

Handler's complaints about training grant cutbacks. But another Administration science official scoffed: "Phil hasn't changed his tune. He still wants more support for graduate students. My God, people are out of work all over the place. What's the justification for training still more people?"

David's rebuttal letter cited two bits of evidence to indicate that the Nixon Administration has a high regard for science. It said that Nixon's budget for fiscal 1971 "showed an 8.7 percent increase over the previous year in funds obligated for research and development projects carried out at universities and colleges." And it said that "the National Science Foundation, 'anchor man' among the Federal agencies in the support of basic research, has reached an all-time high in its budget for the current year." The letter acknowledged that there have been "internal shifts in the funding of science—some of them undoubtedly painful to those affected." These shifts were characterized as away from defense and space activities and toward various social needs such as housing, transportation, and environmental quality. But David's letter concluded that: "At a time when all funding is severely

limited because of the strenuous effort to fight inflation, science has fared very well and in doing so is self-evidently among the high priorities of the Administration."

Handler would clearly not agree. At one point in his press conference he warned that "it's not in the national interest to watch this system [of scientific enterprise] decay for lack of supporting funds." At another point, he charged that "science does not have a high priority at this moment" in the Office of Management and Budget, which, more than any other White House office, is responsible for determining how much money is budgeted for science.

Sources on both sides of the dispute are inclined to believe that the differences between David and Handler reflect, at least partly, the fact that they occupy different positions. And the dispute does indeed point up what appears to be an increasingly independent and critical role toward the government played by the Academy president. In the opinion of George B. Kistiakowsky, former science advisor to the late President Eisenhower and currently vice-president of the Academy, Handler has been taking the Academy on a

more independent tack than his predecessors. While Kistiakowsky recalls that there have been occasions in the past when the Academy has tackled the federal government head on, he says that "by and large" other recent Academy presidents "envisaged the Academy as much more a part of the federal establishment than Handler does." Kistiakowsky said he is "delighted" that Handler sees the Academy as "independent and as a spokesman for the broad scientific community."

Handler has not hesitated to criticize the Administration on specific issues in the recent past, at times employing what some have regarded as colorful and extravagant language. In September 1969, for example, he predicted that there would be "panic in medical schools all over the country" in the wake of budget cutbacks ordered by President Nixon. Handler has also not hesitated to criticize his own colleagues for making self-serving or misleading pleas for support. Thus there are apt to be further disagreements between Handler and the Administration as new science issues arise—a prospect which some observers view with alarm, but others regard as a healthy sign.

—PHILIP M. BOFFEY

Aerospace: Unemployed Scientists, Engineers Have No Place to Go

Santa Clara County on the San Francisco peninsula is one of the places where the term technological unemployment has taken on a new, painful meaning. The economy of the so-called mid-peninsula area, home of the Lockheed Missiles and Space Company, is dominated by aerospace and electronics industries, and cutbacks in defense and space contracts have resulted in unprecedented unemployment among scientists and engineers.

The phenomenon is by no means unique to the county which stretches from Palo Alto to south of San Jose. Layoffs from Boeing operations in Seattle probably affect a higher proportion of the local population, and the aerospace concentrations around

San Diego and Los Angeles have been hard hit. But the unemployment surge in Santa Clara County seems to have had a particularly intense effect on professionals since, just as in the Route 128 area outside Boston, research and development activities have tended to be high relative to production in high technology industry. (Santa Clara County has been second in the state only to the Marin County suburbs of San Francisco in the percentage of employed persons classified as professional, technical, and kindred workers.)

Employment fluctuations, of course, have been chronic in aerospace firms, and aerospace men have been accustomed to moving from one project to the next, often from one company to

another. The difference now, observers say, is that no new major projects are afoot and that R & D men involved in programs approaching completion find no job opportunities anywhere in the industry. The situation caused by the ebb in federal contracts has been compounded by a slump in demand for commercial aircraft. Furthermore, the last aerospace industry low occurred in 1964–65, when the general economy was more robust and better able to absorb professionals.

In broad outline, the depressed state of the job market is readily documented. Unemployment in California dropped slightly in November to 6.9 percent from 7.2 percent in October but still compared unfavorably with the national rate of 5.8 percent. About two-fifths of the manufacturing jobs in the state are in defense-related industries, and in Santa Clara County three-fifths of all jobs in manufacturing or about 70,000 people are in defense or space work.

