uncertainties involved in projecting requirements, . . . the best interpretation of these numbers is that the supply of physicians would be more than adequate to meet the Nation's needs by 1990. . . . In many respects, the potential oversupply could serve as a means of alleviating current problems of geographic and specialty maldistribution, *although the cost implications of such an oversupply are not clear*" [emphasis added].

Another means of determining that 242 physicians for each 100,000 people is too high is to compare this number with those of other countries, many with infant and general mortality rates lower than ours. John Cooper, president of the AAMC, believes that the number will be even higher by 1990 than does HEW—250 physicians per 100,000—and points out that only two countries have higher ratios, Israel and the Soviet Union. He also says that the Kaiser-Permanente Plan in California has only 102 physicians per 100,000; Europe, Great Britain, and Sweden, each with national health programs, have 150 per 100,000. "But all of it doesn't mean anything," Cooper says. "There is no good way to tell whether you have enough. In areas of the United States with a high density of physicians, doctors are simply working more reasonable hours, down from 80 to around 40, which is common everywhere but the United States." To end the capitation grants as a means of reducing the number of physicians is a poor judgment, he adds. "It's just like getting a girl pregnant and leaving her, when she still has the kid."

Determining whether costs automatically escalate as the number of doctors increases is no easier than determining whether 242 doctors per 100,000 people is too high or too low. The economics of medicine has been widely studied, but remains controversial because it appears to violate many commonsense economic notions of supply and demand. The theoretical underpinnings of Califano's proposal come from the work of Uwe Reinhart, a Princeton University economist who assumes that because patients are ill-informed doctors may raise fees at will or increase patient use of medical procedures to bring in more income and protect themselves from competition. "Intuitively, the theory is very attractive," says Frank Sloan, a Vanderbilt University expert in medical economics who disagrees with Reinhart. "His theories are highly regarded because he is so clearly understood. Unfortunately, the evidence for them is not good; it is not bad, either, just not there. And it would be a shame to see federal policy set on such a poor, unscientific basis."

Reinhart's theories depend on data that show physician fees to be higher in areas where there are more physicians—the opposite of what one might normally expect. This suggests that each physician generates his own patient demand in order to maintain income—that by limiting the number of physicians, health care costs will go downward, not up. Sloan, however, says that more refined studies demonstrate that although this may be true for specialty medical practices, it is not so for general practitioners and general surgeons—in these areas, fees are lower or the same when physician density is high, when mathematically corrected for living costs. "Calculus has no appeal to policy-makers," Sloan says.

Strangely, all studies appear to demonstrate that physician's earnings are lower in high-density areas, despite the higher fees. The explanation appears to lie in the same phenonomenon cited by Cooper: shorter working hours for these doctors. In this light, decreasing the number of physicians may decrease the fees charged in the specialty fields, but not necessarily among general practitioners and surgeons. And, unless physicians are willing to return to greater working hours, fees in general will not decrease by much.

This is already known in part. When capitation grants were reauthorized by Congress in 1976, the law was amended to target enrollment incentives at the area of primary care, where fees have not generally been affected by the number of practitioners. Ending the capitation grants would have the obvious effect of ending this incentive for education in primary care.

DuVal suggests that an alternative might be to maintain current capitation funding as an entitlement, and provide additional funds as a reward for diminishing class sizes—a sort of reverse capitation. Medical schools would no doubt scurry to participate in such a plan, which would provide enormous economies. Alas, such a proposal does not satisfy the test of trimming the federal budget and reducing the deficit, which was apparently applied this year to everything OMB could get its hands on. It is because federal support to medical schools has already been on a downward trend that many in Congress and academia were piqued by this latest, additional cut. They will, in all probability, be heard before the legislative session ends, setting the issue aside until the affair is restaged next year. Without much hard data on either side, the debate can go on forever.—R. JEFFREY SMITH

Canada Wants Cash for Cosmos 954 Cleanup

"I looked through the window and saw this object coming toward me," recalled Marie Ruman of Yellowknife, in the Canadian Northwest Territories. "The main part was like a bright fluorescent light. There were lots of small parts trailing behind it. The pieces were bigger than shooting stars, and each had a long bright tail. None of it made a sound."

It was the white fire of Cosmos 954, a nuclear-powered Soviet spy satellite which, 1 year ago, broke apart in the atmosphere and scattered radioactive debris across the Canadian Arctic.

On 23 January 1979, just 1 day before the first anniversary of the Cosmos crash and 1 day before the deadline prescribed by international law, Canada handed the Soviets a $6.1-million bill for the cleanup. It was the first claim of its kind. Canadian Foreign Minister Don Jamieson said that the bill included only those expenses above normal salary and equipment costs. Canada spent a total of $13.7 million on the 35,000-square-mile search and recovery operation. While the Soviet Union has never officially accepted responsibility for cleanup costs, Jamieson said Soviet comments implied acceptance, although Canada is still awaiting an official reply from Moscow. Added Jamieson: "I presented the ambassador literally a briefcase full of documents."

United States assistance, which at its peak included five military planes, three gamma-radiation detection devices, and 120 personnel, cost a total of $2 million over and above normal expenses, according to Colonel Roy Lounsbury, director of Safety, Environment, and Emergency Action within the office of military applications of the Department of Energy. No U.S. bill was handed to either the Canadians or the Soviets. Said Lounsbury: "We wouldn't have put up a fight if the Canadians offered to repay us, but they never asked what it cost."

