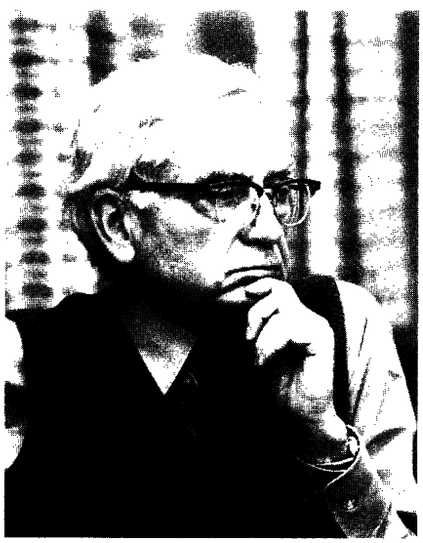
something like a missile silo. Because the entire machine sits in a pool of borated water, the cooling system cannot fail. If the primary system breaks down, the fuel core is flooded with the surrounding borated water without human or mechanical intervention. According to Weinberg, the reactor is supposed to be able to cool itself by natural heat convection for at least a week without any mechanical help. "That's long enough to get a fire hose in, if you need it," he says. One last point in PIUS' favor: unlike other reactors, it appears to be invulnerable to sabotage.



Alvin Weinberg

Ultrasafe reactors could be the basis of a "second nuclear era."

PIUS has some obvious problems. Nothing like it has been built, and so it is not clear whether it will work. Its cost is not known but is likely to be higher than that of conventional reactors. Because its concrete shell is buried in the ground, a Westinghouse engineer says, PIUS may be more vulnerable to seismic shock. It may be difficult to develop waterproof control systems. Maintenance may be awkward. Despite these weaknesses, PIUS may have its value, particularly if its inherent safety makes it easier to license.

The fundamental flaw in all of these designs is that they seem to cost at least 20 percent more to build than existing types. Thus, even allowing for improvements in fuel efficiency, these new concepts are in many ways less attractive economically. This means that the era of ultrasafe nuclear plants may not come to pass unless an important precondition is met: the economy will have to be far healthier than it is today, and demand for electric power will have to be growing strongly.—**ELIOT MARSHALL**

Who's Who in Biology

When Edwin Whitehead selected the Massachusetts Institute of Technology (MIT) as the site for the Whitehead Institute for Biomedical Research, he evidently chose wisely. MIT faculty members in biochemistry, cellular/molecular biology, and microbiology have been rated by their peers as the most prestigious in their disciplines. The Whitehead Institute, whose researchers were initially drawn from MIT's existing faculty, thus tapped into the top rank of American biological research.

MIT's stellar rating in these disciplines can be detected from a careful reading of the latest volume of assessments of graduate programs in the United States, published by the National Academy of Sciences.* Like previous volumes in this series (*Science*, 8 October, p. 140, and 3 December, p. 980), this one, which covers the biological sciences, is a near-impenetrable document that lists an array of data on each program. The data include the number of faculty members in each program, the size of the university library, and the proportion of faculty receiving federal funds.

Although the study deliberately avoids ranking programs, it does include the results of a survey in which 1848 academic biologists were asked to rate programs in terms of the quality of their faculty and their effectiveness in educating graduate students. The survey proved controversial. Only 56 percent of those surveyed agreed to participate, and "some faculty members included in the sample made known to the committee their strong objections to the reputational survey," the report states. Similar surveys in the past have been criticized for confusing prestige for quality.

Respondents were asked to rate faculty members in each program on a scale of 0 (not sufficient for doctoral education) to 5 (distinguished). The following are the top-rated programs, with their overall scores. Some universities have more than one program in each discipline; in those cases, the program is identified.

Biochemistry: MIT, 5.0; Harvard, 4.9; Stanford, 4.9; University of California (UC) at Berkeley, 4.6; Rockefeller, 4.6; Wisconsin at Madison (biochemistry), 4.6; Yale, 4.5; UC San Francisco, 4.4; Harvard Medical School, 4.4; Cornell, 4.3; Brandeis, 4.2; UC San Diego (chemistry), 4.2; UC Los Angeles, 4.1; Pennsylvania, 4.0.

Botany: Texas at Austin, 4.5; UC Davis (botany), 4.5; UC Davis (plant physiology), 4.5; UC Davis (plant pathology), 4.3; Wisconsin at Madison (plant pathology), 4.3; UC Berkeley (botany), 4.3; UC Berkeley (plant physiology), 4.2; Cornell, 4.2; Michigan, 4.2; Yale, 4.1; Duke, 4.0.

Cellular/Molecular Biology: MIT, 4.9; Caltech, 4.8; Rockefeller, 4.8; Yale, 4.7; Wisconsin at Madison, 4.6; Harvard, 4.3; UC San Diego, 4.3; UC Berkeley, 4.2; Columbia, 4.1; Colorado, 4.1; Stanford, 4.0; Washington at Seattle, 4.0.

Microbiology: MIT, 4.9; Rockefeller, 4.8; Washington at Seattle, 4.3; Johns Hopkins, 4.3; UC San Diego, 4.3; Chicago (virology), 4.2; Pennsylvania (immunology), 4.2; Duke, 4.2; UC Los Angeles, 4.1; UC Davis, 4.0; Columbia, 4.0; Illinois, 4.0; New York University, 4.0; Pennsylvania (microbiology), 4.0; Stanford, 4.0.

Physiology: UC San Francisco, 4.5; UC Los Angeles, 4.3; Pennsylvania, 4.3; Rockefeller, 4.3; Washington at Seattle, 4.3; Yale, 4.3; Harvard, 4.1; Michigan, 4.1; Columbia, 4.0; Washington University at Saint Louis, 4.0.

Zoology: Harvard, 4.7; UC Berkeley, 4.4; Washington at Seattle, 4.3; Yale, 4.2; UC Los Angeles, 4.1; Duke, 4.1; Stanford, 4.0; Texas at Austin, 4.0; Wisconsin at Madison, 4.0.

The last major survey of faculty reputations was conducted by the American Council on Education in the late 1960's. In general, relative standings did not change much between the two surveys, although a few institutions—such as MIT and UC San Francisco—appear to have gained in prestige.—**COLIN NORMAN**

**An Assessment of Research-Doctorate Programs in the United States: Biological Sciences* (National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C., 1983). The survey was sponsored by the American Council of Learned Societies, the American Council on Education, the National Research Council, and the Social Science Research Council.