Vaccine Imbroglio: The Rise and Fall of a Scientist-Critic

The reversal of fortunes was dramatic. Just a few years ago, J. Anthony Morris, a research virologist employed by the federal vaccine regulation agency, emerged triumphant over his bureaucratic oppressors. After suffering years of abuse and harassment, he triggered investigations that led to the transfer of his boss and the reorganization of his agency. But Morris's triumph was short-lived. This past summer he was fired for alleged insubordination and inefficiency. Now he is on the outside, scratching and clawing to get back in, his hopes pinned on an appeal for reinstatement that will be heard by a Civil Service Commission examiner starting 29 November. The struggle between Morris and his superiors has been one of the most prolonged and bitter in recent bureaucratic memory. Its very intensity has raised troubling questions about the ability of supposedly public-spirited scientists and federal officials to cooperate for the common good.

Morris first came to wide public attention in late 1971 when he and his attorney, James S. Turner, an articulate consumer advocate, charged that there had been "a major breakdown in the scientific integrity" of the vaccine agency. They alleged that agency managers were suppressing or ignoring data, failing to ensure the efficacy of vaccines, and harassing scientists (such as Morris) whose research findings might harm the vaccine market. Their charges were aired at congressional hearings and were investigated by the National Institutes of Health (which largely discounted them) and by the General Accounting Office (which upheld some of the criticism). The upshot of the fracas was that the Secretary of Health, Education, and Welfare, without acknowledging the seriousness of the allegations, nevertheless replaced the head of the vaccine agency and transferred the agency itself from the NIH to the Food and Drug Administration, where it was rechristened the Bureau of Biologics (see *Science*, 25 February, 3 March, 10 March, 17 March, and 7 April 1972).

It was a heady experience for Morris—almost a Walter Mitty dream come true. A midlevel government scientist had emerged from the obscurity of his laboratory to topple the bureaucracy which, he felt, had oppressed him and other scientists who were trying to protect the public from unsafe vaccines. The victory was all the sweeter because Morris had indeed been treated vindictively by his agency's bosses. At a grievance hearing into allegations that Morris was harassed because he raised questions about vaccines, testimony revealed that his supervisors had taken away Morris's lab and support personnel and had banished him to a small room with no telephone in it. The grievance panel censured the agency's management for allowing the harassment to continue over an extended period.

At the same time, a parade of witnesses offered gratifying testimonials to Morris's high competence as a scientist. D. Carleton Gajdusek, who later won a Nobel prize, told how he had worked with Morris for a number of years in the 1950's and 1960's and "found our collaboration so successful and profitable from my point of view that I was anxious to keep working with him." In fact, Gajdusek revealed that he had twice tried to hire Morris for his own research team, the most recent time being in 1970. Harry M. Meyer, Jr., a government scientist who was subsequently elevated to director of the revamped vaccine agency, testified that Morris "in any evaluation has established himself as a competent scientist who has done good work." And Robert M. Chanock, a distinguished virologist who later was elected to the National Academy of Sciences, praised several studies conducted by Morris, including his 1954 recovery of the respiratory syncytial virus, a feat that Chanock considered "one of the most important discoveries in the field of respiratory virus research." After listening to these and other testimonials, the grievance panel concluded that Morris was a "highly productive, imaginative scientist, highly regarded by his peers."

J. Anthony Morris
Fired Vaccine Scientist

That was 5 years ago. Since then Morris, now 58, has suffered a remarkable fall from the pinnacle of power and esteem he had so recently attained. Last year, a panel of distinguished scientists looked closely at the experiments he has conducted in recent years and found "incompetence of a high order." Meyer and Chanock, who sang Morris's praises in 1971, are now among his critics. And just this past summer, Morris was fired for "insubordination and inefficiency" after a protracted set of hearings into his case.