Details of the plight of professionals are, however, elusive. One difficulty is that "standard industrial categories"

used by federal data gatherers in working up statistics on unemployment are poorly adapted to giving accurate pictures of the situation in research-based industry. Aerospace and electronics professionals may be classed in any of a half-dozen categories from ordnance to electric power generating and transmission equipment, and the categories cut across too many boundaries to allow precision in analysis.

Furthermore, the decline in employment has occurred over a period of 2 to 3 years. Many professionals accepted early retirement or took lesser jobs—often in the category of skilled labor—in their companies. Unemployment insurance rolls are unreliable guides, since many scientists and engineers have been out of work so long that they have used up their eligibility for unemployment insurance and others were simply unwilling to go on what they regard as the dole.

Some are living on savings or are scraping by on the salaries of working wives. Press coverage of the unemployment problems of the professionals has tended to run to feature stories on individuals like the physicist now serving an apprenticeship as a bartender. At least two senior engineers have taken jobs in the area as department store Santas. But it remains difficult to generalize about the fate of job seekers for whom there is now no market.

Little Help on Horizon

For those professionals determined to make use of their educations and experience, the retraining and job-finding services of state and federal governments seem to offer little present hope. Existing retraining programs were designed primarily to give unskilled workers, or those displaced by automation, marketable skills in manufacturing or service industries, and few professionals are ready to settle for the pay or status that such jobs entail. Local self-help efforts are under way, and there are signs that the plight of the professionals is stirring action at state and federal levels. But Santa Clara County cannot expect much help from higher up in the immediate future.

The two high technology hubs in Santa Clara County are Lockheed in Sunnyvale and Stanford University, whose engineering department has spun off a number of electronics firms and created a strong gravitational field into which other firms have been attracted.

Development of the county has gone in step with the growth of aerospace-

APA Information Plan Funded

The National Science Foundation (NSF) has awarded the American Psychological Association (APA) \$2.3 million for development of a new information system despite the objections of a small but angry segment of APA membership which claims that the interests of research psychologists are being ignored (see *Science*, 27 February).

The most controversial part of the program, called the National Information System for Psychology (NISP)—an arrangement providing for dissemination of unedited manuscripts—was withdrawn by APA from the grant application pending further study, but it is still under active consideration.

Many research psychologists—these comprise about 14 percent of APA's total membership of 30,000—object to the scheme of "pre-print publication" as being unprofessional. They point out that once a research paper has been circulated it will probably have to undergo radical alterations before it will be considered for publication in a journal. They also argue that the dissemination of unrefereed, unedited work will lower the quality of information circulated. Designers of the plan believe that such a system is necessary in order to cope with the vast amount of material submitted to APA and that it does away with the huge lags between the time a paper is submitted for publication and the time it is formally published.

What most angers dissidents are the procedures followed by the central office personnel who, according to one critic, David Grant of the University of Wisconsin, have lately come up with a number of "half-witted schemes." In the case of NISP, critics say that the personnel responsible for the design of the system have shown little understanding of the needs of either scientists or editors and have forged ahead with their plan, oblivious of objections and leaving many key members of the organization uninformed. Grant, who is editor of the *Journal of Experimental Psychology*, says that the APA journal, *The American Psychologist*, accords virtually no space to those who wish to criticize NISP or offer alternative ways of improving the information system.

Grant says he is planning to circulate a petition among APA's scientist members to advise NSF of the widespread concern over the behavior of APA's central staff (particularly the Office of Communications Management and Development, headed by Harold P. Van Cott). An official of NSF's Office of Science Information Service (OSIS), which administers the grants, said that he had heard of the petition and that, if received, it would be returned to APA as "something for the psychologists to decide for themselves."

The NSF has already put \$960,000 into NISP, starting with a planning grant in 1968. It is expected that the system will take five more years before it is fully developed and self-supporting, and that during this time it may absorb as much as \$5.5 million from NSF.

NISP is divided into three categories: a primary publication system, bibliographic products and services, and supports to informal communication. The primary publications system, of which journals are now the main component, will be expanded to provide for the dissemination of scientific memos, catalogs of abstracts, and an archives—to be published in journal or book form—of research papers selected for their exceptional quality. The bibliographic system will feature a centralized, computerized data base. Informal communications include computerized distribution of tape cassettes and films.

