

Chiefs of Staff, Central Intelligence Agency and other security-related entities. The resulting directive set forth policy in a number of areas, but also formalized the NSC review committee as a key element in the overseeing of space policy matters.

Part of the committee's function will be to aid information and technology exchange among the growing number of space-related federal agencies. But it is a two-sided coin.

When NASA was established, its nature as a civilian agency was stressed, both in its overall goals and in the public availability of its information, pointedly setting it apart from military concerns. There have certainly been NASA-DOD interactions, even confrontations, over the years, dealing with such matters as whether a given NASA sensor revealed too much of U.S. capabilities, or whether the NASA-funded space shuttle would be redesigned to let it land quickly from military missions (it was). But the Policy Review Committee is an official means of applying "national security" pressures to NASA's decision-making, so that all U.S. earth-oriented remote-sensing satellites, for example, will receive closer scrutiny and regulation.

The space shuttle's dual role as a civilian/military vehicle has also contributed to other concerns. Besides the main Florida launch site, a second is planned for Vandenberg Air Force Base in California, in part because it offers over-water ascents and greater payload capabilities for launches to polar and near-polar orbits. A report this summer by the U.S. Comptroller General, however, discounted several of the arguments for the site and urged Congress not to fund its construction "unless there are compelling national security reasons." A nonmilitary concern about the shuttle has been voiced by some scientists who fear that it will restrict the size and/or weight of some unmanned interplanetary probes that must be carried in the shuttle's cargo bay together with multiple auxiliary rocket stages to reach their goals.

Even NASA's most earth-related efforts have been criticized in recent months. The Landsat earth-resources program, for example, has been widely used and praised, yet in June, a task force of elected state and local officials from the Intergovernmental Science, Engineering and Technology Panel said in a report to the White House that the Landsat system lacks federal commitment to smaller-scale users and "has been planned and operated ... with little input from state and local governments." Last year, a committee of the National Research Council's Space Applications Board maintained that NASA had dropped the ball in research and development of communications-satellite technology for large numbers of small potential users, and this summer another SAB panel criticized the agency's studies of processing materials in space.

Many eyes are looking curiously toward the Space Age's next 20 years. □

## Catch 3C273: Gamma rays from a quasar

Quasars have a history of being surprising. It started with them sitting there looking like stars while being no such thing. They are now known to be extragalactic, to radiate energy like galaxies over a wide range of the electromagnetic spectrum, and to do a number of other weird things. Some of them even seem to be coming apart at velocities faster than light.

So it is a difficult thing to make astrophysical models of what kind of object a quasar ought to be. As soon as an astrophysicist gets all the pieces in place that are necessary to explain current data, something new seems to come along that threatens to unbalance the act. This time it is high-energy gamma rays from one of the most famous of quasars, 3C273, found by the European Space Agency Cos B satellite.

It appears that 3C273 radiates gamma rays with energies of 100 million electron-volts per photon. This corresponds to frequencies in the range  $10^{22}$  to  $10^{23}$  hertz. These are really high-energy particles rather than waves, and because their presence is going to raise problems in quasar model making, it is necessary to point out that Cos B's pointing accuracy is not sharp and yields an error box of  $3^\circ$  by

$3^\circ$  in the sky. This means the source can conceivably be anywhere in the box. 3C273 is in the box, and there are other "compelling arguments" for the identification, according to the authors of the report in the Sept. 28 NATURE—B.N. Swanenburg and W. Hermsen of the Huygens Laboratory in Leiden, The Netherlands; K. Bennett and R. D. Wills of the European Space Agency's ESTEC laboratory at Noordwijk, The Netherlands; G. F. Bignami and P. Caraveo of the University of Milan; G. Kanbach and H. A. Mayer-Hasselwander of the Max Planck Institute for Extraterrestrial Physics; J. L. Masnou and J. A. Paul of the Center for Nuclear Studies at Saclay, France; and B. Sacco and L. Scarsi of the University of Palermo.

This group is already engaged in further observations of 3C273. One thing they are looking for is a time variability in the gamma-ray output similar to that found in other wavelengths. Gamma-ray observation of other quasars is also suggested. Meanwhile, there is a curious fact for quasar modelers to chew on: 3C273's rate of energy output in high-energy gamma rays is higher than in any other part of the spectrum,  $10^{46}$  ergs per second. Inflation is a problem everywhere. □

## Slow virus finally identified

For the past 25 years, medical scientists have become increasingly intrigued by a group of agents that infect people and animals yet wait months or even years before triggering disease. And when disease finally appears, it is swift, dramatic and nearly always fatal, having as its target the central nervous system. These diseases are called "slow virus diseases" and the agents that cause them slow viruses.

But are the culprits really viruses, and, if so, conventional viruses? A "Yes" to the first question, and a "No" to the second on the basis of current evidence. For instance, Canadian researchers reported three years ago that they had isolated tiny virus-like particles from the brains of mice experimentally infected with scrapie, a slow virus disease native to sheep. If the particles were indeed viruses, they were the smallest viruses ever reported (SN: 11/8/75, p. 297). And now comes even more stunning news: A slow virus (the scrapie virus) has finally been identified, and it's not even a total virus—rather a naked core of DNA without a protein coat.

This finding, reported in the Sept. 14 NATURE by R. F. Marsh of the University of Wisconsin and colleagues, also suggests that slow viruses may be comparable to viroids—viral particles that cause certain plant diseases. Like the scrapie virus, viroids lack a protein coat, but, unlike the scrapie virus, they contain a core of RNA rather than a core of DNA. □

One reason the scrapie virus has remained so elusive till now is that it hooks on tight to target brain cell membranes and thus is difficult to separate from the membranes for study. Recently, though, Marsh and company found that they could obtain lots of membrane-free viral material from hamsters infected with scrapie. They then set about separating the material with two different techniques—chromatography and electrophoresis—and submitted it to enzymes that degrade DNA, RNA and protein, respectively. Only the DNA-inactivating enzyme destroyed the scrapie virus infectivity. So the researchers concluded that the virus must be a core of DNA without a protein coat.

Such a finding really isn't that surprising, notes Howard Temin of the University of Wisconsin and a Nobel Prize-winning cancer virus scientist. "The DNA of some viruses enters and leaves cells during normal animal development," he says. What is disconcerting about the discovery, however, is that it tends to rule out the possibility of ever vaccinating people against slow-virus diseases, because immunization only works against viruses with protein coats. Nonetheless, as R. P. Hanson, one of Marsh's co-workers, points out, "Diseases that destroy brain ... have long periods of remission .... If we could find the cause of this, we may be able to induce remission throughout the lifetime of an infected person." □