ment, scientific contact, and professional recognition at each stage of their professional lives, they would undoubtedly become more visible.

The lack of encouragement and self-confidence leading to isolation, which then leads to lack of recognition, is a vicious circle that must be broken for the woman professional. This can be done most easily for the beginning student. For older women, there must be increased placement in positions of responsibility and visibility. Protective practices that discourage women from entering arenas of competition can only be viewed as discrimination on the basis of sex, since women professionals are rarely given the choice between being protected and being independent.

Unexpectedly, this study illustrates the lower status of another group of individuals who are considered deviants from the expected roles of the established society—single men with doctorates, who were found in the positions predominately filled by women.

In conclusion, this study of a select group of scientists probably has general applicability to all women professionals in their roles vis-à-vis men. Examination and documentation of discriminatory practices based on sex points to the areas in which women must direct their demands for equality.

References and Notes

1. Among the approximately 3500 registrants at the meeting in Minneapolis, about 900 answered the questionnaires, 815 of which were sufficiently complete for full analysis. The purpose of the survey was not indicated on the questionnaire. The questionnaire consisted of 40 questions with multiple choice answers. The questions were grouped under headings which related to (i) personal information, (ii) education, (iii) past professional experience, (iv) present professional experience, (v) self-evaluation, and (vi) career decisions of individuals with professional spouses. Answers were first encoded on standard coding sheets and then keypunched and verified on standard IBM cards. Analysis was done with the aid of an IBM computer, using the set of programs *Statistical Package for the Social Sciences* [N. H. Nie, D. H. Bent, C. H. Hull, (McGraw-Hill, New York, 1970)]. Using the determinants sex, marital status, and doctoral degree for categorizing the respondents into eight groups, the answers to the questionnaires were examined in relation to these groups. Chi-square values were derived to determine the significance (P) of the differences observed among these groups.
2. The data on salary levels and supervisory roles are derived from the 1970 annual membership survey conducted by the American Society for Microbiology [M. L. Robbins, *ASM News* **37**, 34 (1971); L. Leive, *ibid.*, p. 57].
3. See *Chem. Eng. News* **50**, 34 (1972); P. H. Abelson, *Science* **175**, 127 (1972); D. J. Glancy, *Harv. Law Sch. Bull.* **21**, 22 (1970); M. S. White, *Science* **170**, 413 (1970); A. S. Rossi, *Am. Sociol.* **5**, 1 (1970); H. S. Astin, *The Woman Doctorate in America: Origin, Career and Family* (Russell Sage Foundation, New York, 1969); A. Fischer and P. Gold, *Am. Anthropol.* **20**, 332 (1968); C. Lopak, *Women in Medicine* (Johns Hopkins Press, Baltimore, 1969); A. E. Bayer and H. S. Astin, *J. Hum. Resour.* **3**, 191 (1968); R. J. Simon and E. Rosenthal, *J. AAUW* **60**, 127 (1967); A. S. Rossi, in *Women and the Scientific Profession: The M.I.T. Symposium on American Women in Science and Engineering*, J. A. Mattfeld and C. G. Van Aken, Eds. (MIT Press, Cambridge, Mass., 1965), pp. 51–127.
4. *ASM News* **38**, 173 (1972).
5. Additional comments were solicited from the respondents, and 62 persons wrote notes on various topics. Ten of the essays dealt with the employment situation in general, 8 contained criticisms of the questionnaire, 13 mentioned bias against applied microbiology in educational institutions and in the questionnaire, 2 had favorable comments on the ASM, and 19 mentioned miscellaneous topics. In addition, 13 essays dealt with discrimination against women in education and jobs: 7 were written by married women doctorates, 1 by a married man doctorate, and the others by single women and female students. The comments included personal testimony on, first, lack of encouragement of female graduate students and, second, the severe impediments to promotion at the higher faculty levels.

