Abridging Medical Education

My reaction to Walsh's article "Medical education: Carnegie panel urges expansion, acceleration" (13 Nov., p. 713) is that such expansion and acceleration may produce unexpected advantages. The demand that a larger amount of knowledge be acquired in a shorter period of time could foster a change in the attitudes of physicians toward continuing education. On the other hand, there is the danger that it will only further increase the current resistance of the physician to expose himself to future learning. Physicians too often assume a facade of omnipotence today as a defense against the unrealistic public and professional expectations that they should have a command of the vast total spectrum of medical knowledge. An obligation to continue one's education would threaten this facade by requiring a confrontation with deficient areas of knowledge. There must always be a lowering of defenses if new knowledge is to be accepted. It is certainly questionable whether continuing education can be acquired simply by attending symposiums at medical conventions and by following the literature in specialty journals.

One need in medical education is to instill the continuing spirit of inquiry in every student. This spirit has frequently been lacking in the exchange between professors and students because the faculty is required to encapsulate knowledge and deliver the final unsalable truth. There is often a general atmosphere of grandiosity, fostered by the public's needs, accepted by the teachers, and transmitted to the students in the medical schools.

This atmosphere may be changed if the students are to be given less time for preparation without the goal of acquiring total knowledge. The shorter training period may reveal to the students gaps in their preparation which will encourage them to seek continuing (throughout life) education—a step that is necessary if one is to use his potential to the maximum. These changes may not only increase the number of physicians, but they may continue to improve the breed.

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The Carnegie Commission's report calls for increasing medical school enrollment by 50 percent in 7 to 8 years, and an even greater increase in paramedical personnel—a very big order. In 1910 the Flexner Report led to improved medical education, and specialization and research orientation in academic medicine. If this Carnegie report is heeded seriously by medical educators, it should lead to a better system of health care.

One recommendation—shortening the period of medical training from 4 to 3 years should probably not be combined with another recommendation that the internship be eliminated. I would suggest that a medical student might consider either a 3-year medical school or skipping the internship, but not unless, of course, he does not plan to practice medicine.

Further, the Carnegie Commission proposes the creation of a "midpoint degree," after which the student could pursue the M.D. or Ph.D. curriculum or take employment as a teacher or as a medical assistant or associate. The last options would be better named research assistant or associate rather than medical, since one learns science and biology early in medical school, not medicine. An appropriate title for the "midpoint degree" might be master of science (M.S.) in human biology.

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Industry and Academe: Closer Ties

This may be an opportune time to consider closer integration between industrial requirements for research and development and academic or institutional basic research programs. Federal funding is no longer adequate to support a normal rate of growth of the basic research structure in universities built up over the last 15 years. Also, there are several advantages in forming closer ties between basic research and industry. The selection of basic research problems (from an otherwise-infinite range of choices) can be made more directly in the public interest. Also, basic research will have available a very large addition to its funding sources apart from the usual federal agencies (Department of Health, Education, and Welfare, National Science Foundation, Atomic Energy Commission, and others). To achieve this inte-
igration of goals, some federal funding, administered possibly through the National Academy of Sciences, will be required to provide lists of cooperating industries and to circulate grant proposals to relevant industries. Also, the possibility of cost-sharing (say, one-third federal funding) should be considered.

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La Porte Precipitation Fallacy

I was pleased to note that Landsberg in his admirable survey “Man-made climatic changes” (18 Dec. p. 1265) recognized the controversial nature of the La Porte precipitation anomaly which too many meteorologists, without close scrutiny of the record, have accepted as a proven case of man-made climatic change. The La Porte rainfall record is a celebrated but specious example of man’s inadvertent modification of climate.

During the years 1928–1963 the precipitation for La Porte, Indiana, located some 30 miles east of the Chicago industrial complex, was higher than that recorded at surrounding stations. Meteorologists have been puzzled by this precipitation anomaly. Changnon suggested that the increased precipitation might be due to inadvertent man-made cloud modification resulting from nuclear debris ejected by the industrial activities to the west (1). Air pollution in any form is bad, but to blame the Chicago industrial complex for the change of climate at La Porte is most unfair.

The precipitation record at La Porte can be shown (2) to be spurious, statistically invalid, and physically unacceptable. (A most ludicrous outgrowth of the belief that the La Porte anomaly is true was the award of a government research contract to a fine university to study the presumed ecological changes in the environs of La Porte because of fictitious excesses of rain.)

The rainfall anomaly began in 1927 when a new cooperative climatic observer was appointed and ended in 1964 when an automatic rain gauge installed at La Porte replaced him. Prior to 1927 many of the surrounding stations reported more annual rainfall than La Porte and after 1964 many of the nearby stations also reported more rain than La Porte. However, in the intervening 37 years except for one instance, La Porte always reported the highest rainfall amounts.

A study was also made of many synoptic weather situations, especially in those years which had unusually high rainfall amounts. Trajectory analyses demonstrated that when a west-northwest flow brings effluent nucleation debris to La Porte, either of two events occurs: (i) if it is raining at La Porte, the rain stops, and (ii), if it is cloudy at La Porte, the weather clears. These easily explainable occurrences are hardly conducive to causing excess precipitation.

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Last Word on Yogurt-Making

Being an Armenian by ethnic origin and also a microbiologist, I should perhaps be in a more advantageous position to comment on the making of yogurt than the previous letter writers (Segal, 31 July; Goodman, 9 Oct.; and Bagdikian, 6 Nov.).

