At present, Fang is most interested in what very massive, very fast-moving objects can reveal about the very early universe. Some objects, such as quasars, seem to be moving much more rapidly than their neighbors—violating assumptions about the homogeneity of the universe. While confined to the U.S. embassy, Fang calculated an upper limit of about 1000 kilometers per second for the so-called peculiar velocity of quasars. "That's not so different from the galaxies," he says, and will help to put limits on the size of the perturbations in the early universe.

"The large-scale structure today we observe comes from the seeds of the quite early universe," he says. Picturing the growth of those seeds excites him now. "I'm just beginning," he says. "I already have some solutions, now I need to find exact numerical solution." This, he thinks, is what will occupy him when he moves to the Institute for Advanced Study in Princeton, some 6 months from now, to work in a group led by astrophysicist John Bahcall.

Fang's most recent scientific work is a series of papers written during his year in the embassy. On the quality of that work, most researchers are quite guarded. The four papers he wrote, which will be published in *Astronomy and Astrophysics* and elsewhere, are, says Remo Ruffini, chair of theoretical physics at the University of Rome, "at the forefront of research. That makes it very difficult to give an assessment. It will have to be assessed by the whole community." Jerry Ostriker, another Princeton astronomer, concedes that Fang has "worked in isolation to some extent, and so is hard to evaluate."

While Fang was in the embassy working on those papers, he and Li became chips in protracted negotiations between China and the West. One complication had to do with Fang's sons; the younger, Fang Zhe, was an undergraduate studying—what else?—physics, at Peking University. On 25 June, Fang and his wife were allowed to leave on a U.S. military aircraft. Fang Zhe joined them in Cambridge a few days later, as did Fang Ke, the elder son, who is doing research on superconductors at Wayne State University in Detroit. Fang laughs as he considers his family: "All physics," he chortles, "all physics."

How long does Fang plan to stay in Princeton collaborating with Bahcall? "Not permanently," he says," but maybe for longer than here." Yet in spite of the greatly improved conditions he has found for his scientific work in the West, his heart is elsewhere. "I think there will be change in China in the future. Not the near future. Maybe several years. Then I will go back."

■ JEREMY CHERFAS

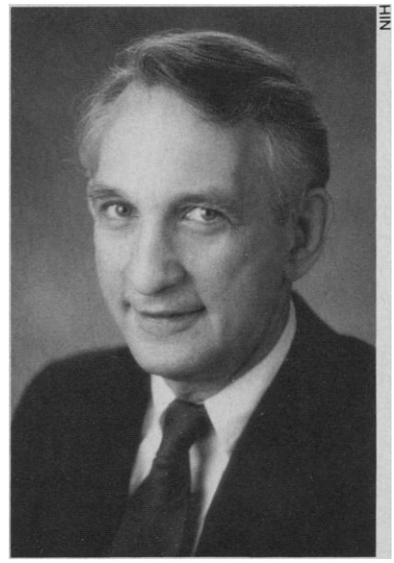
The Ideal Scientist Described

What, exactly, is scientific misconduct? Fraud? Yes. Data fabrication? Plagiarism of someone else's scientific idea? Yes.

But what about interpreting data selectively, leaving out points that do not fit a hypothesis? What about failing to give credit to other researchers? Failing to share reagents? What about keeping sloppy notebooks or tossing away data? Are these instances of misconduct, or are they just bad manners?

The answers to questions such as these do not roll trippingly off the tongue. Yet they become vital in an era when the public and the Congress are studying scientific behavior almost as intently as scientists study unfamiliar organisms.

At the National Institutes of Health, a committee of peers has just completed "guidelines for the conduct of research" at NIH that can be read as scientists' own description of a researcher who achieves the Platonic ideal.



Use with care: *"If these guidelines become prescriptive, they'll do more harm than good."—Edward Korn.*

The scientists who crafted the five-page pamphlet describing what a scientist should be were led by Edward D. Korn, scientific director of the National Heart, Lung, and Blood Institute. The guidelines, which apply to scientists in NIH's intramural program, are meant to promote the "highest ethical standards." They are not, says Korn, "meant as a handbook for whistle-blowers. If these guidelines become prescriptive, they'll do more harm than good."

The document should be released soon, says Korn. And then what? Guidelines often have a way of undergoing metamorphosis and turning into rules to the surprise of their authors. In this instance, because current definitions of misconduct include a vague phrase about behavior that "deviates from accepted scientific practice," the odds of transformation seem especially high.

The ideal scientist, according to the guidelines, is a good mentor, a teacher who imparts to his or her students the ethos of a life in science, and "recognizes that the trainee is not simply an additional laboratory worker."

The ideal scientist knows the importance of hanging on to primary data and recording them in a way that makes them accessible to colleagues. "Scientific integrity is inseparable from meticulous attention to the acquisition and maintenance of research data," reads the new manifesto.

The ideal scientist publishes just the right amount—neither too much nor too little and, when possible, makes reagents and the like available to colleagues who want to follow up on published data. The guidelines call "timely publication" essential to scientific progress but oppose "fragmentary publication." People should be judged on the quality, not quantity, of their scientific output.

The ideal scientist is listed as an author of a paper only if he or she actually did some of the work. The guidelines describe authorship as a privilege that belongs only to those who make a "significant contribution to the conceptualization, design, execution, and/or interpretation of the research study." If you don't know enough about the study to be able to defend it scientifically, don't put your name on it, the guidelines add.

The ideal scientist never abuses peer review by taking a colleague's idea for his own. Nor does he tell anyone else about the substance of a paper or proposal under review—especially not in casual conversation.

And finally, if the ideal scientist is a physician, he or she carefully follows all the existing guidelines that are in place for the protection of patients.

■ BARBARA J. CULLITON