How did it happen? How could a scientist who got rave reviews in 1971 be deemed incompetent just a few years later? The opposing sides offer wildly different explanations. To hear Turner, a 36-year-old former associate of Ralph Nader, tell it, his client, Morris, was tarred and fired because he raised troubling questions about the safety and efficacy of vaccines to which the reigning powers of the vaccine world are wedded. "The bureaucracy reacts to somebody like Tony Morris very much the way the body reacts to an invading virus," he says. "They feel very threatened by Tony. He irritates them, he bothers them, and their reaction is to try to expel the irritant. When they can't, they get more and more hysterical." But Meyer, the director of the Bureau of Biologics, believes that he had no choice but to lower the boom on Morris, whose work, he claims, has become increasingly shoddy and irrelevant and whose behavior—encouraged by Turner—had become so obstreperous and insubordinate that it was disabling the Bureau. "You give me 200 Morris-Turner pairs and I can stop the federal government in its tracks," Meyer says.

Morris believes he was fired because of his opposition to the government's swine flu immunization campaign—a charge for which he has no evidence beyond the fact that he was indeed challenging the swine flu campaign in the period just before he was dismissed. But top health officials insist Morris was fired

for other reasons—an accumulation of problems highlighted in a tangled record that goes back for years.

The rights and wrongs of the Morris affair are lost in a cloud of charges and countercharges, evasions, and outright falsehoods. Unraveling the feud between Morris and his superiors is a bit like trying to explain a divorce proceeding—emotions run high, key participants feel deeply wronged and misunderstood, and allegations of bad faith abound. Yet an effort should be made to understand the dynamics of the Morris case. For one thing, the issues raised by Morris are said to be important to national vaccine policy. For another, Morris is still frequently quoted in the media.

Close examination of the case can also shed light on the interaction between consumer activists (Turner and Morris) and the federal bureaucracy. Much has been written about how industry affects government, but relatively little about what happens when consumer activists grapple with a government agency. The Morris case has convulsed the Bureau of Biologics for almost 2 years. Meyer, the director of the bureau, says he devoted more time and energy to the Morris case over a 2-year period than to any other problem confronted by the bureau—more total time than he has spent on this year's swine flu immunization campaign. That is an extraordinary statement for the head of an agency that is conducting a major review of vaccine policy—roughly akin to Secretary of State Henry Kissinger's announcing that he spent more time on a personnel grievance than on shuttle diplomacy. Morris and Turner believe the time devoted to their case reflects the fundamental importance of the issues they have raised. But Meyer says he was really fighting for his agency's life against an all-out assault that was unjustified but potentially disastrous.

Did Meyer really have that much to fear from a single scientist and his young attorney? "Some people look at me as a powerful person, part of a huge organization that is flagellating one solitary scientist standing nude and shivering in his laboratory," Meyer says. "That's the biggest pile of crap in the world. Management today is powerless in dealing with that kind of person. Morris is extremely intimidating. He gets that storm-cloud look and threatens other employees with Jim Turner and the courts. You haven't seen Tony shake his fist at my throat and threaten me with Ribicoff [the senator who provided a forum for Morris and Turner in 1972]. Yet if I, as a manager, take any employee in this organization

James S. Turner
Consumer Attorney

and shake my fist at his throat, I'd be hauled up on a grievance charge and they'd tack me to the wall." Meyer says he was also threatened in "a shouting session" by Turner who "shook his fist and said if I didn't have [a bureau official] do what he and Morris wanted done, he'd have me up before Ribicoff."

Those incidents are flatly denied by Turner who says "There was never a time when we said we'd go to Ribicoff." Turner says he did suggest repeatedly that the Bureau of Biologics use Morris as an inhouse critic who would point to problems so that they could be resolved before they surfaced in public. "I said it was only a matter of time before these issues got outside the bureau, not that we'd take the issues outside," he explains. "They always interpreted that as a threat to go to Ribicoff." Turner says that, in actuality, he had "no contact with Ribicoff" until the senator's staff, having received official notification that steps were being taken to fire Morris, called to find out what was going on.

