LETTERS

Carter's Engineering Background

While it is a heady thought that we may have a scientist-engineer as our next U.S. president, namely Jimmy Carter, it seems rather unfair to an earlier chief executive to say that Carter "will become the first American president, at least in recent times, who can lay claim to any significant degree of scientific and technical knowledge" (News and Comment, 6 Aug., p. 462).

Although Herbert Hoover's administration of 1928–32 may not qualify as "recent" in the eyes of author Nicholas Wade, it doesn't seem so very long ago to many of us. In an earlier issue of *Science* (8 Jan. 1965, p. 125), Hoover's scientific and engineering talents were discussed at some length.

Hoover was the only U.S. president ever to hold membership in the National Academy of Sciences. Educated as a mining engineer at Stanford University, he was a fellow of the AAAS, as well as of the Royal Geographical Society of London.

Hoover's early application of scientific mining principles and techniques throughout the world were spectacularly successful and made his fortune, enabling him to retire at 34 and later to devote himself to public service. As Secretary of Commerce he made over the Bureau of Standards into a first-class research institution and brought infusions of scientific methods to the Bureau of Fisheries, the Bureau of Mines, and the Census Bureau with similar benefits to each. And at Stanford University he established the Food Research Institute to bring scientific principles to the study of mass food problems.

Although science and technology may have seemed less vital to the nation during Hoover's presidency, he unquestionably had great faith in their efficacy for improving the condition of humanity.

ROBERT E. LAMAR
News and Publications Service, Stanford University, Stanford, California 94305

Nicholas Wade makes the statement that "A professional engineer is often understood to be someone who has undergone a 4-year course in a particular engineering specialty, such as electrical, mechanical, or civil." To call oneself a "professional engineer" in any of the 50 states or the District of Columbia, a person must complete an 8-year training program, the first 4 years of which include earning a baccalaureate in an engineering specialty, followed by a 4-year internship *and* a professional-level examination lasting 2 days. The use of the term "professional engineer" is restricted in most of these states to the person who has completed this program and has passed the examination so that he has been registered as a Professional Engineer by the state in which he intends to practice.

Whereas the scientist is in the pursuit of truth, he can and should deliver his hypotheses only after he has ascertained that he is in possession of all the available facts. He should not be under any time or financial pressures, and he certainly should be under no political pressures. The professional engineer, on the other hand, is most frequently working against a time, dollar, and political deadline. He must make value judgments weighing cost against performance, performance against political expediency, political expediency against his inbred ethics. He is on the firing line of technology; he must develop methods to make technology useful. He must also very frequently justify his every move to those who are not adequately prepared to understand them.

It is unfortunate that in this country the credentials of those who call themselves engineers are not very carefully examined. Since the mid-1950's there has been a proliferation of people calling themselves engineers, yet today it is doubtful that 10 percent of them are legally, mentally, or ethically qualified to do so. All too frequently we find the applied mathematician calling himself an engineer because he knows a certain amount of engineering theory, or the graduate of a technical school calling himself an engineer because he can get a better job that way, or the electronics technician recently discharged from the armed forces calling himself an engineer because he can get away with it.

In the long run, this downgrading of the engineering profession can serve only to hurt science. Although the engineer must perform in a different manner than the scientist, they both serve science.

WILLIAM B. JARZEMBSKI
Department of Biomedical Engineering and Computer Medicine, School of Medicine, Texas Tech University Health Sciences Centers, Lubbock 79409

Nicholas Wade's article is somewhat misleading in describing my connection with the early phases of the U.S. Navy Nuclear Power Training Program and thus, by implication, my possible views on the scientific or engineering credentials of Jimmy Carter.

My experience with this program began in 1958 and terminated in 1961, as Wade states. The program was initiated in 1956, under the direction of Commander William Behrens, at New London, Connecticut. The nuclear physics curriculum, which I taught primarily, was developed at New London by Austin Frye, who had been chairman of the physics department at the U.S. Navy Postgraduate School, and was extended by others, including myself. While the New London program was based upon previous experience in training in nuclear technology at the Bureau of Ships and at the prototype sites near Pittsburgh and Schenectady, it was not, specifically, the program that Carter attended. The mode of operation in the early days of the nuclear program is, however, well documented (*1*). My remarks should at most be construed as generic comments on the nature of that program and reflect no direct evaluation of Carter's credentials.

Further, Wade follows a statement describing enthusiasm for Carter in the scientific and technical community with a correctly stated quote from me that "it would be unusual to see a president who knows a Bessel function from a Fourier series." My statement was intended to be factual only. It would be quite inappropriate for a public servant such as myself to voice preferences in the presidential contest; such preferences were neither expressed nor implied in my conversation with Wade.

JOEL A. SNOW

Division of Policy Research and Analysis, National Science Foundation, Washington, D.C. 20550

References

1. R. G. Hewlett and F. Duncan, *Nuclear Navy, 1946–1962* (Univ. of Chicago Press, Chicago, 1974).

The Science Court

Philip Boffey's excellent article on the science court (News and Comment, 9 July, p. 129) reports that the "only outright opposition to emerge from the scientific community thus far has been voiced by leaders of the Scientists Institute for Public Information."

At the American Physical Society (APS) Washington meeting last April, the Forum on Physics and Society organized a public session on the science court. Among the panelists was Arthur Kantrowitz, principal advocate of the court. I think it is fair to say that most of the audience came to the session interested in the idea, or at least neutral, and ended up leary of it. It struck me, at least, as an attempt to institute a Plato's Republic of scientists. Not since the time of the trial of Galileo have we had a canon court issuing pronouncements of scientific Truth. At the conclusion of the APS forum session the audience (and the panelists) by a show of hands resolved overwhelmingly that "before an experiment on the Science Court be conducted, much further discussion is needed, not merely among scientists, but in the American community at large, which will be powerfully affected by the conclusions reached in any Science Court." The Forum on Physics and Society is now endeavoring to stimulate its 2000 members to think about the issue and hopes to encourage the broad public discussion which has so far been lacking.

There are important differences between the plan now being considered by the Consumer Product Safety Commission and the general proposals of Kantrowitz and the White House advisory group on science and technology. Commissioner Lawrence Kushner, who spoke at the forum session, views the court as a kind of Robert's Rules for scientific controversy, a way of forcing opposing sides to confront each other's facts and arguments. The court would have no life of its own. From time to time a court would be impaneled by the Commission and dissolved upon the issuance of a report to the Commission.

The more ambitious plans of Kantrowitz and the White House group seem to me both simplistic and dangerous. Implicit in the argument for a science court is the assumption that value-free questions of fact can be separated from political questions of policy. The science court, it is argued, will resolve controversies as to the facts. But which facts? The answers you get depend upon the questions you ask. In those recent matters of public controversy with a heavy technological component—the ABM, the SST, the B1 bomber, reactor safety—the two sides have been stressing different questions. What the important questions are is a political judgment.

Furthermore, since the answers to whatever questions one considers important are not known, but can only be estimated, the two sides quite properly assign different weights. Judgments on the complex questions of public policy rest not upon one fact, or one lemma, but on a rich foliage of argument, each branch of which is reached only after logical branching at previous stages in the argument. Assigning different probabilistic estimates of "the truth" at each