lies in Europe without resorting to nuclear attacks on Soviet population centers.

Schlesinger resigned from the Ford Administration under pressure at least in part because his warnings that the Soviets were seeking military superiority over the United States put him into conflict with Secretary of State Henry Kissinger. But his flexible-response strategy influenced policy under his successor Donald Rumsfeld and several of the new weapons systems now under consideration are designed to implement that strategy. These include the new M-X missile which could be used with mobile launchers. Schlesinger, who apparently impressed Carter with his obvious competence and grasp of technical detail in much the way Brown did, is energy coordinator in the Carter Administration.

When Brown was asked at his confirmation hearings whether he thinks the Soviets are in fact seeking a military edge, Brown said that the Soviets would probably continue to build up their conventional and strategic forces with the possible aim of gaining "more political leverage and options."

When pressed for his views on Soviet intentions, Brown said these are "uncertain and will remain uncertain," and "We're going to have to learn to live with ambiguity because I believe their intentions will vary according to what our actions are."

In recent weeks Brown has expressed skepticism about arguments that Soviet civil defense measures may have upset the strategic balance in favor of the Soviets, and has also indicated that he does not concur with intelligence estimates based on "worst case" analyses that show the military advantage shifting to the Soviets. At the hearings, Brown said that his own assessment was that "we are not behind" in military strength, but that the United States should be prepared to modernize both its conventional and strategic forces to avoid falling behind.

On the matter of military spending, Brown told Senate questioners that cuts proposed by Carter could not be achieved immediately. During the campaign, Carter said that $5 billion to $7 billion could be trimmed from the military budget by trimming waste in Pentagon programs. Brown said of such cuts that "It's not going to be easy," and "I don't think it's something we can promise for the first budget we prepare, but that is our goal." Brown pledged a close look at the military pay structure, which has been causing concern since the volunteer army accelerated the rise in the cost of military pay and pensions.

Brown has amply demonstrated his ability to deal effectively with questions of military hardware and "housekeeping," and his familiarity with the Pentagon should permit him to move expeditiously on such matters. But it seems evident that dealing with controversial issues of strategic policy, with their implications for SALT and détente, will be the major challenge for Brown and, very possibly, for the Carter Administration.—JOHN WALSH

Gene-Splicing: Critics of Research Get More Brickbats than Bouquets

"Some of us are now in the awkward position of having our colleagues ask us, 'What have you done to the future of genetic research?' "

So Norton Zinder lamented at a recent Senate hearing on the gene-splicing technique known as recombinant DNA research. Zinder was a member of the group, led by Paul Berg of Stanford, that first called attention to the possible hazards of the new technique. In the eyes of the public, the Berg group performed a responsible and self-denying action which reflected to the credit of the scientific community. "If Berg and his colleagues don't get the Nobel prize for medicine, they deserve it for peace," was the comment of one outsider well versed in science and society issues, former FDA general counsel Peter B. Hutt.

Far fewer bouquets have come from within the scientific community for those who draw attention to the possible hazards of the gene-splice technique. "There are people who say, 'If you guys hadn't opened your mouth, nothing would have happened, it would all have blown away,' " Zinder remarks.

The initiative taken by Berg and his colleagues resulted in the NIH guidelines on gene-splicing research, but a second group of critics then emerged who believe, for various reasons, that the guidelines are too weak.

The Berg group has been subject to the occasional reproof from their fellow biologists, but the reaction toward the second group of critics has often burst into outright hostility. While the Berg group tends to feel somewhat defensive at being attacked from both sides, the second-wave critics, especially those at Cambridge, perceive themselves to be the objects of a much harsher reaction. Untenured faculty, they say, have been pressured into keeping quiet for fear of jeopardizing their jobs or promotion, and tenured staff have been subject to degrading slanders or rumors designed to discredit their position.