Meyer believes consumer activism as represented by Turner and Morris poses a greater threat to the conduct of government than does industry influence. "The conventional image is that a regulatory agency has to be fearful of industry," Meyer says. "But in actual fact I've absolutely no fear of the biggest manufacturer we deal with. In closed meetings I speak bluntly to them and use four-letter words if I feel strongly. I can negotiate with industry and if I can mobilize the scientific community behind me, they'll back off. They're a paper tiger. But you take a man like Turner and he'll piss on you and all you can do is smile."

Meyer sees Turner as the prime mover in the "assault" on his agency with Morris serving as the mechanism through which Turner acts. But some observers believe it is the other way around—that Morris takes the initiative in raising issues and then uses Turner to articulate them.

Meyer complains that Turner and Morris will not accept the verdict of other scientists and are prepared to use the media, the political process, and grievance proceedings to get their way if they meet resistance from the bureaucracy. "To me this is one of the critical problems in government agencies," Meyer says. "It makes it difficult to manage and to retain managers. I'm close to the breaking point. What normal person would want to spend all of his time doing this?"

But Turner and Morris scoff at the notion that they represent a threat to good government. As they see it, they are simply raising legitimate questions that the vaccine bureaucracy tries to sweep under the rug.

The tragedy of the affair is that the contending sides—each avowedly committed to advancing the public health through safe and efficacious vaccines—were unable to cooperate. Instead, they became intransigent, stopped talking to each other, and engaged in squabbles so seemingly petty that they only make sense when viewed as expressions of deep antagonism and distrust.

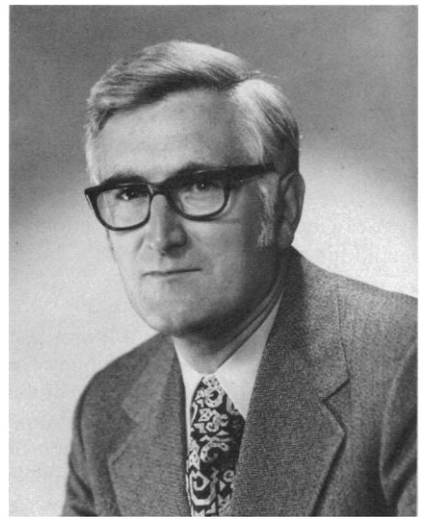
That antagonism is a development of recent years. During the 1950's Morris and Meyer worked at the Walter Reed Army Institute of Research and were on relatively cordial terms. Later, when both ended up at the vaccine regulation agency—then known as the Division of Biologics Standards of NIH—Meyer came to sympathize with Morris's plight as a target of harassment. The two men even formed an alliance of sorts during the events that led to reorganization of the agency in 1972. As Morris and Turner recall it, Meyer came to them during that earlier struggle and said, "I think you guys are going to win and I'd like to be on your side." Turner says Meyer conferred with him once every week or two "like the Fuller Brush man" and professed great admiration for the consumer movement. So Turner and Morris, apparently perceiving Meyer as a person of like mind and a bureaucrat whom they could influence, began pushing him among numerous candidates then under consideration to become head of the newly revamped vaccine agency. They also quietly dropped plans to attack some of Meyer's own work. (Meyer contends he did not ask to "join" the Turner-Morris side but simply kept lines of communica-

tion open to all contending parties in the 1971–1972 struggle.) Whether the support of Morris and Turner was crucial to the eventual choice of Meyer as head of the agency is difficult to determine so long after the fact. But several observers believe that, if Morris and Turner had objected strenuously to Meyer, they could have blocked his appointment in the highly politicized atmosphere of 1972. Thus, in that sense, they believe, Meyer owes his job to Morris and Turner—an ironic reversal of today's circumstances, where Morris owes his lack of a job to Meyer.

The alliance didn't last very long after Meyer was in as director in mid-1972. Morris and Turner say they found Meyer unreceptive to warnings about possible problems with vaccines. After the reorganization of 1972, Morris had been made director of a new section at the Bureau, on slow, latent, and temperate viruses, with a mission to investigate the long-term effects of vaccines on their recipients. His first major finding was that certain vaccines appeared to induce "cross-reacting hypersensitivity" in guinea pigs so that later on they might actually be more susceptible to a number of diseases than if they had never been vaccinated at all. But when these findings were communicated to Meyer as worthy of further investigation, according to Morris, "he said we were crazy." That was the first of several instances in which Morris felt his warnings were ignored. (Meyer, in turn, complains that Morris seldom had any very "hard" data, just conjectures based on questionable experiments.)