6. We wish to express our deep gratitude to Lotte Bailyn and Gertrude Baltimore for their helpful advice and criticisms of this study; to Asger F. Langlykke and the many ASM members for their interest and support; and to Richard Triplett for programming and computation.

An Invitation for Suggestions on Candidates

At the December meeting of the Board of Directors, William Bevan confirmed his decision to resign as Executive Officer of the Association effective 30 September. In response to the announcement of Dr. Bevan's decision, the Board of Directors appointed a committee of three persons to serve as a search committee, consisting of the Board chairman, Leonard Rieser, president Roger Revelle, and president-elect Margaret Mead.

The appointment of a new Executive Officer is of crucial importance to the Association; at the same time it is an extraordinary opportunity for an individual to exercise leadership in the scientific community. The committee invites suggestions of possible candidates and applications from individuals who wish to be considered for the position. Those submitting applications should include a résumé of their experience. Such communications should be addressed to Leonard M. Rieser, Chairman of the Board of Directors, American Association for the Advancement of Science, Dartmouth College, Hanover, New Hampshire 03755.—LEONARD M. RIESER

NEWS AND COMMENT

Eradicating the Boll Weevil: Would It Be a No-Win War?

The boll weevil, bane of the cotton belt for more than half a century, is reported to cause some $200 to $300 million in economic losses annually, making it the United States' most important farm pest. Great amounts of chemicals have been applied just to keep the weevil in check. Indeed, the U.S. Department of Agriculture says that one-third of all insecticides used in this country on farm crops are used for control of the boll weevil or for control of other pests that would not become problems if chemicals used against the weevil did not also destroy beneficial insects. Eradication of the boll weevil has long been the goal of the cotton industry; and now the industry, supported by some leading USDA entomologists, is pressing to have the government lead a 6- to 10-year campaign intended to rid the cotton belt of this pest for once and for all.

The cost of this campaign would be

high—$655 million is the industry estimate, and some skeptical entomologists believe $1.5 billion is more like it—but perhaps no higher than the risk of failure. The proposed campaign's most prestigious scientific sponsor is Edward F. Knipling, the USDA entomologist who led the development of the sterile male release program by which the screwworm fly was eliminated from the Southeast. Knipling concedes that this would be by far the most costly and difficult pest eradication program ever attempted. According to him, "100 percent cooperation of growers and 100 percent [operational] precision and efficiency" would be required for success.

Certain other entomologists, such as Dale Newsom, chairman of the department of entomology at Louisiana State University, say that, if undertaken, the campaign will be long, costly, and futile—one might say an entomological Vietnam. The Vietnam analogy is not entirely fanciful. As in the war in Vietnam, the foe would be stubborn, elusive, and often aided by favorable ground cover and terrain, not to mention a political sanctuary in Mexico. Deployed against him would be airplanes, helicopters, and even defoliants. Detailed body counts would be made. Nevertheless, given its support by respected scientists such as Knipling and by cotton growers willing to bear possibly up to half of the cost of carrying it out, the eradication proposal deserves serious examination, especially in view of the very large benefits that success would bring.

The boll weevil has been under investigation ever since the early 1890's when it was first discovered in Texas, an unwelcome migrant from Mexico. The adult weevil (Fig. 1) is about ¼-inch long, its snout accounting for nearly half its length. After its emergence from winter hibernation during spring and early summer, the weevil moves into the growing cotton, and, unless its numbers are controlled, it will greatly damage the crop by puncturing "squares" (buds) and bolls while depositing its eggs and feeding.

The weevil's reproductive potential is enormous. A 10-acre cotton patch that has a very light infestation of, say, 100 weevils on 1 July can have 100,000 weevils by 1 September. Economic damage usually begins when the weevils number 1000 per acre, and the purpose of normal "in season" control is to keep the population from reaching that level before all the cotton is "made" about the end of August. Studies done in Texas and the Carolinas have shown that growers who have neglected to control the boll weevil have been losing up to one-half of their potential crop.