NSF's Information Systems Program has been providing financial support for such systems in other branches of science. Two are already in operation: the *Chemical Abstracts* Service System of the American Chemical Society, and the National Information System for Physics of the American Institute of Physics. In the planning stage are information systems in linguistics and the life sciences.—CONSTANCE HOLDEN

electronics. Population was less than 200,000 at the start of World War II and tops 1 million today. The increase in population accelerated after Lockheed located in the mid-peninsula in 1958; the population of Sunnyvale, for example, rose from about 10,000 to around 90,000 today. The orchards that once covered the valley to the foothills of the coastal range have largely yielded to housing tracts, highways, and shopping centers, and smog has degraded the once pellucid air. The mid-peninsula is essentially a middle- and upper middle-class enclave with tough zoning laws, good schools, high tax rates, big mortgages, and heavy credit indebtedness. It remains a pleasant place to live but not for most unemployed.

Employment at Lockheed peaked at about 27,000 in 1967-68 and had fallen to around 17,000 by the end of the summer. Some smaller firms, particularly Lockheed subcontractors, have suffered at least proportionately. Salary cuts of 10 percent or more have been levied by several firms, and even Hewlett-Packard, regarded locally as having diversified its business with relative success, in the summer announced the reduction of the work week by a half-day and reduced paychecks accordingly. Research operations are universally down, and funds for such activities as corporate planning seem to have virtually disappeared.

Hearing on Unemployment

During last fall's election campaign, congressional candidate Stuart McLean, a University of Santa Clara faculty member, made an issue of aerospace unemployment. McLean sponsored a day-long hearing in September in which a cross section of persons affected by the aerospace recession participated. Testimony indicated that a substantial number of professionals have gone through months of fruitless job seeking. Witnesses reported employer prejudice against scientists and engineers with only defense industry experience because of their alleged "cost-plus" mentality. More often applicants heard that they were "hyperspecialized" or "over-qualified." Older professionals, not surprisingly, experience special difficulty. And employers in nondefense fields appear reluctant to sign up researchers or executives released from higher-paying jobs even if these people are willing to work for substantially lower salaries. The assumption of the employers is that the aerospace veterans will leave as

soon as government programs pick up again.

In the aerospace-electronics community there seems to be little agreement on the question of whether the current slump represents a particularly severe "down" phase for the industry or the beginning of a long-haul period of adjustment. The question seems to depend on whether the Vietnam war will really be phased down and development of major new weapons systems begun. If that does not happen, it appears that the aerospace and electronics industries will have to adjust to a lower level of activity than prevailed through most of the 1960's. In general, there is not much optimism that civilian markets could replace military demand, although there are some exceptions—for example, among companies that hope to capitalize on tape cassette technology.

Long-term unemployment and the uncertain outlook for the industry constitute a corrosive experience for those affected. Aerospace salaries have been relatively high and the mid-peninsula life style one of open-ended expectations. Unemployment hurts financially and professionally, as scientists and engineers find themselves falling behind in their fields of expertise as well as in their payments. And morale is especially hard to maintain when the unemployed remain a minority among an affluent majority.

The plight of an unemployed professional is intrinsically no more painful than that of the jobless clerk or production worker. The professional's private resources and social connections are likely, in fact, to cushion him from the worst effects of unemployment. But in one respect the professional is different. His education and development in his profession in a real sense represent a national investment. The value of work in defense and space industries has been under sharp attack from some quarters, but there can be little argument that the talents of unemployed aerospace and electronics professionals constitute a national resource which is largely going to waste. By and large there are no mechanisms to use their talents to help solve environmental and social problems.

After the hearings in September several suggestions were advanced to ameliorate the situation of the unemployed. Moratoriums on credit payments during periods of unemployment and retraining were recommended. Pension policies came under special criticism. It was recommended, for ex-

ample, that unemployed be permitted to draw from their companies' pension funds to supplement unemployment compensation, and, most urgently, it was asked that pensions be made "portable" to allow for the cyclical pattern and high mobility in aerospace and electronics fields. Less clear in their prescriptions but no less vehement were demands that talents of the unemployed professionals be used in socially useful nondefense programs.