Morris also came to feel that the Bureau's management was purposely trying to disrupt his research program. In December 1974 he received notice that he would have to abandon one of his animal rooms—an action that he perceived as culminating a series of threats. His supervisors said they had only allowed him to use the room on a temporary basis and that they needed to have the room back for higher priority work. But Morris viewed the move as an effort to sabotage his research; he filed a formal grievance complaint on 7 January 1975. His supervisors, angry at his refusal to vacate the room, notified him that they intended to suspend him for 2 days without pay, then backed off and allowed the grievance mechanism to take its course. "The government couldn't run if you had a grievance proceeding over everything like this," complains Meyer. "Any time you want to take an animal room with a bunch of mangy mice in it, an activist lawyer can tie you up for two years."

The dispute escalated rapidly and soon



Harry M. Meyer, Jr.
Director, Bureau of Biologics

spilled over into three major arenas. There was a scientific evaluation of Morris's work, a hearing on his grievance petition which alleged that he had been harassed, and a hearing on a counteraction filed by Meyer, which proposed that Morris be fired for insubordination and inefficiency. The hearing record, including transcripts, written submissions, decisions, and appeals, is voluminous and multivolumed. Seldom has the work of a government scientist and his relations with his superiors been subjected to such detailed scrutiny.

The most important question in the Morris case is undoubtedly the quality of his work. If one believes that Morris is conducting sound experiments and raising legitimate issues—as his supporters fervently believe—then one is apt to view him as a white-hatted, though somewhat abrasive, hero whose warnings should be heeded no matter how his supervisors feel about him personally. If, on the other hand, one believes Morris's experiments are essentially worthless—as the Bureau's management fervently believes—then one is apt to see him as an ill-informed troublemaker who wastes the time and energy of the vaccine community and gives it a bad press to boot.

The task of evaluating Morris's work was assigned primarily to a committee of scientists that was formed in 1973 to advise the Food and Drug Administration (of which the Bureau of Biologics is a part) on the safety and effectiveness of viral and rickettsial vaccines. That panel is in the process of reviewing the research of staff members at the Bureau of Biologics and, because of the controversy, it took on Morris as the first scientist to be evaluated.

From the start, Morris protested that, while he did indeed want his work reviewed, he did not think the panel was the appropriate body to evaluate him. He notes that many of the panelists and their consultants have received substantial grants from the federal government which makes them, in his eyes, part of the vaccine establishment he is challenging. A few have even developed or tested some of the very vaccines Morris has questioned. And the panel, of course, has been serving as an adviser to Meyer; thus it might be predisposed to take his side in a contentious issue.*

The proceedings were lengthy and permeated with suspicion and hostility. The panel interviewed Morris and his research staff for 6 days at acrimonious, open hearings, appointed subcommittees to meet with him further on specific issues, visited his laboratory and animal rooms, and interviewed others in the Bureau of Biologics who were familiar with aspects of his work. Morris and his supporters became convinced that the panel was out to "get" them. Turner later charged the group with "viciousness" and "bias." And Bobby G. Young, professor of microbiology at the University of Maryland, who had left the Bureau of Biologics in 1969 in an earlier dispute, described the proceedings as an "inquisition" or a "kangaroo court," in which the panelists all seemed to "smell blood" and "want to move in to draw blood."

