(*Continued from page 174*)

I agree with Carstater that the young scientist "should be concerned with both the scientific and managerial quality of the supervision he will receive." These are important considerations. A record of publication constitutes one type of evidence as to the caliber of the scientific output of a laboratory. The "managerial quality of supervision" is extremely difficult to evaluate unless one is personally involved in an organization.

I do not know what Carstater means by "the privilege of publishing." Publication is not a favor to be conferred upon good behavior. In my opinion, in discussing the publication of a research paper, the word *privilege* should be taboo. It is legitimate to ask a research director, "What is the policy of your organization regarding the publication of research results?" One should be guided by one's own ideals after an answer to that question is obtained. Verbal answers, no matter how sincere, may not be known to administrators who later may direct a man's work. Unless reduced to writing, "policy" can become a meaningless thing.

Carstater is ungracious in stating that "an undeserved slur on the perspicacity of senior scientists, research directors, and deans" was intended or implied in the thesis of "The lost legion" editorial. Selection, at best, is a difficult task. All evidence, even if remotely related to the problem, should be available for consideration before an appointment is made. A record of published research constitutes evidence. It should be used in conjunction with, and not as a substitute for, verbal reports on behavior, attitudes, and record searches. The published record of research most certainly would not constitute "the only acceptable, or even the best, evidence of his productivity as a scientist." But it would be an important item for consideration.

I am slightly amused by but very tolerant of Carstater's "father knows best" point of view. He refers to "the immature scientist" and the scientist at a "more mature stage." There may be organizations where the research administrator "is likely to be mentor, counselor, and friend, seeking to develop and nurture whatever aptitudes are present." It would be interesting to conduct attitude surveys to check this hypothesis.

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Skin Diving in Rocket Ships

A person in a tank of water is able to withstand relatively great accelerations without damage or malfunction (even more than in a pilot's "G suit"). This could possibly be expected from the report on weightlessness by H. J. Muller [*Science* **128**, 772 (1958)].

Experiments demonstrating this were described to me by Carter Collins, about the time of the publication of my report "Some principles of self-contained underwater breathing apparatus" [*Science* **128**, 1001 (1958)]. Collins noted that an air-pressure regulator which is wrongly positioned with respect to the body is dangerous in high-acceleration situations because the density of the material separating the lungs and the regulator is effectively increased proportional to the acceleration, and thus the lungs are not necessarily supplied with air at the pressure surrounding them. The weight-compensated regulator described in my report effectively puts the regulator within the lungs, and it retains this ability under the action of most commonly experienced acceleration forces, whether compensation is by a weight or by a float. In a centrifugal field, if the center of rotation is near the person, departures from exact compensation can exist. Under changes in gravity, compensation in all positions can remain perfect. Compensation with a spring does not give these effects.

In this connection, it is relevant to

note that some early tests to determine the best location of a regulator (which indicated a location within the lungs) involved diving in a medium more dense than water and moving the regulator up or down to the most comfortable position relative to the body. An acceleration field effectively increases the density of the liquid and the compensating weight at the same rate, and so the required weight does not change as it would have to for diving in a different medium.

The concept of a "center of pressure" for the lungs, at which a regulator should effectively be positioned, probably loses much of its significance if a great pressure difference exists across the chest itself. (For example, one might expect difficulty in trying to breathe under mercury.)

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Strontium Content of Human Bone

In the issue of 1 August [*Science* **128**, 256 (1957)], Thurber, Kulp, Hodges, Gast, and Wampler report on their measurements on the common strontium content of human bones from urban populations. They deduce a ratio of Sr to Ca in bone of $(0.45 \pm 0.1) \times 10^{-3}$. Combining this with the figure they quote for the same ratio in average soil, one obtains a discrimination factor of 16 ± 4, which has a significantly higher error than they quote.

This perhaps makes less disturbing the discrepancy between their measured discrimination and the one which can be calculated on the basis of the discrimination factors they quote for the various biological systems. Using these numbers—namely, human calcium half derived from vegetation and half from milk, plant-to-soil discrimination equal to unity, plant-to-milk discrimination equal to 7, and milk or vegetation to human bone discrimination equal to 4—one estimates the over-all discrimination between soil and human bone to be about 7 (not 16 as quoted in the report). A discrepancy of a factor of 2 is perhaps not surprising in view of the roughness of the numbers and the simplifying assumptions which have been made.

The factor of 16 ± 4 is certainly an encouraging sign, but its relative constancy in these measurements, as Thurber *et al.* point out, is largely a function of the averaging of food sources in a modern urban environment. It would be interesting to see similar measurements on bones from isolated rural populations in calcium-rich and calcium-deficient regions.

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