the last century. We use a value of 0.5°C, which is on the high side of the IPCC range of uncertainty of 0.3° to 0.5°C. We also agree that the part of this rise attributable to an enhanced greenhouse effect is unknown.

What is clear is that a conservative approach to action, a policy matter, is strengthened by the IPCC estimate that, by 2030, sea level will rise between 8 and 29 centimeters. This estimate of less than 1 foot is a far cry from the 20-foot rise that was claimed 10 years ago and then downgraded, first to 7 feet and then to 2 feet. Such numbers have been changing fairly rapidly, as have the estimates for the rise in global temperature, whose range has been narrowing more and more toward the lower limit. An item that is continually forgotten is that the extremely long-range economic forecasts on which future CO_2 emission rates are based and that are parallel to the climate model calculations are even far more uncertain.

We are far from being alone in voicing caution concerning the magnitude of enhanced greenhouse effects. There are many others like ourselves who feel that the current uncertainties are such that a delay in taking action is the proper policy. Kerr does not mention the corridor talk at the IPCC workshop about the concern that the temperature rise has not been as large to date as many of the models would have predicted. Nor does he mention that many of those involved at the sessions have had second thoughts about the policy intrusions and have since disassociated themselves from the report.

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I was surprised that Kerr interprets the report of the IPCC Scientific Working Group (on two panels of which I served) as a repudiation of greenhouse skeptics. In fact, the consensus cited by Kerr—that there is some convergence of opinion toward the low end of the range of possible warming, that sea level rise will be somewhat less than a meter, that considerable uncertainties remain, that greenhouse warming has yet to be detected—is more or less the position of those of us who used to be considered skeptics. It takes a very short memory indeed not to see how the consensus (or, at least, the version described by Kerr) has shifted over the past 2 years.

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Response: What the 200 IPCC authors and reviewers appear to disagree with is not the existence of evidence but Lindzen's interpretation of that evidence, to wit, that the temperature change "does not significantly vary from 0. . . . We certainly cannot assert that no warming occurred; however, it cannot be said the data show it" [R. S. Lindzen, *Bull. Am. Meteorol. Soc.* 71, 292 (1990)]. Instead, the IPCC report claims the evidence does show a significant warming.

The consensus response to the central question of the greenhouse debate—how much a doubling of greenhouse gases will warm the globe—is still 1.5° to 4.5°C. It has not changed since 1979. IPCC's reiteration of that range and its best guess of 2.5°C suggests slight, but only slight, convergence toward the low end of the range.

—RICHARD A. KERR

Chemical Engineers: At the Forefront

It was with a certain degree of consternation that I read Robert Pool's article, "Who will do science in the 1990s?" (News & Comment, 27 Apr., p. 433). Relying on information from the U.S. Bureau of Labor Statistics (BLS) and Robert Dauffenbach's "crystal ball," Pool writes that "electrical and electronic engineers will be hot; chemical engineers will not."

At first glance, I suppose we at AIChE might have taken solace in one aspect of this report. Given the figures provided for chemical engineers (49,000 employed in 1988; an estimate of 57,000 for 2000), we've apparently gotten all chemical engineers—and then some—to join our organization. Such a successful saturation of our market would make us the envy of every scientific and engineering society.

We have, unfortunately, not been so successful. On the basis of our member records and annual surveys of enrollments in chemical engineering programs and job placements, we believe that there are three times as many chemical engineers in the workforce as the BLS reports. Indeed, National Science Foundation (NSF) findings bear us out. The NSF put the number of chemical engineers in 1988 at 148,500. But, beyond our disagreement with the BLS numbers for the past, we suspect demand by the year 2000 will increase substantially more than that agency predicts.

The source of this discrepancy is, in all likelihood, the limited definition of chemical engineering that the BLS uses in its questionaires to employers. While many of us do "design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, and pulp and paper," those roles are but a few of many played by today's—and tomorrow's—chemical engineers.

In fact, we find growing numbers of chemical engineers not only performing functions beyond design and development in industries with which we've been historically associated, but also in fields like electronics, advanced materials, biotechnology, and environmental control and clean-up. Perhaps it's time for our government statisticians—and those who rely on their numbers—to realize that some, if not most, professions are much more than someone's short list of job functions.

Chemical engineers have long liked to brag that, as the engineers with the broadest training, we are industry's versatile problem-solvers. We're finding that, in fact, chemical engineers are important players on—and, frequently, leaders of—the cross-disciplinary teams at the forefront of technology.

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