But the panelists—all scientists of some stature—saw matters quite differently. They found Morris hostile—at one point he told them: "I see no one on this table who to me represents good science"—and exasperatingly evasive. One of the panel's consultants—David T. Karzon, chairman of pediatrics at the Vanderbilt University School of Medicine—later testified that the atmosphere at the panel meetings was "unusual." But, whereas Morris's supporters saw their hero as the victim of a barrage of hostile questions coming from all direc-

*The panel was chaired by Saul Krugman, professor of pediatrics at New York University Medical Center. It contained three elder statesmen of the immunization community, namely John P. Fox, professor of epidemiology, University of Washington; William S. Jordan, Jr., professor of medicine, University of Kentucky; and Edwin H. Lennette, chief of biomedical laboratories, California Department of Health; plus three up-and-coming younger scientists, namely Kenneth McIntosh, associate professor of pediatrics, University of Colorado; June Osborn, associate dean of the graduate school, University of Wisconsin; and Wade P. Parks, head of the viral genetics section, National Cancer Institute. The panel's consultants included Robert J. Huebner, chief, Laboratory of RNA Tumor Viruses, National Cancer Institute; David T. Karzon, chairman of pediatrics, Vanderbilt University; Samuel L. Katz, professor of pediatrics, Duke University; Edwin D. Kilbourne, chairman of microbiology, Mt. Sinai School of Medicine; and Wallace P. Rowe, chief, Laboratory of Viral Diseases, National Institute of Allergy and Infectious Diseases.

tions (the hearings played to packed houses), Karzon believed the questions were provoked by Morris's refusal or inability to answer. "What seems to have occurred," he said, "is that the scientific presentations by and large were poor, the data was poor, the data was incomplete, sometimes obscure, which prompted questions on the part of the audience more than usual. The questions in turn evoked more hedging, confusion, loss of memory, 'I will find out the result and bring it down.' . . . It was very strange. It was as if I had a graduate student present who was not prepared and things do not go well for him. . . . I think the audience responded by probing more and more because they wanted rational, scientific answers, and seemed to have difficulty obtaining them."

The panel evaluated eight research projects conducted by Morris since 1972, of which the most important, according to Morris's own priority list, was his study of ts-1[E], a live-virus influenza vaccine that is being tested for possible use in man. The developer of that vaccine is Chanock, who was once friendly with Morris, was co-author of some papers with him, testified in his behalf in 1971, but now finds himself on the opposing side. Morris's initial finding was that four of ten female mice inoculated with ts-1[E] developed tumors, whereas none of the other mice did. The panel notes that Morris had no idea what kind of tumors he had found—they were later determined to be mammary adenocarcinomas.

The panel itself concluded that there was no significance to the findings because of grave defects in the design and conduct of the experiment. One of its chief complaints was that Morris had failed to randomize the mice before inoculating them. That alleged failure was considered crucial because it opened the possibility that the mice inoculated with ts-1[E] may all have come from a litter whose genetic characteristics predisposed them to develop a high incidence of spontaneous tumors.

The randomization issue was typical of Morris's dealings with the panel. Some panelists say they asked Morris if he had randomized the animals and understood him to indicate he had not. Others looked at his laboratory records and found no indication of randomization. Two panelists stated baldly at open hearings that Morris had not randomized; and Morris, according to the transcript, did not contradict them. But now that the panel's verdict makes such an issue of randomization, Morris contends that he did in fact randomize. He and his associates say they told that to the panel at unrecorded sessions in the laboratory and also tried to explain the randomization at open hearings in somewhat halting language whose meaning is obscured by portions marked "inaudible" in the official hearing transcript. So where does that leave us? Did Morris randomize and simply fail to communicate this to the panel in the hostile environment? Or did he lie about randomization in an effort to defend his experiment?

Inaccurate Testimony

One issue which became a litmus test of Morris's reliability and credibility for some panelists (because it was one of the few issues where outside documentation was available) involved the question of whether there were other animals housed in the same room during the ts-1[E] experiment. If there were, the panel reasoned, then it would be possible for the mice in various experiments to get mixed up or for the mice in the ts-1[E] experiment to be infected by a tumor-causing agent from the other animals rather than from the ts-1[E]. After repeated badgering, Morris told the panel that there were no hamsters in the room during the course of the experiment and that the only mice in the room were those involved in the ts-1[E] experiment. Yet when the panel obtained inventory records from animal caretakers, it found that there were 315 hamsters and 864 mice in the room at a time that Morris said there were only the 130 mice in his ts-1[E] experiment present. After that, many panelists tended to view Morris's assertions on other matters with skepticism.

