OSI's draft report and to request a formal appeal hearing if OSI recommends sanctions, such as debarment from receiving federal research funds.

However, says Hadley, "We do not give the accused access to someone else's testimony." And that has become the rub.

Hallum and Hadley report, with some justification, that OSI is making great strides in the way it does business. One attorney who has seen things from the defendant's position sees things differently. "It's a Star Chamber," he says, recalling the secret British tribunals that were abolished in the 17th century.

Others would not go that far, but do take issue with OSI's way of conducting an initial inquiry, an investigatory phase that is meant to quickly determine whether a full investigation is warranted. The NIH's ongoing inquiry in the case of AIDS scientist Robert C. Gallo (*Science*, 22 June, p. 1494) illustrates the point. For 6 months, NIH has been conducting what it insists is nothing more than a "fact-finding inquiry" into questions about the discovery of the virus that causes AIDS. Even though Gallo has been "interviewed" by an NIH panel on a dozen occasions so far, with three or four more scheduled, the NIH's position is that it is engaged in a preliminary inquiry.

Gallo has not complained, but others worry about the impression OSI conveys. Attorney Barbara Mishkin, viewing the case as an outsider, says the notion of an "interview" is "nonsense. They're really holding quasi-legal hearings," she believes. And therein lies the dilemma. Although institutions want to maintain the position that their inquiries and investigations are a far cry from civil or criminal court proceedings, there are many similarities—except due process.

Would the accused be better off if formal legal charges were brought against them? *Science* found no consensus among defense attorneys on this point but Mishkin did note that "once the Justice Department or the courts are involved, you can have all the due process you want." However, another, who declined to be quoted, says, "Absolutely, yes. Then you'd be confined to matters that are plainly illegal, and you'd only be able to hear from witnesses who have firsthand knowledge of a case."

The current debate may become moot if Congressman Roe's due process bill is approved by the House and Senate. Then, institutions that want to take advantage of congressional immunity will have to amend their procedures to include due process—even if the ink is barely dry on policies recently put in place.

■ BARBARA J. CULLITON

Hubble: It Could Have Been Worse

As good news goes, it seems a bit like learning that your tumor hasn't metastasized. But to scientists still trying to come to grips with the devastating optical flaw in NASA's $1.6-billion Hubble Space Telescope, the test results that arrived in early July were about the best they could hope for: "With a fair degree of confidence," says optics specialist Christopher Burrows of the Space Telescope Science Institute in Baltimore, "the error appears to us now to be on the primary mirror"—the 2.4-meter-wide disk of lovingly polished glass that NASA once called its Crown Jewel.

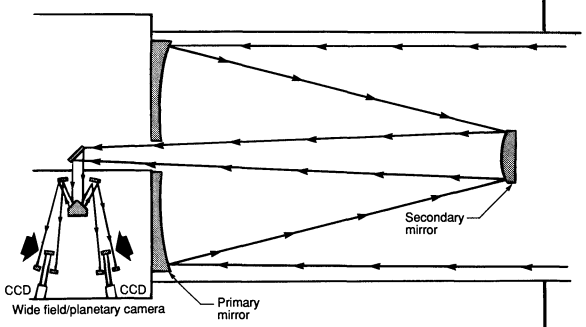
This is *good*? Indeed it is, says Burrows. Had the error been in Hubble's 0.3-meter secondary mirror, which takes the starlight collected by the primary and bounces it down into the scientific instruments, it would have given observers far more trouble than they have already and would have been considerably more difficult to fix.

Back when Hubble's optical imperfections were first recognized in late June, he explains, most astronomers hardly cared which mirror was at fault. Either way, the telescope's images were going to be contaminated with severe spherical aberration, a distortion that gives every star a fuzzy halo; more than half of their planned observations were going to be hampered or destroyed (*Science*, 13 July, p. 112).

However, Burrows and other opticians quickly realized that pinpointing the error was critical. If the flaw lay in the secondary mirror instead of the primary, he says, many observations would also suffer from a type of aberration known as coma, in which some star images acquire little tails that make them look like comets.

No such problem has yet showed up in Hubble's Wide Field/Planetary Camera (WF/PC), the instrument that first revealed the spherical aberration, says Burrows. But the WF/PC is located at the center of the telescope's field of view, where the coma would be close to zero in any case. Only about halfway out, at the location of the telescope's "off-axis" instruments—its two spectrographs, its photometer, and its Faint Object Camera—would the coma start to become serious. And at the very edge of the field of view, where Hubble's three Fine Guidance Sensors look for ultraprecise star images to keep the telescope pointed accurately, the coma would be crippling.

So Burrows and everyone else on the Space Telescope project were greatly relieved when several days of tests beginning on 6 July revealed no obvious sign of coma anywhere. In particular, trial images from the Faint Object Camera showed plenty of spherical aberration, but no comet tails. And the Fine Guidance Sensors locked onto their guide stars and steered the telescope quite happily. Thus, the error is almost certainly in the curvature of the primary mirror.



An easy fix? *The new camera can bring Hubble into focus with one new mirror per CCD detector (arrows).*

Scientists and engineers at NASA's Jet Propulsion Laboratory in Pasadena, California, are also relieved. They are currently in a rush to devise corrective optics for a second generation WF/PC scheduled to replace the first one when space shuttle astronauts revisit the telescope in 1993. And, as WF/PC II principal investigator John Trauger points out, a curvature error in the primary mirror turns out to be much easier to compensate for than one in the secondary mirror.

In either case, he says, the fix would consist of replacing certain nickel-sized relay mirrors inside the WF/PC II with new mirrors, each one having just enough curvature to restore the aberrated starlight and bring it to a perfect focus on the camera's eight detectors. But since the error is on Hubble's primary mirror, says Trauger, WF/PC II will only need eight new relay mirrors, one for each detector. If the error had been on Hubble's secondary mirror, WF/PC II would have needed 16 new relays—and the compensating curves on each one would have been much more complex.

"What we need now is to know exactly how big and what shape the error is," he says. To put it mildly, "we want to be 100% sure we have the correct solution."

■ M. MITCHELL WALDROP