Letters

Gerontology

In describing a new agency, the Administration on Aging (News and Comment, 6 Aug., p. 617), Elinor Langer quotes the comments of a federal official on the unhappy state of gerontology. I would agree with his list of diagnoses, namely that the field is unfashionable, has attracted few competent investigators, and is lacking in projects of high quality. The official suggested that "most scientists seem to prefer to do something more dramatic . . . than work on retarding for a few years the inevitable process of aging and death." I would like to argue that problems of aging deserve our best brains and efforts and offer a much more exciting challenge than many of the areas of research that are fashionable today. That gerontology is not fashionable may be a compliment to workers in that field. At any rate, there are historical examples of important discoveries being made in obscurity while individuals without imagination were following fashions of the day.

Aging processes are almost universal, in nonliving as well as in living systems. In the latter they are observed at all levels of organization, from populations of macromolecules to populations of human beings. The widespread occurrence of such normal processes, if not their consequences, would fully justify major research efforts. In addition, however, aging processes constitute a 100-percent fatal disease that everyone has. Such a barrier to immortality should be worth understanding if not altering. The degenerative lesions and diseases of aging, which dominate medicine in modern societies, are caused or potentiated by underlying aging processes. It is unreasonable to expect progress in coping with these debilities without gaining information about basic mechanisms of aging.

We actually are accumulating considerable knowledge about aging—much more than has been presented conceptually in biological or medical texts. There is no theoretical reason why it will not be possible eventually to lengthen the human life span, if society judges this to be a worthwhile goal. This does not mean keeping old people alive a few years longer, but inhibiting the normal acceleration of aging processes so that the period of vigorous maturity is prolonged. Studies leading to such a program could certainly be among the most exciting scientific activities ever undertaken. I have attempted to develop these ideas in some detail in *Reproduction: Molecular, Subcellular and Cellular*, M. Locke, Ed. (Academic Press, New York, in press).

Aging processes are, or should be for the foregoing reasons, of more personal concern to us than, for example, mantle-drilling or the space program, in which our best scientific resources are being invested.

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Floating Accelerator: Progress at Last

It has been a pleasure to observe, during the last 6 weeks, increasing interest among policy makers in the proposal that the 200-Gev proton accelerator be located on a large, specially designed, floating platform. Long recognized as offering unique advantages of flexibility of use and economy of construction, the plan has been plagued by questions of safety. Happily, these have been solved, and, according to a report soon to be issued by the Conference of Eastern Coastal Universities (CECU), full-scale consideration of the plan is now warranted.

The report stresses two main design goals: (i) avoidance of extensive use on land and (ii) transferability of the accelerator from one harbor to another at approximately 6-month intervals. Preliminary engineering surveys show that the harbors of New York, Philadelphia, Baltimore, Boston, and Norfolk, Virginia, are almost ideal for the purpose, and West Coast harbors could be used after the widening of the Panama Canal is completed.

The accelerator, of strong focusing (alternating gradient) type, would be incorporated in four floating platforms, each about the length and width of a modern 100,000-ton oil tanker. Each would have the form of a quadrant of a circle, and the four units would be joined (by a precision key system and giant hydraulic clamps) to form a single rigid ring. Prior to the clamping operation, ballast tanks in each quadrant would be flooded with sea water to appropriate depth to bring the quadrants to the same level. Thanks to the slight elasticity in the integrated structure, fine-scale alignment of the quadrants of the synchrotron itself can be accomplished by fine adjustment of the water levels in these tanks.

The diameter of the accelerator is relatively small: 400 meters. Correspondingly more powerful magnetic guide fields are provided by 60-kilogauss superconducting magnets of low-inductance design in a multiple-pyramiding arrangement which provides especially tight control of betatron oscillations without significant increase in the period of the synchrotron oscillation (except at injection, when special pentapole magnets of diamagnetic ferrite are superimposed on interphased counter-fields.