Yogurt (yogurt in Turkish; mādzun in Armenian; leben in Arabic) is curdled or coagulated milk resulting from the fermentation of sugars in the milk by two microorganisms, Lactobacillus bulgaris and Streptococcus thermophilus (1). Both these microorganisms are capable of multiplying at temperatures between 20° and 50°C (2) and, with acid formation, ferment a number of sugars including lactose which is the main sugar present in milk. As a result of acid formation the proteins in the milk are curdled or coagulated and the milk attains the yogurt consistency.

Any kind of milk can be used to make yogurt but whole fresh cow’s milk often gives the best results. The optimum temperature for the growth of yogurt-forming microorganisms lies within the range of 40° to 50°C. At this temperature range growth is rapid and yogurt formation takes only a few hours. If the temperature falls below 40°C the growth continues but at a slower rate and consequently yogurt formation delays. Multiplication of

References

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yogurt-forming microorganisms is minimal or stops below 20°C. If growth is rapid and acid production is extensive, souring of yogurt results. Thus, as soon as yogurt is formed it should be refrigerated to prevent further souring of the product. All this is learned by experience.

In brief, to make yogurt the milk is brought to its boiling point to kill inborn and other microorganisms present in the milk and allowed to cool down to a temperature slightly above the body temperature. This can be determined by the touch of the little finger. Dipping the elbow into the milk is unnecessary. It is then inoculated with yogurt and mixed. Two tablespoonfuls of yogurt per liter of milk should be adequate as starter. Next, it is covered with a dish and wrapped in a woolen material to minimize heat loss until yogurt consistency is obtained. This will commonly take 5 to 10 hours depending upon the temperature of the room. It is advisable to use crockery or glass bowls for processing yogurt as metal containers may get eroded by the acidity contained in the yogurt.

When equal parts of yogurt and iced cold water are mixed together and the mixture is homogenized by means of a fork or an electric mixer, it forms a delicious and refreshing beverage known asłım in Armenian or ărăın in Turkish. Some salt may be added to it. It goes well with any kind of steak, hamburger, or shish-kebab. Yogurt also can be emptied into a bag made of cheesecloth and hung overnight from a faucet over a sink to drain the excess fluid. The part that remains in the bag has a pasty consistency and is known as lebneh in Arabic. In Lebanon it is eaten with bread. The addition of olive oil and some spices makes it more palatable. It is a Lebanese national food product and is sold in any grocery store. Incidentally, the yogurt and cucumber salad described by Segal is known as jâneh by the Armenians and the Turks. In my opinion and in the opinion of many others this salad does not necessarily require pepper as one of its ingredients.

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References
Expertise at Land Grant Colleges

The mechanism for relieving Iza Goroff's search for safe reliable pesticide information (Letters, 18 Dec.) has been in existence for many years at land grant universities located in every state in the United States. There is at every such institution at least one extension entomologist, plant pathologist, and agronomist well qualified to handle questions regarding pesticide registration, safe usage, effectiveness, and disposal. In 1964 the U.S. Department of Agriculture used newly appropriated federal funds to support a pesticide coordinator at each land grant university. He performs a liaison role between the several federal agencies dealing with pesticides (USDA, HEW, EPA, and so forth) and agricultural college personnel and county agents using and recommending pesticides and herbicides. As American merchants, farmers, and homeowners we must immediately utilize such specialists to advise us in the use of agricultural chemicals that are so essential to our food and fiber supply as well as to community health.

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Australia: Equal Pay in 1972

"The letters of Kennedy, Rothman, and Graubard (25 Dec.) commented on the salary differential between men and women described in the advertisement in Science (11 Sept., p. 1115) for research positions in the Division of Land Research, Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia. The ad should have included the additional sentence: "The differential between male and female salaries will be eliminated by 1 January 1972."

The principle of paying men and women equally for equal work has been adopted throughout Australia and is being brought into effect by stages. It will be fully effective by 1972. Since its inception, CSIRO has followed a policy of advertising its research positions internationally in order to recruit the best qualified applicants from around the world.

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Clerk Maxwell pioneered color photography. His idea of additive projection wasn't nearly as good as his concept of electromagnetic radiation. Use of subtractive primaries was proposed in 1869. Forty-three years later a patent was issued on forming the subtractive dyes as needed, in situ in each of three emulsions, by condensing reacted developer with three different couplers. Twenty-three more years passed before a pair of musicians with a very strong interest in photography reduced this coupler idea to commercial practice.

Kodachrome Film the world learned to call their accomplishment, and for helping to teach the lesson to the world at the 1939 New York World's Fair another chap got himself off on a course that led only last year to the presidency of Kodak.

That job might not amount to much but for the fact that Kodachrome Film and another embodiment of the coupler principle in Kodacolor Film (plus some newer ones just now coming out) deliver such satisfactory color pictures at such a modest cost.

"Satisfactory" means more than just getting a principle to work. "Satisfactory" seems to require, a century after Clerk Maxwell, some study of fundamentals, even as that Scot is better remembered for his equations than for his proposals on color photography. Therefore, men like our Karl Tong and our Charles Bishop and a woman like our Carol Glesmann devote their time and thought to entities like the quinone-dimine cation

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formed in those 2um-tall chemical reactors—the emulsion layers—by oxidation of the developer

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After a while, certain subtle manipulations lose some of their subtlety as the ion is routinely led this way

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or that way

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or that way

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If the gap from ditty to ion seems too wide, permit us to send you a reprint of an article in American Scientist, "A Chemist's View of Color Photography," based on a Sigma Xi National Lecture. Address request to Dept. 55W, Eastman Kodak Company, Rochester, N.Y. 14650.

For alma mater

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