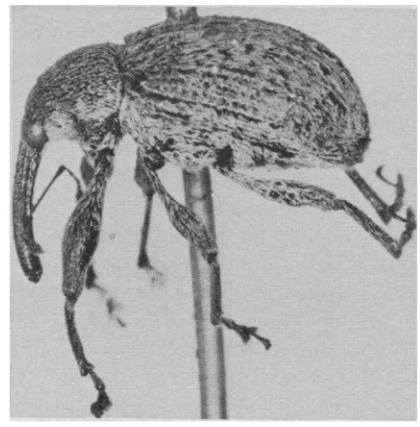

Fig. 1. The boll weevil, magnified from its life-size length of ¼ inch.

It is no wonder, then, that, as the boll weevil gradually extended its range from South Texas through the entire cotton belt (finally reaching the Carolinas and Virginia by the 1920's), its advance was chronicled with foreboding and alarm. In 1911 a cartoon appeared in the Greenville [S.C.] *News* showing a huge boll weevil standing at the Georgia-Alabama line, its shadow falling ominously on South Carolina. A folk ballad conveyed the same message with a sad humor:

The first time I saw the boll weevil
He was standin' on the square
The next time I saw the boll weevil
He had his whole durn family there
Lookin' for a home
Lookin' for a home.

For many years the only available boll weevil control measure of real value was that of planting and harvesting the cotton as early as possible, then destroying the stalks in order to reduce the overwintering weevil population that would threaten the next year's crop. And, in most situations, even these cultural practices were not of much value, at least so long as there were no other means of control. By the 1930's, calcium arsenate was being used effectively for control of the weevil, but, as time went on, this pesticide proved to have grave drawbacks. Besides being dangerous to humans and livestock, the arsenate, once applied, would not disappear but would build up steadily in the soil, to such a point that the growth of some crops—legumes, for example—was severely retarded.

In the mid-1940's, calcium arsenate was replaced as a boll weevil control insecticide by whole new families of chemical compounds, the most favored being a combination of DDT and Toxaphene. Properly used, this combination was effective for in-season control of the boll weevil; but ultimately it proved even less acceptable environmentally than calcium arsenate. Noted for its persistence, mobility, and tendency to build up in food chains, DDT was banned for cotton insect control in December 1972 by the Environmental Protection Agency (EPA). The EPA order has been appealed, but its reversal seems unlikely.

Fortunately for the cotton grower, the organophosphate compounds, such as methyl parathion, Guthion, and malathion, were still available and already were in widespread use. But they, too, have their drawbacks. These insecticides vary greatly in toxicity, but methyl parathion, perhaps the one most commonly used, is extremely poisonous and must be applied with great caution. In an ecological and economic sense, a big disadvantage associated with these and all other broad-spectrum pesticides is that they kill insects indiscriminately, the harmful and the beneficial alike.

As an introduced pest, the boll weevil, although it has natural enemies, has never been sufficiently controlled by biological agents to keep it from doing major economic damage. In the case of some other pests, however, natural agents can contribute much to keeping them from causing such damage. This is said to be true of the bollworm and the tobacco budworm, pests that damage cotton and a variety of other crops, such as tomatoes, corn, tobacco, soybeans, peanuts, and sorghum. Yet, insecticides used in cotton fields are as deadly to the beneficial insects that control the bollworm and the budworm as they are to the boll weevil. This being the case, still more insecticides must be applied to prevent outbreaks of the bollworm and budworm.

The consequence of the continuing use of the organophosphate compounds from year to year could be more serious yet, however, if either the boll weevil, the bollworm, or the budworm should develop resistance to them (the boll weevil developed resistance to Dieldrin, a chlorinated hydrocarbon, within about a 5-year period). With DDT banned, and the organophosphates no longer effective, the cotton grower could be in real trouble.