A widely cited example of the kind of attack being made on the critics is the comment made recently by James Watson, a member of the Berg group who has now become a vigorous proponent of the gene-splicing technique. In a recent interview in *New Times* magazine Watson is quoted as deriding, in flamboyant terms, Erwin Chargaff of Columbia and Ruth Hubbard of Harvard, two well-known critics of the research, and as describing a third scientist in even harsher words.

In a letter in the current issue of the magazine, however, Watson says that the passage "seriously misrepresents my views, and in doing so conveys a totally unwarranted impression of the professional abilities" of the third scientist.

Whatever Watson said or meant to say, the sentiments expressed, according to the critics, typify the attitudes on the part of senior faculty which have inhibited younger scientists from speaking out on the issue. Chargaff and Hubbard are established scientists who can take care of themselves, but untenured scientists, such as the third subject of Watson's ire, are more vulnerable to such attacks.

Because of the passions aroused last year in Harvard over the plans to build a containment laboratory for gene-splicing research and Mayor Vellucci's threatened interference, several scientists found the debate had become unpleasantly heated. One was Ursula Goodenough of the Harvard Biological Laboratories, who dropped out of the debate after a brief early involvement. "I decided that,

while I was happy to speak out on things that really concern me, I didn't want to lay my head on this particular block at this stage in my career," Goodenough recalls. "A lot of people dropped out about the same time I did, probably for the same reasons. All of us were feeling very pressured, but it was very subtle stuff. Those of us who aren't tenured and who know how difficult it will be to keep our jobs get anxious when there are bad feelings between us and our tenured colleagues. It is unwritten things like a hostile reaction in the hallway," she says.

According to Ruth Hubbard, another member of the Harvard Biological Laboratories, it is no accident that most of the present critics of the gene-splicing research are tenured. The junior faculty members who spoke up when discussion first opened have now receded into the background; even for tenured people, Hubbard says, "it is still simply not comfortable to speak out against your colleagues and feel the animus."

Hubbard, who together with George Wald has advised Mayor Vellucci of the possible dangers of the technique, attributes the hostility to the fact that the critics have offended academic mores by going outside. "The whole business of projecting the discussion into a public forum—that is the sin for which there is no forgiveness, not that we disagree on a scientific issue," Hubbard declares.

Another critic who has felt his colleague's hostility is Jonathan King of MIT. King, a member of Science for the People, is no stranger to controversy, but finds that the gene-splicing issue has aroused unusual bitterness. One of his colleagues, he says, stopped speaking to him for a time, while others have taken it as a personal attack that he gave evidence on the hazards of the technique before the Cambridge City Council.

King also pays tribute to Richard Goldstein of the Harvard Medical School, a member of the Boston Area Recombinant DNA Group, which prepared a scholarly critique of the NIH guidelines. "Goldstein was very brave because there was a time when it looked as if he was jeopardizing his professional career by being so outspoken," King remarks.

Goldstein, who does not have tenure, says that he did spend a lot of time in preparing the document, though he has not been prevented from speaking out on the issue.

Pressure can be applied in subtle ways, yet, on the other hand, much can depend on the eye of the beholder. One critic, cited by several observers as having been put under considerable pressure after giving testimony before Mayor Vellucci, says flatly that he has experienced "no intimation of improper pressure." Another similar case widely cited as an example of retaliation by a Harvard supervisor on a graduate student does not fit that interpretation as well as it appears to do.

Even if the critics are exaggerating the pressure upon them, it appears real enough not only to them but to outsiders. The Cambridge citizens review board in its recent report (*Science*, 21 January) expressed its gratitude to "those scientists who continue to call for more stringent control over this technology, in many instances against the majority view of their colleagues and amidst very strained personal relations."

Asked to elucidate this statement, review board chairman Daniel Hayes said that the critics who testified before the board imperiled their career by stating their views. "If you have criticized those who might be in a position to affect your advancement in an academic field, you are putting yourself on the line. I think it was courageous for them to come forward. They put themselves open to future harassment from their fellow scientists," is Hayes' observation.