Morris retorts that, even if the panel's criticisms are valid (which he denies), they simply indicate that something *could* have distorted his results, not that something actually *did* distort the results. Morris believes the panel was so eager to discredit him that it refused to accept the possibility that the tumors he found might really have been caused by ts-1[E]. The validity of Morris's findings—which he describes as "preliminary" rather than conclusive—may become clearer when follow-up studies are completed. Chanock reports that a "very extensive test" of ts-1[E], with very many more mice than Morris used, has been under way for almost a year and thus far shows no evidence of any tumor-causing effect.

The panel's final report, completed in June 1975, dismissed virtually all of Morris's projects as irrelevant or so poorly designed and conducted as to be of little use. The panel concluded that Morris lacked the competence to perform technologically demanding investigations and that he failed to make up for his own lack of experience by collaborating with other scientists who had the requisite skills. It found "incompetence of a high order" in Morris's repeated failure to randomize the test animals, and it could detect "no evidence" that Morris was keeping up with the literature. The panel noted that Morris had published only one scientific paper in the past 3 years despite his numerous investigations, which suggested to the panel that he was unable to do "valid science."

So how could a man who was said to be such a hotshot 4 years earlier be judged incompetent now? The panel's explanation is that Morris has "not advanced his competence" in recent years, with the result that scientific knowledge and techniques have passed him by. But supporters of Morris offer two counter-explanations. They contend that Morris's productivity has been circumscribed by the actions of the Bureau's management—a charge that the panel largely dismissed by noting that Morris was supported to the tune of at least $750,000 in 1 year, making his unit "by far the largest purely scientific research program in the Bureau"—a vast waste of resources in the panel's opinion. Morris's defenders also contend that the panel exaggerated the defects in Morris's work. There is some evidence that the panel reached hard to make its case. It cites some alleged flaws in Morris's experiments, only to acknowledge that these flaws were probably inconsequential. And it accuses Morris of failing to read key papers on the cancer-causing potential of the influenza virus when, in fact, he had refereed the major review paper on the subject. Some observers believe Morris was neither as good as he was portrayed in the sympathetic environment of 1971–1972 nor as bad as he was portrayed in the hostile environment of 1975–1976. One panelist says he suspects that Morris is no less competent than many other scientists on the government payroll. Still, when all the explanations are in, the panel's indictment is bound to undermine his reputation in scientific circles.

The administrative aspects of Morris's battle with his superiors were argued out primarily in two arenas—a hearing on his grievance petition and a hearing on Meyer's proposal to fire Morris. In the grievance proceeding, Morris cited numerous actions by his superiors (such as depriving him of an animal room and failing to respond to his warnings of vaccine hazards) which Morris felt constituted harassment, intentional or inadvertent, of his work program. An employee appeals examiner for the Department of

Health, Education, and Welfare failed to uphold Morris on most of the allegations. In a murky report issued on 20 May 1976, the examiner found that Morris's superiors exercised poor judgment in some instances, but in no case did the examiner conclude that Morris had been harassed.

The hearing on the proposal to fire Morris produced mixed results. The examiner in that case agreed with many (though not all) of management's charges that Morris had been insubordinate and scientifically inefficient. But he found the transgressions too trivial to warrant dismissal. Instead, he recommended that Morris be suspended for 5 days without pay. But Food and Drug Commissioner Alexander M. Schmidt, basing his decision solely on those charges which had been upheld by the hearing examiner, fired Morris effective 16 July (*Science*, 30 July 1976). The appeals process which begins shortly will consider whether that punishment fits Morris's crimes.