The beginnings of the cotton indus-

try's current proposal for a campaign of eradication against the boll weevil go back to the late 1950's. At that time less than $5 million had been spent by the federal government for research on the boll weevil, although by then crop losses and pest control costs attributed to the boll weevil totaled an estimated $10 billion. Delegates to the 1958 annual meeting of the National Cotton Council, the principal industry association, were soberly aware of the continuing crop losses, the high cost of controls, the danger of the weevil's developing resistance to available insecticides, and the possibility of this pest extending its range into the irrigated cotton fields of the Far West. They decided that the time had come to mount a major effort against the weevil.

The cotton industry, which includes growers, ginners, merchants, warehousemen, and manufacturers, does not lack political influence in the South, and, as one knows, the South does not lack potent representation in Congress. Accordingly, the government was not long in responding to the cotton council's fervent desire for a broad-based program of research looking toward better control of the boll weevil and, if at all possible, its eradication. By 1961, the Boll Weevil Research Laboratory had been built at Mississippi State University, and, since then, more than $21 million has been spent on eradication and control research, at the new laboratory and elsewhere.

A new strategy of integrated controls was emerging by the time this cotton council established its special Committee on Boll Weevil Eradication in 1969. That strategy would consist of these major elements:

- Normal in-season application of insecticides by the grower to control the weevil population.
- Repeated late-season insecticide treatments to kill as many weevils as possible before they achieve diapause, the state of hibernation essential to the insect's winter survival.
- Defoliation or desiccation of cotton plants before harvest and destruction of the stalks immediately afterward, the purpose being to deny the weevil a favored place to feed and produce one or more new generations.
- The deployment in the spring, prior to the weevil's emergence from diapause, of traps containing a sex attractant called grandlure.
- The release of sterile boll weevils, 100 to an acre, with the aim of preventing fertile matings by the few native weevils that have survived the diapause treatment and have not been drawn to the grandlure traps. Effective use of sterile-male release technique is possible only if the weevil population has been reduced to extremely low numbers, of, say, two weevils per acre.

The cotton council's committee on eradication concluded that this new strategy of integrated controls offered a way to eliminate the boll weevil, a conviction supported by the committee's technical advisers from the USDA and state agencies. These advisers included Knipling, who was then also science adviser to the administrator of the USDA's Agricultural Research Service; J. R. Brazzel, the entomologist in charge of methods development for the USDA's Animal and Plant Health Inspection Service; and T. B. Davich, director of the Boll Weevil Research Laboratory.

So it was that, by mid-1971, a pilot eradication project was initiated in an area of 25 miles radius in southern Mississippi, adjoining parts of both Louisiana and Alabama. Around this core area were delineated three buffer zones, 50 miles wide altogether. Inside the core area, which at the end of the test contained some 1890 acres of cotton, the full integrated control strategy was to be applied. Less intensive suppressive measures were used in the buffer zones although, except for the sterile-male release, all of the control measures were used in the inner-

Briefing

Vice President Ford Hears Scientists' Concerns

A group of scientists met briefly last month with Vice President Gerald Ford to express their concerns about the role of science in government. Though Ford made no guarantees, he impressed his audience as a careful and sympathetic listener who would not be ill-disposed toward science should he ever occupy the White House.

Ford is a busy man these days, and the group was not a little surprised that he found time to talk with them. "Not until a Secret Service man appeared to check us onto the bus to go to the Cosmos Club did we think that he would show," says one participant. The group was the Committee of Scientific Society Presidents, formed last year by Alan C. Nixon, past president of the American Chemical Society (*Science*, 27 July 1973). Nixon wrote a month ago to Ford suggesting he might meet with the committee. What may have persuaded the Vice President to accept the invitation was the rather considerable number of people whom the society presidents represent—some 300,000 scientists, according to Nixon.

