complains. "In the long run nothing less than the reconstruction of the training of college teachers and a revision of the prevailing standards in the recruitment of faculty will liberate the curriculum and the professors themselves from a misguided overemphasis on research and a corresponding neglect of teaching."

Little of this is new. What makes this report particularly interesting, however, is that the Association of American Colleges is essentially telling its 560 member institutions that they have only themselves to blame and that remedies for the apparent ills of undergraduate education lie largely in the institutions' own hands.

The report exhorts college and university administrators to take a hard look at the undergraduate curriculum and confront the obstacles to reform that are deeply ingrained in academic practice. It suggests, for example, that faculty curriculum committees, which usually "suffer from chronic paralysis," should be given more authority to mold curricula and give them coherence rather than just approve individual courses. It also argues for an overhaul of the reward system so that teaching is as highly valued as research in tenure, promotions, and salary decisions.

It outlines nine elements that should be part of undergraduate education and embedded in all curricula. The idea, says the report, is to move away from programs that offer "too much knowledge with too little attention to how that knowledge has been created and what methods and styles of inquiry have led to its creation."

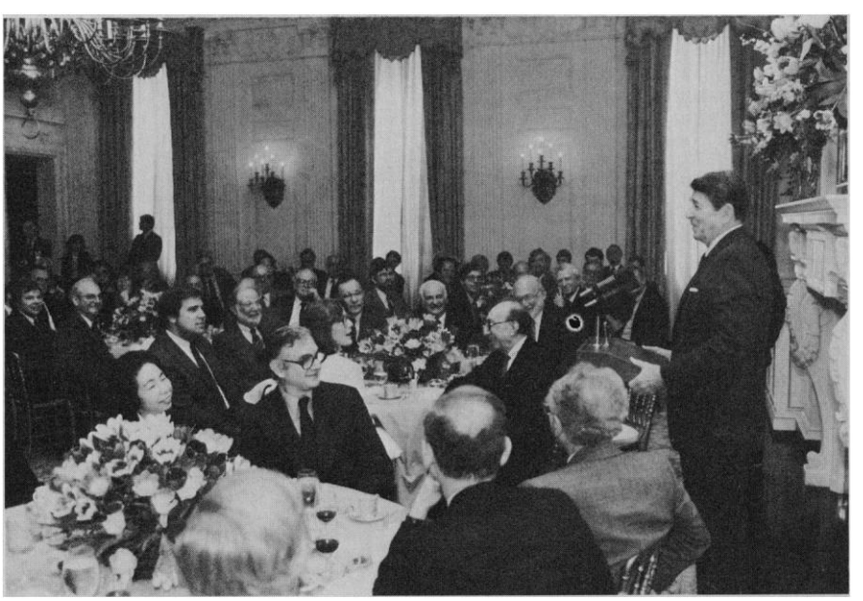
The nine elements are:

- *Inquiry, abstract thinking, logical analysis.* These skills, notes the report, "grow out of wise instruction, experience, encouragement, correction, and constant use."
- *Literacy.* Students should be "taught how to read actively, arguing along the way with every word and assertion."
- *Understanding numerical data.* This should include such concepts as "degree of risk, scatter, uncertainty, orders of magnitude, rates of change, confidence levels and acceptability, and the interpretation of graphs as they are manifest in numbers."
- *Historical consciousness.* "The more refined our historical understanding, the better prepared we are to recognize complexity, ambiguity, and uncertainty as intractable conditions of human society."
- *Science.* "A student can best take possession of science and its methods not in a broad course about science but in a course where the subject matter is highly circumscribed, even narrow." The report argues that education in science should include developing an understanding of the way scientific concepts are developed, the limitations of science, and the "human, social, and political implications of scientific research."
- *Values.* "There is no place in the course of study where the capacity to make informed and responsible moral choice cannot appropriately be nurtured."
- *Art.* Without some knowledge and experience of the arts, students are "denied the knowledge of disciplined creativity and its meaning as a bulwark of freedom and of social cohesion."
- *International and multicultural experiences.* "Colleges must create a curriculum in which the insights and understandings, the lives and aspirations of the distant and the foreign, the different and the neglected, are more widely comprehended by their graduates."
- *Study in depth.* "Today's majors are not so much experiences in depth as they are bureaucratic conveniences: they allow the professors to indulge their professional preoccupations and they allow deans to control the flow of student traffic," the report contends. Instead, study in depth should involve an understanding of a discipline's central core of method and theory, its analytical tools, and its complexity.—**COLIN NORMAN**

Scientists at the White House

Early in February, some 100 of the nation's leading scientists and engineers received a telegram inviting them to have lunch with the President on 12 February. About 75, including 22 Nobel prizewinners, showed up, most of them mystified about the reasons for the occasion. According to one White House official, the reason was straightforward: the President wanted to have lunch with some of the nation's leading scientists and engineers.

The lunch, which was attended not only by President Reagan but also by Vice President George Bush and the entire top echelon of the White House staff, provided an opportunity for a few private grumps about cutbacks in biomedical research support and some postprandial tributes from Reagan for the "transforming discoveries and achievements you and your colleagues are making every day." He also urged the assembled scientists to treat with "vision and hope" his strategic defense initiative. The President declined to accept questions and left immediately after his remarks.—**COLIN NORMAN**



Bill Fitz-Patrick, the White House