he says, "I'm not happy that it had to be done but we have to live with it."

For some advocates of airborne spraying, the experience of recent months is proof that aerial spraying is effective and no threat to health. According to Dick Jackson, a USDA official and deputy director of the Medfly project, a "positive thing" about the aerial spraying is that "it opened the door to a sensible use of pesticides." He mentioned the possible deployment of aerial spraying against the gypsy moth and grasshoppers. In California, says Jackson, "We've proven that we haven't even made anybody sick and have done a hell of a lot for our credibility."

Ehrlich and other biologists disagree. He contends that the Medfly had been virtually controlled by integrated pest management techniques "when the ball was dropped." Ehrlich blames the shortcomings of USDA in its quality control of sterile flies. "It was a serious error," says Ehrlich, "which led to spraying which may or may not be successful."

Critics of USDA cite not only the suspect Peruvian flies but also mention reports of a mix-up in a Hawaiian laboratory that permitted fertile Medflies to get into a batch of sterile flies destined for California.

James Brazzel, director of the USDA's Methods Development Center in Brownsville, Texas, and chairman of the Medfly project's technical advisory committee, suggests another side to the quality control story. Brazzel, who joined the committee in a reorganization after aerial spraying began, notes that in the emergency atmosphere then prevailing project officials had to "search desperately" for sources of sterile flies. The Peruvian facility was thought to be reliable. He says the USDA has plans for a new facility in Hawaii to produce sterile insects that would be designed to prevent shipment of nonsterile flies. USDA had urged creation of such a facility for years, he says, but not until the Medfly emergency were funds forthcoming in the budget. The facility should start to operate in 1983. Brazzel and others including Race, however, say that there is still not conclusive evidence that nonsterile flies shipped in from outside were the source of the Medfly surge earlier this year.

This is one of a number of questions left open because the Medfly, although now famous, remains scientifically relatively unknown. Medfly appearance in northern California surprised biologists because it was assumed the insect could not survive the cool winters. Knowledge of the effect of winter cold on Medfly survival still amounts to "educated guesses," according to Donald L. Dahlsten, chief of the biological control division of the Department of Entomological Sciences at Berkeley. The last two winters have been fairly mild in northern California and there is speculation that this contributed to the Medfly infestation. But not much is known about the Medfly's overwintering ability or how cold it has to be to kill off the insect because "the soil provides a certain amount of insulation and we don't know the temperature in the insect microclimate," says Dahlsten.

Dahlsten and other entomologists have been critical of the federal-state project for missing opportunities for intensive study of the biology of the insect. The project has been operating in a "knowledge vacuum," says Dahlsten. "Here is an experimental situation and there is no money for population biologists." He acknowledges that emergency conditions have prevailed, but faults the project for succumbing to the atmosphere of "crisis, fear, and politics." Asked what would happen if the Medfly strikes in the future, Dahlsten surmises, "They're going to panic and run for the helicopters again."

Critics of the project's scientific dimension concede the promise of a computer-based model of the life cycle of the Medfly developed by entomologist Richard Tassen, a research associate at Berkeley. Using temperature data from soil and air probes, the Tassen model links temperature changes to variations in the insect's life cycle.

The biologists continue to be critical however, both of attitudes of the project staff and actions taken. Ehrlich says one high USDA official told him "We're in the middle of an eradication program and can't afford the luxury of research." Others noted actions that undercut efficient use of data. For example, releases of flies have been recorded on one set of map grids and recaptures on another set so that analysis of data is very difficult. Ehrlich's view is that "People on the project have not had the scientific backup to do the job properly."

As many academic biologists see it, eradication efforts are dominated by pest control specialists accustomed to relying on chemicals to do the job. They are backed by classically trained USDA entomologists who see sterile fly and ground treatment tactics as still experimental and regard aerial spraying as a tried and true remedy.

Ehrlich says part of the problem is that isolation exists between old line ento-

*(Continued on page 1224)*

## U.S. Announces Pullout from IIASA in Vienna

The United States has served notice that it intends to withdraw from the International Institute for Applied Systems Analysis (IIASA) near Vienna, in which the Soviet Union and the United States have been the major dues payers. Citing budgetary constraints, U.S. representatives to the IIASA council meeting in mid-November said that the U.S. National Science Foundation (NSF) will cease to underwrite U.S. participation after 1982. The IIASA council responded by saying it was prepared to adjust the institute's dues structure and asked that the United States reconsider its position on membership. The council also relaxed some rules, in effect, giving the United States until mid-1982 to review the decision.

The institute was established in 1972 after 5 years of negotiation and was viewed as an early fruit of détente between the Soviet Union and the United States. IIASA was thought to be attractive to the Soviet Union and other Eastern European countries because it provided access to Western expertise in systems analysis. The institute is housed in Schloss Laxenburg, a remnant of Austrian imperial splendor, in a village about 16 kilometers from the center of Vienna. IIASA has only a small permanent staff, but at any time about 100 professionals are in residence working on projects.