The meeting, which took place for an hour and a quarter over lunch at the Cosmos Club in Washington, was off the record, and participants declined to go into the detail of what was said. It seems that the society presidents expressed the scientific community's sense of rejection by the administration, as manifested in the abolition of the Office of Science and Technology. Ford noted that he had had no hand in that decision. Members of the group also opined that there was not enough opportunity in government to translate science and technology into action, particularly with issues that require long-term planning.

The National Science Foundation, it was said, lies too far from the center of power. Some members advocated that all federal science programs should be reorganized in a Department of Science; others preferred the idea of a Council on Science and Technology similar to the Council of Economic Advisers.

Ford, it seems, kept his counsel on these matters but at the same time conveyed an impression of openness and informality in which it was easy for people to ask questions. "It was clear that he had a serious interest in the views of the group," says one participant.

ACS president Nixon was pleased at the success of the meeting and plans to hold others. "We will try to get people like Mansfield, Kennedy, whoever the next vice president is, Shultz, and so on," he said buoyantly.

The group included representatives of the AAAS, the ACS, the American Physical Society, the Federation of American Scientists, the National Science Teachers' Association, and the Coordinating Committee of Engineering Society Presidents.—N.W.

most zone. The purpose of the buffer zone controls was to keep weevils, which are known to be able to fly distances of up to 50 miles (at the least), from migrating into the core area. The pilot project was to cost $5.2 million, with the industry contributing about $1 million and the federal government nearly all the rest.

The test area selected was considered unusually challenging because the cotton fields were generally small and often surrounded by high trees, making it difficult to apply insecticides from aircraft. In addition, the fields were frequently tended by illiterate tenants or part-time farmers, with the equipment needed for proper in-season control of boll weevils often lacking. The project sponsors believed that if the boll weevil were eliminated from the core area, this would indeed demonstrate the feasibility of eradicating the weevil from the entire cotton belt.

The pilot project ended last 10 August, about 2 years after it had begun; shortly thereafter, the eradication committee concluded that the project had demonstrated the feasibility of eliminating the boll weevil. The fact is, however, that the results were ambiguous enough to allow either the optimist or the pessimist in the matter of boll weevil eradication to nourish his conviction.

The project team, using sampling techniques, could find an infestation of adult weevils in only one of the 236 fields in the core area during the final week of the test, although punctures made by female weevils in laying eggs were found on a few cotton squares in several fields (none contained fertile eggs). According to project scientists, the one isolated infestation and the evidence of oviposition punctures could have come from migration of weevils into the area. Also, they contend that, even if a few wild female boll weevils should survive or hatch out under such circumstances, they would mate with sterile males and thus fail to reproduce.

A special review committee of the Entomological Society of America, invited by the eradication committee to evaluate the project, was decidedly cautious in interpreting the test results, however. This six-member review body, headed by W. G. Eden of the University of Florida, was divided as to whether the technical feasibility of eradication had been demonstrated. But the panel was unanimously of the view that the time had not yet come for a massive eradication effort. ". . . [W]e have reservations until such time as currently available suppressive techniques have been improved and collectively tested in different geographical and ecological areas," it said.

The panel called particularly for improvements in the mass-rearing and sterilization of boll weevils (during the experiment the sterilization was only 98 or 99 percent effective), in the techniques of population surveillance, and in evaluating the relative effectiveness of the various suppressive methods. It expressed regret that the core area had not been larger and that the experiment had not run longer.

In the panel's view, the *technical* problems associated with an eradication effort are likely to be less difficult than the *operational* problems. A prime case in point was the project team's failure to discover and treat one 2-acre plot of cotton until near the end of the second growing season. It turned out that the farmer who owned this

A New Look at Federal Science

The National Academy of Sciences' (NAS) governing council has established a blue-ribbon committee to develop recommendations on how the relationship between science and techology and the federal government can be improved. Chairman of the committee is James R. Killian, Jr., who, during the Eisenhower Administration, was the first to hold the post of presidential science adviser.