Thus the feud seems destined to continue—underlining the tremendous waste involved when deeply committed individuals work at cross purposes. Morris is energetic and dedicated in pursuit of what he perceives to be the public good. He often uses his personal funds to finance trips or scientific work that he believes crucial to gain understanding of vaccine safety. He seems to have the respect and affection of his staff. Yet he does not converse easily with many of his scientific peers and he is at perpetual war with his superiors. Many scientists close to the situation put most of the blame for the friction on Morris. But one hearing examiner concluded that both Morris and the Bureau administrators "have contributed to the atmosphere of noncommunicativeness." Wherever the fault lies, an observer can't help feeling that enormous energies have been expended on essentially pointless hostilities by scientists who supposedly seek the same goal—safe and effective vaccines.—PHILIP M. BOFFEY

Legion Fever: Postmortem on an Investigation That Failed

It has been nearly 4 months now since Legionnaires' disease took the lives of 29 men and women who were directly or indirectly associated with the Pennsylvania State convention of the American Legion that was held in Philadelphia last 21–24 July. The disease, which begins with flu-like symptoms, made another 151 persons sick, all within a matter of days after the convention.

Initial confidence that the cause of the malady would be expeditiously revealed as batteries of laboratory tests were completed has long since faded. Now, the best guess is that no one will ever know what caused Legion fever, although studies are still going on. As this story goes to press, a congressional hearing on what, if anything, was wrong with the investigation of the outbreak is getting under way in Philadelphia under the chairmanship of Representative John M. Murphy (D–N.Y.), who heads the House subcommittee on consumer protection and finance. In a widely leaked "confidential investigative report" dated 27 October, Murphy declared, "It was totally unacceptable that in a country of 220 million people, supposedly with the most advanced technology in the world, we find ourselves in a position of not knowing what happened in Philadelphia and, even worse, not being in a position to prevent it from happening again."

It is hard to cope when science fails. One expects an answer, and, when it does not come, one naturally tries to affix blame. It is more intellectually satisfying than accepting science's failure. And so the time has come for a postmortem on the search for the cause of Legionnaires' disease, but it is by no means certain that it will be possible to pinpoint the cause of failure any more than it has been possible to pinpoint the cause of the disease. Lately, a lot of criticism has been leveled against the federal, state, and local authorities who conducted the search, with the brunt of the allegations directed at the Center for Disease Control (CDC) in Atlanta whose officials became the de facto leaders of the investigation when state health officers invited their help on Monday, 2 August—day one of the investigation.

Critics, who count many toxicologists among their number, are quick to point out what should have been done, their principal complaint being that no one seriously considered toxic poisoning until the virologists and microbiologists ran into trouble in their pursuit of viruses, bacteria, and fungi. But the principal investigators reply that, given certain practical realities in the situation they faced in Pennsylvania, if they had it to do over again, they would do things pretty much the same way.

As is now well known, when the investigators did turn their attention to toxins, they discovered that tissue samples from the dead or ill were inadequate in both quanity and quality for their needs. And Congressman Murphy, who calls the entire investigation a "fiasco," concludes that "it appears to be the consensus of opinion that the failure to save, take and keep free from contamination the tissues of the victims of this epidemic is clearly the reason that ultimate resolution of the cause of Legionnaires' Disease may never be found." Actually, it is not all that clear. If the epidemic was caused by an organic chemical, it is possible that it would have been cleared from the victims' bodies before tissues could be collected. But the matter of "thinking toxins" in this chemically polluted world that the whole episode has raised is an extremely important one.

Last August people started out thinking swine flu. The idea, if not the virus, was in the air. And the disease that the victims had looked very much like a severe flu complicated by viral pneumonia. Furthermore, during the first few days it was not clear whether the disease was contagious. Pennsylvania State health commissioner Leonard Bachman told the press he even imagined having to impose quarantines or seize temporary control of hospitals.

Pennsylvania State, city of Philadelphia, and CDC health officers reviewed what had happened and answered questions on their performance recently at a meeting that the local chapter of the American Lung Association sponsored in what its president described as an effort to improve the association's image. It was held in the pink- and gold-domed cameo room atop the Bellevue Stratford on 15 November, just 3 days before the hotel, which had been headquarters for the convention, closed its doors, the 30th fatality of Legionnaires' disease.

It was during the week of 26 July that