The 5-ton, 46-foot-long satellite was powered by 100 pounds of enriched uranium. It scattered itself in a long arc over the thinly populated Northwest Territories in the early hours of 24 January 1978. In the following

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months, the U.S. and Canadian governments found thousands of radioactive pieces ranging from pepperflake fragments to an object the size of a 5-gallon drum. Forty-one beryllium rods and 6 beryllium cylinders were also found. In all, more than 4000 pieces of satellite debris, weighing some 200 pounds, were located.

AT & T Hits Files of Ten Federal Agencies

Some call it simply "The Big Case." Others say it will be the "largest lawsuit in the history of litigation."

By whatever name, the government's antitrust suit against the American Telephone and Telegraph Co. (AT & T) is finally picking up steam after 4 years of jurisdictional bickering and charges of delay. The action right now centers on discovery—a pretrial process by which each side has a chance to see what evidence the other side has and to dig for all the facts. And it is more than just a polite exchange of envelopes. For ten federal agencies, a troublesome aspect of discovery is the current sweep by AT & T attorneys through huge piles of agency files.

In a suit filed under the antimonopolization section of the Sherman antitrust act, the government is seeking nothing less than the divestiture of AT & T's manufacturing arm, Western Electric Co., which last year had sales of $8 billion; its Long Lines Department, which encompasses the company's long-distance network; and even some of its operating companies. AT & T is trying to find evidence in the government's files that will counter the monopoly claim.

"It's difficult to know just what they're looking for," says Arthur Kusinski, an attorney with the National Science Foundation. As of last 18 December, says Kusinski, AT & T has been perusing NSF files in search of . . . well, just about anything, it seems, that will strengthen AT & T's defense.

The search is called for by a court order that was issued last summer. In 28 pages, it defines the scope of the search, and includes not only all communications between NSF and the Justice Department, but just about any document that touches on Western Electric Co., the Bell System, Bell Telephone Laboratories, or on any aspect of telecommunications equipment, service, or the industry. In addition, AT & T requested the files of 125 NSF personnel. Complained one NSF staffer who had to haul around hefty stacks of manilla file folders: "It was a headache."

What becomes of the copies is pretty much up to AT & T. They can be used in court, or, as one observer noted, in "grinding out news releases." The upshot of all the fuss around NSF has been a slight slowdown in work output. Says Kusinski: "It has taken time from program officers who normally would have been processing grants."

The first agency to be searched by AT & T, this past summer, was the Justice Department. That search produced some 600,000 pages of documents that AT & T will use in court. In addition to Justice and NSF, AT & T is also poking its nose into the files of the National Aeronautics and Space Administration, the Department of Energy, and seven other federal agencies. By April 1980, some 37 federal agencies in all will have had the same treatment.

Some say it is a bit much. The rules of discovery were hammered out by reformers in the late 1930's. Before that time, neither side in any court action knew much about the other's case, and trials could be full of surprises. To eliminate this "sporting theory of justice," as legal philosopher Roscoe Pound once called it, reformers handed down new rules, and each side was able to look over the other's material. The problem, as some see it, is that the reformers did not envision the copying machine. Nor did they foresee the huge dimensions of cases such as the United States of America versus AT & T. The rules of discovery, designed to eliminate "trial by ambush," have been exploited to create what Federal Judge Charles Renfrew calls "trial by avalanche."

Even so, the AT & T antitrust case is moving right along, under the careful prodding of Judge Harold H. Greene. Last September, Greene imposed an April 1980 deadline on discovery. That may seem a long way off, but for The Big Case it is just around the corner.

Acorns? Fat Chance. The Skylab Is Falling!

A "public relations gimmick with life endangering side effects" is what NASA's attempt to control the reentry of Skylab has been dubbed by—yes, you guessed it—Chicken Little Associates of Washington, D.C., a group of area computer buffs.

The 85-ton space station (*Science*, 12 January) about the size of a three-story house, was shifted by NASA on 25 January into an orbit that may shorten its life and send it crashing back to earth sometime between April and September. The move was touted in one newspaper as allowing "flight directors to bring it down over one of the world's oceans."

No way, says Chicken Little. The capability just does not exist. And should a crash warning become necessary, says Little, NASA, by lulling the public to sleep, has damaged the chances for "effective reaction." At a December press conference, moreover, a NASA official said most of the Skylab would "float like a leaf" through the atmosphere. Dream on, says Little. "The big pieces will come crashing down like bullets from a monstrous high-powered rifle," says Alex Fraser, one of the C. L. Associates. Most dangerous according to Chicken Little's computer projections, is a 4000-pound lead film vault that could come crashing to earth at a velocity of 1 mile per second.

It is not just a bad case of being chickenhearted. There is an angle Chicken Little has initiated a service to "counter the coverup." For a mere $100 a month, C. L. Associates will provide you with a localized computer report that lists visible Skylab overflights, and will inform subscribers of the "risk pattern" when Skylab goes down. "We believe that personal sightings will increase public awareness of Skylab and mitigate the chance for the loss of life," says a Chicken Little press release. So far there has been one taker.

Asked for their reaction to the Chicken Little initiative, a NASA spokesperson said: "We don't think much of it. We don't think there is anything to talk about."

William J. Broad