Those involved in the effort emphasize that the committee is not attempting to reconstruct the White House science advisory machinery which was dismantled last year. The aim is a broader one of suggesting improved means by which scientific and technical information and advice can be provided to federal operating agencies and the Congress as well as to the White House.

An obvious attempt has been made to reassure the Administration that the committee's intentions are not hostile. Killian is among the ranking elders of the scientific community but has not figured personally in the tensions that have arisen between scientists and the present Administration and the previous one. The two vice-chairmen of the committee are Emanuel Piore, former IBM vice president for research, and Kenneth S. Pitzer, a distinguished chemist with experience as a university administrator, who is now a professor at Berkeley. Most members of the committee* named so far are prominent scientists or science administrators with past close connections with federal science, but only a few are mainly identified with the now defunct White House Office of Science and Technology and the President's Science Advisory Committee.

Killian made the following comment on the purposes of the committee:

> The committee has been appointed by the Council of the NAS to review and evaluate ways in which science and technology provide information and assistance to both the executive and legislative branches of the government. The committee will explore opportunities by which this essential service can be strengthened and improved in the future in view of the increasingly vital and humane role science and technology must play in serving the changing needs of our society. The committee will seek to assess present organizational arrangements, recognizing that new circumstances have already created new needs. In the course of its work, the committee will consult with leaders in both branches of government and in the scientific and technical community.

Killian is known to take the view that the committee should make a concentrated, short-term effort, and not, for example, commission papers on all aspects of the problem and engage in extended deliberations. The committee is expected to report in 4 to 6 months; the form of the report has not been decided upon.—J.W.

* Other members of the committee are Graham T. Allison, Harvard; Ivan L. Bennett, Jr., New York University; Harold Brown, Caltech; James B. Fisk, Bell Labs; Robert C. Gunness, Standard Oil of Indiana; Edwin H. Land, Polaroid Corp.; Franklin A. Long, Cornell; Donald B. Rice, Rand Corp.; James Tobin, Yale; Charles H. Townes, Berkeley.

plot was cheating on his cotton allotment, and project personnel had been deliberately misled. In another instance, a farmer who complained that insecticides applied in the test project had killed some of his cattle and chickens refused to allow project personnel on his place until the state entomologist threatened legal action against him.

The problems that would be associated with a beltwide eradication program do not stop with those just cited. The fact that the boll weevil would have a sanctuary in Mexico means that there would have to be a never-ending battle against the pest in South Texas. Unless those weevils that fly across the Rio Grande into Texas are quickly suppressed, they could again spread from there into other parts of the cotton belt.

Also, there are several alternate host plants, the most important of which is cienfuegosia, a wild cotton plant that grows in scattered colonies over a vast area along the South Texas coast. All colonies would have to be found and any weevil infestations suppressed. Althea, a hibiscus plant found throughout the South in home gardens, may also harbor the weevil unless homeowners can be persuaded to stop growing it. Besides the alternate hosts, there is the problem of volunteer cotton (which can spring up in fallow fields) and ornamental cotton, the latter sometimes grown by operators of roadside businesses to attract Yankee tourists. All such volunteer and ornamental plants would have to be eliminated.

Whatever the potential difficulties, the National Cotton Council, eagerly pressing on, presented an overall plan for boll weevil eradication to Secretary of Agriculture Earl L. Butz in Decem-

Proxmire Hits NSF Research Priorities, Funding Flexibility

When officials of the National Science Foundation (NSF) went to Congress in December to ask for $8.2 million in supplemental funding for their $566.6 million fiscal 1974 appropriation, they got a taste of what it is like to be grilled by the cost-conscious senator from Wisconsin, William Proxmire, who is chairman of an appropriations subcommittee overseeing NSF.

The supplemental money was intended for some new expenses in connection with the Administration's energy program and the new science policy office that is to assist NSF Director H. Guyford Stever. But Proxmire used the occasion to question a range of agency programs, some of which are dear to NSF. The senator's staff confirms that the approach taken in the 2 December hearing is the one he intends to follow when the entire NSF budget for 1975 comes before him this year.