Plans for the linac injector are still tentative, but may call for a 1500-foot 1-Gev traveling-wave assembly mounted on two aligned concrete barges to be held by slender, prestressed-concrete equants in rigid tangential orientation.

The ring of 1024 magnets, located in a common circular tunnel running through all four platforms, will be situated 6 meters below the waterline, so that adequate shielding is provided, at no expense, by the surrounding water. A protective screen of nylon netting will probably be mounted some 10 or 20 meters from the quadrants to keep fish away and thus prevent radiation damage to them. The use of such a screen was suggested by the Izaak Walton League.

Although shielding, cooling, and electrical grounding present no problems (thanks to the unlimited amount of sea water available), the provision of adequate power poses problems. Because city electric power, supplied to the accelerator via submarine cables, may be in short supply during the daytime, the accelerator may have to be operated at night only. (If so, tourists could visit the accelerator during the day, and the entrance fees charged might pay a significant fraction of the operating cost.)

When repair work must be performed in the circular tunnel, which would soon become highly radioactive, accelerator engineers would fill the entire tunnel with sea water. Mechanics employing aqualungs or diving suits could then work in complete safety.

A separately constructed central area of the assembly would contain machine shops, special power supplies, a large control room, administrative headquarters, and also a kind of motel (with parking for helicopters rather than cars) for the crew of approximately 1000 engineers and technicians. Recreation facilities would include a movie theater, squash courts, swimming pools, and a specially stocked fishing pool.

The plan circumvents rivalry from groups in different parts of the country. (The possibility of building the quadrants in smaller units that could pass through the St. Lawrence Seaway and be assembled in Lake Erie or Lake Michigan has not been ruled out.) Also, four different parts of the country could be given contracts for building the four arc-shaped platforms. (Already, a bid has been received from a Japanese shipbuilding firm experienced in building supertankers.) Since these four quadrants—and the linac structure and the experimental hall structures—could be built simultaneously in different shipyards, as much as 2 years could be saved relative to the time needed to construct a fixed synchrotron.

Only in the last few weeks has the last and thorniest problem been solved: the problem of radiation beamed toward a particular part of the city adjacent to the harbor in question. If an emergent beam were aimed toward a certain portion of the city, persons living there would receive, during a typical month, five or ten times the permissible dose (from muons, which are fundamentally aquatic and can travel freely in water). The solution is to mount a 5-hp outboard motor tangentially at the outer edge of the platform and keep the motor running continuously, so as to rotate the entire accelerator at the rate of one revolution per week and thus distribute the radiation uniformly along the entire harbor-front. The direction of rotation will be the same as that of the protons in the accelerator, so as to add to their speed; even a slight increase is significant if the particles are already traveling at a speed almost equal to that of light.

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Metric System: Easy Conversions

Anyone who did not read Manuel Mateos' letter (24 Sept., p. 1450) missed an important proposal. Mateos suggests a "metricized British system" whereby our quart and pound would be made slightly larger, thus making the new "metric quart" equal to 1 liter and the "metric pound" to 1/2 kilogram; the inch would become a bit shorter, so that 1 "metric inch" would equal 25 millimeters and 40 "metric inches"—1 "metric yard"—would be 1 meter.

This would be an easy way to make the metric system more acceptable to the general public. More important, however, for those of us who are not interested in the precise conversion when reading (or writing) articles using metric units, it is an ideal method of beginning to think in these equivalent units without constantly referring to conversion factors.

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Psychologists' Title

In the recent exchange of letters about degrees and titles, Wiesinger (10 Sept., p. 1174) writes that "it is not good form in English for a Ph.D. . . . to refer to himself as Dr. . . ." It should be noted that the clinical psychologist, who is a Ph.D., cannot function professionally without referring to himself as "Dr." If he calls himself "Mr." he is respected by neither his physician colleagues nor his patients. This poses a special problem for psychologists who work simultaneously in clinical and academic settings.

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