The institute budget is about $10 million a year; the Soviet Union and United States each pay 23 percent. The other 15 members—Canada and Japan belong as well as Eastern and Western European nations—pay the balance in equal shares. IIASA is a nongovernmental organization. Membership is formally held by a scientific organization in each country. In the United States, the National Academy of Sciences (NAS) is the national member organization.

From the start, U.S. participation has been funded through the NSF budget. Early this year, under general budgetary pressure applied by the Reagan Administration, NSF opted for an immediate end to U.S. membership in IIASA. The agency backpedaled, however, after it was noted that, under contractual obligations, a full


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year's notice must be given in advance of withdrawal. The academy was to give formal notification this month, but IIASA offered the waiver.

The withdrawal announcement comes at a time of strained relations between the Soviet Union and the United States. IIASA was also embarrassed last spring when a British magazine reported that a Norwegian double agent had identified a Soviet citizen, Arkady Belozerov, then working

IIASA

***Schloss Laxenburg***

as an administrator at IIASA, as being involved in Soviet intelligence activities in the North Sea region. No formal action was taken by IIASA or the Austrian government, but Belozerov resigned his IIASA post.

NSF officials discount political considerations, insisting that U.S. withdrawal from IIASA was determined by budgetary factors. They point out that U.S. dues to the institute—$2.3 million to $2.5 million, according to the strength of the dollar—amount to 25 percent of the NSF international budget and that expenditures under bilateral arrangements are viewed as more cost effective.

Chances of continued U.S. participation appear to hinge on revision of the IIASA dues structure. After the initial NSF announcement early this year, the Department of State canvassed federal agencies to determine their interest in funding projects at IIASA. Some agencies did express interest, notably the Department of Agriculture, but the total provisionally offered came only to about $500,000. The NAS governing council felt that this left too large a funding gap for the academy to plan to continue acting for the United States. Since the IIASA offer of a restructuring of the dues, Department of State sources say a wait-and-see attitude has been adopted here. The question is whether other IIASA member countries regard the institute as sufficiently useful to see it recast as more of a consortium of equals in respect to bearing the financial burden.

***—John Walsh***

## Engineers Flee Academia

The big money to be made in industry by holders of engineering degrees has lured away both graduate students who at one time would have gone on to receive a Ph.D. and faculty. Though not well documented, the trend has been decried far and wide. Now, the first survey of reports on the brain drain has been issued by the National Science Foundation in its science "Highlights" series.

The survey notes that 10 percent of all faculty positions at engineering colleges went unfilled in the fall of 1980. The biggest drain was in computer science and engineering, where 16 percent of the positions went vacant. In grappling with the problem, schools have increased teaching loads and dropped courses. The faculty shortage has also forced schools to hire more faculty from other countries. Almost one-quarter of the junior faculty in engineering received their bachelor's degree outside the United States.

At the root of the problem is the considerable difference in salaries offered by academia and industry. In 1981 a baccalaureate engineer in some fields could pull down an offer of $26,500 per year, whereas an assistant professor in engineering received about $22,000 for the academic year. The total number of doctorates that have been awarded has dropped steadily since 1972, the report noted, going from about 3500 to the current figure of 2500.***—William J. Broad***

## Aliens on the Campus

The Department of State has upset academics from at least two institutions in the course of what the department regarded as routine attempts to adhere to the Export Control Act.

In particular, officials at the University of Minnesota have publicly expressed resentment at what they see as pressure to monitor the activities of a scholar from the People's Republic of China. The Export Control Act is designed to inhibit the transfer of hardware and information if it is deemed threatening to national security. When scholars from foreign nations, particularly Communist ones, apply to come to the United States, their plans of study are screened by the State Department to be sure their work will not entail access to classified research. This is usually done before visas are issued. But according to State Department spokesman James Menard, Chinese scholars have been allowed to enter the country before their work has been checked in order to facilitate access, in accordance with Chinese-American cultural accords.

Thus, when Qi Yulu arrived at the University of Minnesota to study computer science, the department head, W. R. Franta, received a form letter and questionnaire on Qi's area of research from the State Department. Upon getting no response, the department's exchange officer for China, Keith Powell III, wrote Franta that Qi should "be restricted from any access to unpublished or classified Government-funded work."

Affronted, university president C. Peter Magrath wrote back that "our mission is teaching, research and public service, and neither our faculty nor our administrators were hired to implement government security actions."

According to Menard, the incident boils down to "a failure to communicate." He said the State Department's only function is to remind people of the laws and it is up to the institution to decide what procedures to follow. He also vouchsafed that the wording of the follow-up letter probably was "not too accurate."

The Export Control Act is commonly applied to corporate activity and it may be that the State Department needs to develop more finesse in dealings with academe. A year and a half ago scientists accused the government of clumsy meddling when it revoked the visas of some eastern bloc scientists and got Chinese scientists to sign "letters of assurance" that they wouldn't divulge information gained at a bubble memory meeting in California.***—Constance Holden***