Proxmire's authority over the NSF budget stems from his chairmanship of the Subcommittee on Housing and Urban Development, Space, and Science of the Senate Appropriations Committee—which oversees appropriations for NSF, the Department of Housing and Urban Development (HUD), the National Aeronautics and Space Administration (NASA), and some smaller agencies. NSF is something of a dwarf compared with HUD and NASA, each of which has a budget over $3 billion. But Proxmire obviously thinks fiscal waste can be cleansed from any budget—large or small.

NSF officials say that, despite his reputation as a maverick in the Senate, Proxmire has treated them fairly in the year and a half he has been chairman. Indeed, after the 3-hour hearing on the supplemental funds, he followed the House's lead and merely cut the request by $400,000 to $7.8 million.

During the hearing, however, he queried NSF Director Stever and Assistant Director for Research Applications Alfred J. Eggers, and other officials. Instead of encouraging NSF's applied projects outside of basic science, Proxmire argued that many of them seem to belong more properly under the jurisdiction of other agencies. Citing a $900,000 automotive propulsion project under the program of Research Applied to National Needs, he asked whether or not the auto industry was funding similar work and declared, "I fail at this time to see a place for the National Science Foundation." Proxmire went down a specific list of projects in fields from history to transportation, asking why they weren't being sponsored by other agencies.

Stever, Eggers, and others argued that NSF's perspective on these problems was different from that of other, mission-oriented agencies. Defending the automotive propulsion project, Eggers noted that they had found only 100 university experts in the field in the country—hence they funded the work "primarily" at universities.

It is relevant to ask, in addition, how basic science fared with the senator. Only one such project was included in the supplemental funds—$3.1 million for ultrasonic imaging—and it received, at best, cursory treatment from Proxmire. Like other politicians in the past, Proxmire seemed to take NSF at its word when it comes to basic science.

Proxmire also extracted a promise from Stever that he would look into the unspent $300,000 that NSF set aside a year ago for the Presidential Prizes for Innovation, and report back to him. And, as to the NSF director's new function as Science Adviser to the President, Proxmire was equally skeptical after totaling up the cost: "Whereas we were told that the abolition of the Office of Science and Technology would save $2 million, it is actually costing the taxpayer $4.5 million. . . ."

Perhaps the most important sign in the sky for NSF's future was Proxmire's decision, after the hearing, that there should be greater congressional control of NSF's ability to transfer funds within its budget and alter its research priorities. "The Committee desires to put the . . . Foundation on notice," said the subsequent committee report, "that, in the consideration of the budget estimate for fiscal year 1975, it contemplates placing the programs of the Foundation on a line-item basis. . . ." NSF officials admit that itemizing their appropriations would limit the considerable flexibility NSF now has for fund transfers. Whether Proxmire will try to control the foundation in this way depends on the outcome of a committee study of the subject he has ordered. However, his inclinations are clear.—DEBORAH SHAPLEY

ber. The plan would have the cotton belt divided up into nine zones, with the eradication effort to begin in West Texas. A total of 377 persons, mostly local people to be hired especially for the campaign, would be fighting the boll weevil just in this one region. Some 750,000 acres of cotton would be treated there, and, before the belt-wide campaign ended, it would have reached to more than 10 million acres.

The campaign would advance eastward from West Texas, and, after 2 years, a "second front" would be opened in Virginia and the Carolinas, with this front to advance southward. If all went well, the boll weevil fighters on the two fronts would eventually meet in the mid-South, like the meeting of the Russians and the Americans on the Elbe.

Newsom of LSU, possibly the cotton belt's most outspoken critic of the proposed boll weevil eradication, is convinced that, once begun, the campaign would fail but that it would not die, at least not for a long time. He compares it to some other insect eradication efforts that have failed. "I know we have spent at least $150 million on the fire ant," he says. "The infestation continues to spread, yet we continue to spend money on this ill-advised program."