Another critic who has come under personal attack is Robert Sinsheimer, chairman of the division of biology at Caltech. No one has impugned Sinsheimer openly, but a rumor casting doubt on the sincerity of his position is circulating so widely that he has felt it necessary to issue a statement of denial.

The rumor has it that, while advocating restraints on the gene-splicing technique in public, Sinsheimer has been using it himself privately. In his statement Sinsheimer explains that although his colleagues are using the technique—Caltech has a P2 containment lab and a P3 lab is under construction—he, as division chairman, does not have or want the right to deter them. He states that he is not using the gene-splicing technique himself (though like any other microbiologist he is studying recombinant genes in the old-fashioned sense of the word, that is, gene combinations obtained through the natural processes of exchange between microorganisms).

Sinsheimer believes it makes sense to advocate his position (which is to restrict use of the technique to a few sites, not to

Briefing

Carter Going Slow on National Health Insurance

National health insurance was something President Carter talked about a lot during his campaign, so it should have come as no surprise that, in an interview published in the 19 January issue of the *Medical Tribune*, Carter adviser Peter G. Bourne, the psychiatrist who is among the new President's advisers on health—his assignment is in mental health—declared that health insurance was a "very high priority" item that would get immediate attention.

However, somewhere between campaign rhetoric and postelection transition planning, Carter apparently decided to go slow on health insurance, presumably out of recognition of the great complexity of the issue. Therefore, when Joseph A. Califano, Jr., went before the Senate on 13 January for confirmation hearings on his nomination as Secretary of Health, Education, and Welfare (HEW), he stated in no uncertain terms that Carter had decided to postpone any formal action on national health insurance for at least a year, while he and HEW officials concentrated on welfare reform first. Nevertheless, Califano reassured the senators, work would begin forthwith so that, when Carter was ready to present an insurance proposal early in 1978, it would not mean starting from the beginning.

Senator Edward M. Kennedy (D–Mass.), who has been committed to the notion of an all-inclusive plan for the past couple of years, was not exactly elated by Califano's news, in particular his allusions to HEW's conducting a study of the issues involved. "With all due respect to you and Mr. Carter, the issues have been studied to death," Kennedy observed. But, inevitably, the Carter people will "study" it again.

Just how expansive a Carter proposal for national health insurance will be is hard to judge, but the betting is that it will be more modest than Kennedy's version, which calls for "cradle-to-grave" coverage of all medical costs for all citizens right from the start. With the benefit of hindsight, it is possible to point out that, even before the presidential campaign was over, Carter began to modify his original, unreservedly pro–health insurance stand by saying he would push for adoption of national coverage "as revenues permit."—B.J.C.

ban it completely) on a national but not on a local basis. "I personally deplore the introduction of personalities instead of issues into this discussion of recombinant DNA. I regard such actions as an indication of bankruptcy of argument and I will not engage in such."

The strength of reaction against the second wave of critics seems in some ways disproportionate to the critics' actions. With some notable exceptions, their language has been moderate, and most of their arguments in favor of stricter guidelines, whether right or wrong, are not inherently extreme or unreasonable; 24 percent of biologists and 32 percent of other scientists think the guidelines are "probably insufficiently cautious," according to a straw poll conducted by the Federation of American Scientists. The warmth of the hostility is perhaps explained, at least in part, by an understandable nervousness that the public might use the critics' arguments to shut down research completely. Mayor Vellucci's threats to do just that in Cambridge were certainly alarming, and the citizens' faith in the value of the research, as expressed in the review board's recent report, could perhaps not have been foreseen. "The scientific community seems to have a tremendous sense of living in a hostile environment, of being a little enclave of rationality in a hostile world," notes Rae Goodell, an MIT historian who has followed the gene-splicing issue from the beginning. "There are rigid rules about what a scientist should and should not do. It's fine to be critical in private but not in public. If you want to express social responsibility, it is fine to do so in Washington but not on the street. Pressure on the critics in this issue would seem absolutely inevitable," Goodell observes.

