limited patient information, and certainly not the total hospital record.

Miller is certainly correct in his thesis that a computer network for transmitting patient care information from one hospital to another is a desirable feature, not only to facilitate improved patient care in a mobile urban society, but also to make possible medical research on a large population. However, a network is only feasible when there are viable units, and this latter objective has not yet been realized. The significant problems concern the nature of medical practice and the characteristics of individual hospitals; once these are solved, the network problems should not present severe barriers.

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### **The Measure of Good Teaching**

With respect to the discussion concerning Warren Weaver's editorial, "Good teaching" (Letters, 19 Aug.), it seems to me that, in the simplest essence, the good teacher has to fulfill two independent roles. He has to communicate to his students the contents of the particular subject matter field that he is teaching. Since it is to students that he is communicating, it follows that the students should judge the effectiveness of his communication. This, I believe, is what is really measured by various tests of students' opinions of teachers. That is, they are judging the instructor with respect to whether he is telling them something in an interesting, enthusiastic, and dedicated fashion.

Students, of course, are not able to judge whether the instructor is giving the appropriate content information. An instructor may be just as enthusiastic and dedicated in imparting disproven facts as in describing new and current

information. How does one determine whether the content imparted by the instructor is up to date? This obviously must be done by the colleagues of the instructor, as Weaver states. However, this should not be done in a haphazard or casual fashion. To judge the effectiveness of an instructor, some of his colleagues must sit in on the instructor's class and hear what he has to say. This does not mean that they must sit in on each and every class the instructor teaches. It should be sufficient to sample just a few lectures. The instructor shall be given 2 or 3 weeks' notice that he will be visited by some of his colleagues who are going to judge him on the content of his material. I fully realize that this suggestion violates the basic tenet of the sanctity of the classroom. However, it is about time that this dogma was discarded or at least placed into proper perspective. I see nothing wrong with having one's colleagues sit in his classroom to hear his lecture several times a semester.

In summary, I think it is necessary to obtain reliable measures of student judgment of the communication process and colleague judgment of content of material before one is able to evaluate the effectiveness of an instructor.

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### Hardy and Weinberg Principle

Bensinger's letter (11 Nov., p. 725) took issue with the implication that increasing medical care, by allowing carriers of undesirable traits to reproduce, will lead to an increase in the proportion of the population carrying those traits. His quotation of the Hardy and Weinberg principle neglected the provision that mutations must be absent or very infrequent for the principle to hold. In the past the number of carriers of diabetes remained more or less constant because they were strongly disfavored due to early mortality, thus offsetting the new mutations which appeared in each generation. Now that carriers may survive and reproduce, the number of carriers will increase because mutations continue to occur.

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