In a boll weevil eradication campaign, he adds, "there will be failures, as in the fire ant program. They will be explained away. 'Just give us more funds.' This thing will last for decades. We are a long suffering people." Among those to suffer most, Newsom suggests, are those agricultural scientists who would find adequate funding denied for many promising research endeavors because of the high priority given to boll weevil eradication research.

As for what he thinks desirable for control of the boll weevil, Newsom favors some of the same methods that would be used in the eradication effort, but he would avoid heavy application of insecticides for diapause control. "The heavier the pressure put on a species, the more likely you are to bring out inherent resistance," he observes. In his view, the USDA and the cotton industry should be giving greater emphasis to the development of varieties of cotton that are resistant to the boll weevil.

Top officials of the USDA speak cautiously about the proposed eradication campaign. "The eradication program is down the road a few years," T. W. Edminister, administrator of the Agricultural Research Service, told *Science*. Edminister even suggested that "eradication" might not be the right word and that some more modest goal could be in order. Secretary Butz also is reported to have received the eradication proposal with reserve. Ultimately, the question whether the government is to launch a massive attack on the boll weevil may have to be decided in Congress.—LUTHER J. CARTER

Computer Sales to U.S.S.R.: Critics Look for Quid Pro Quos

A large scientific computer sold to the Soviet Union by a British subsidiary of Control Data Corporation has been used by Soviet weapons designers to reduce by 2 years the development of their first MIRVed missile. So at least a Georgia Republican, Representative Ben B. Blackburn, announced last December on the advice of a source which his staff declines to reveal.

In as far as Blackburn's story can be independently checked, it seems to be erroneous in detail and probably unreliable in origin. But as beneath other fantasies, there lurks a serious issue. The Nixon-Kissinger policy of détente with the Soviet Union involves the construction of an elaborate web of relationships, a vital strand in which is the regularization of trade. Following the 1972 agreements on science and technology and on trade, the Soviet government has been seeking, and in many cases obtaining, the items of advanced technology which characterize one of the American economy's major strengths over the Russian.

Whatever the overall advantages of détente, the trade in high technology seems to many to be too much of a one way street in the Soviets' favor. The Pentagon is concerned that items such as computers may be diverted directly to military applications or, by bolstering the civilian side of the economy, may free resources for military use. Company officials fear that the Russians will follow their traditional practice of buying only prototypes or production technology and then going into manufacture themselves. "If the businesses of the United States engage in a series of one-shot technology know-how sales, our economy will very quickly have traded all it has to trade in the way of high technology," Texas Instruments vice president J. Fred Bucy told a House committee in December. Economists note the difficulty of meshing Soviet business habits into the Western economic system; the wheat deal, for example, quite apart from the fact that the U.S. Department of Agriculture allowed the nation to be stolen blind by astute Russian trading, showed how great a disturbance the Soviets could cause on Western markets. There is widespread feeling that the Russians are now placed to get more than they give. "Though our restrictions of the cold war period did not serve U.S. interests well, it does not follow that the simple removal of such restrictions will serve our interests much better. The distribution of the economic benefits from détente may be so unbalanced as to threaten the process of détente itself," says Raymond Vernon, director of the Harvard School of International Affairs, in the current *Foreign Affairs*.

Just what is U.S. policy on the sale of high technology goods? Computers afford a convenient test case, since they have a military as well as general economic significance, and are a field in which the United States has a clear lead over the Soviet Union—reckoned as 2 to 3 years by Soviet sources, and 5 to 10 years by most American analysts. Since the beginning of the cold war exports to Iron Curtain countries have been regulated by an elaborate system operated by the Office of Export Controls (now renamed the Office of Export Administration) in the Commerce Department. A company wishing to export a computer to the Soviet Union first consults a document known as the Commodity Control List which lists the benchmark parameters above which an export license must be applied for. Applications are considered at the weekly