Pressure is hard to measure and easy to exaggerate. Yet however high tensions may have risen at Cambridge, there is no sign that any facts or arguments on the critics' side of the case have failed to reach the public record. The public must have confidence, said the NIH, in an environmental impact statement prepared last year, that the goals of the gene-splicing research accord with social values, and "A key element in achieving and maintaining this public trust is for the scientific community to ensure an openness and candor in its proceedings." The hostility toward the critics is the one shadow on what has otherwise been a notably open and candid process.—NICHOLAS WADE

Legion Fever: "Failed" Investigation May Be Successful After All

Scientists at the Center for Disease Control (CDC) in Atlanta, having labored for months, seemingly in vain, to find the cause of Legionnaire's disease, think that they finally have cracked the case. On Tuesday afternoon, 18 January, at a hastily called press conference that had a decidedly celebratory air about it, CDC officials announced that they have isolated an as yet unidentified organism as the probable cause of Legion fever and the related "Broad Street pneumonia," whose victims were within a block of the Bellevue-Stratford hotel on Broad Street in downtown Philadelphia at the time the two diseases struck last summer. The organism is about the size of a bacterium, is shaped like a bacterium, and stains like a bacterium. So, CDC is calling it a "bacterium-like organism" for now, while gearing up for a series of tests to characterize it in detail. So far, it has no name, but that is a minor matter to researchers whose investigation is beginning to go somewhere.

Legionnaire's disease is one of those mysterious and terrifying things that comes from out of the blue, strikes its victims, and is self-limiting. After a short time, it simply vanishes. It has happened before. CDC files list close to a dozen such instances that are still unsolved. But not many are as conspicuous or attract as much national attention as Legion fever (*Science*, 3 December). It struck 180 individuals who were associated in one way or another with a Pennsylvania state American Legion convention headquartered at the Bellevue-Stratford last July. Twenty-nine of its victims died, as did the hotel after frightened patrons stayed away in droves. At about the same time, there was another mini-epidemic in Philadelphia—38 cases of Broad Street pneumonia were recorded.

Amidst accusations that the investigation was being bungled in every conceivable way, epidemiologists from CDC and state and local health departments tried everything they could think of to find out what was going on. First, they looked for swine flu virus, then other infectious agents—bacteria, viruses, and fungi. Then, and some charge belatedly, they searched for inanimate toxic agents. All they managed to do was rule things out and, by fall, many of the investigators were ready to concede that the cause of Legionnaire's disease might never be found. But they diligently kept on looking just the same, and it appears that their patience has paid off. As yet, they have no absolute proof that their bacterium-like organism is the culprit, but they have the next best thing to it. And Louis Weinstein of Harvard, an acknowledged leader in infectious diseases and a member of a panel of outside reviewers called in to assess the way CDC is doing its job, says "Now the burden of proof is on those who want to say that this organism is *not* the cause of the disease."

According to Weinstein, the review panel, satisfied that CDC officers had done everything they could to detect a conventional organism or agent as the culprit, suggested that they start looking for something unconventional. As it turns out, that is what they seem to have found.

In late December, Joseph E. McDade of CDC's leprosy and rickettsial disease branch decided to look once again at slides that had been prepared about the time of the epidemic and studied thoroughly. He found something that had not been noticed the first time around—in a slide of lung tissue from a dead Legionnaire he saw tell-tale signs of what he thought might be rickettsiae. It was during the course of following that lead to an infectious agent that investigators came upon the "bacteria" that they now suspect caused the disease. How it got to Philadelphia and from where, nobody knows.

Some organisms that cause disease can be identified as pathogens by their behavior in various laboratory test systems. Others reveal their pathogenicity only in living animals. Trying to tease the culprit out of hiding, McDade and Charles C. Sheparel inoculated some guinea