The predicament of the unemployed scientists and engineers is likely to become more of a public issue in California after the first of the year as attempts are made to organize political action on the problem. There are plans, for example, to arrange for a descent of hundreds of scientists and engineers on Sacramento for a day in the capital to discuss the situation with their state legislators. John Vasconcellos, an assemblyman whose district includes part of the Santa Clara County high-technology belt, has been gathering information on the situation and will be arranging appointments in the legislature.

Federal Emergency Fund

The major federal move to meet job losses caused by cuts and shifts in defense and space spending has been the allocation of \$28 million by the Secretary of Labor under the Manpower Training Development Act to eight states hardest hit by the government actions. California's share is \$7 million, and nearly \$2 million of that has been earmarked by Governor Reagan for use in the mid-peninsula area. The catch is that the money is to be used in expanding existing programs for upgrading and retraining unskilled and semiskilled workers, and Washington officials concede that the ongoing manpower training programs are designed for subprofessionals and offer little help to scientists and engineers. Some \$125,000 in federal funds, however, has been put into a national registry for engineers at Sacramento designed to match qualified professionals with existing jobs.

Congressional interest in problems of economic "conversion" when the Vietnam war ends has been fitful. Senators Edward M. Kennedy (D-Mass.) and George S. McGovern (D-S.D.), for example, have sponsored legislation, but so far neither bill has gained appreciable momentum. Funds for conversion studies have been knocked out of the Defense Department budget, and the

Arms Control and Disarmament Agency has only a token budget in the field.

One modest pilot project which could provide a possible pattern for retraining is in progress at Stanford. Sponsored by the National Science Foundation (NSF), 15 unemployed Bay area scientists and engineers are in the midst of a 1-year program in computer engineering. The NSF grant is being administered by a local Technological and Social Committee (TASC). TASC began as a loosely organized group of socially concerned scientists and engineers. The group was setting up an action arm to make it possible for professionals who wished to do so to use their talents outside defense work. The employment squeeze struck before the project got under way, and the NSF program became a chief TASC activity. The NSF grant pays tuition and some fees and a

\$541 a month stipend during the academic year of the program.

The major hope for more ample federal help currently seems to rest in a Department of Housing and Urban Affairs (HUD) idea for retraining unemployed scientists and engineers to work on urban problems. Details are not yet available, but the idea is being developed in HUD's Model Cities division headed by assistant secretary Floyd Hyde.

A working paper detailing the plan is expected to go forward to the White House within a few weeks. It is obvious, however, that the project could not have progressed so far without blessings from up the line.

Estimates put the number of unemployed scientists and engineers in the nation at about 45,000. A budget of under \$5 million for the project is

mentioned, and the chances of action seem to be enhanced by the prospect that funds already voted could be transferred to the program.

HUD last spring launched a small pilot program under which some 20 professionals under the age of 35 were retrained and then placed in various housing and urban affairs jobs for which they had no previous experience. All of the original group are reportedly still employed.

Aerospace scientists and engineers who have lost their jobs could become a new kind of hard-core, high-technology unemployed. Their plight and the social cost of their idleness are now at least gaining greater visibility. But this is not much consolation to those who have experienced the shock of discovering they were living on a kind of economic San Andreas fault.—JOHN WALSH

Timber Management: Improvement Implies New Land-Use Policies

Last summer, when testimony was being taken in Congress on a proposed National Land Use Policy Act, the need for such legislation was endorsed by two groups generally regarded as natural enemies—the Sierra Club and the National Forest Products Association (NFPA), the first of which views a tree as an esthetic and spiritual resource while the other sizes it up by the board foot. Each of these groups knew that it had much at stake in the development of a land-use policy. For the Sierra Club, there was the goal of preventing needless exploitation of natural areas and of having all development planning respect ecological principles. For the NFPA, there was the objective of protecting the industry's resource base.

The land-use policy bill recently approved by the Senate Interior Committee is not specifically directed at regulating forestry practices or protecting forests for commercial timber management or wilderness use. Rather, it is concerned with land-use practices generally and would require the states, as a condition for receiving funds under

federal programs having a substantial environmental impact, to establish enforceable land-use plans. Its aim is to end the haphazard process by which development activities have proceeded in the past, with forest lands and open space around cities often having been lost to urban sprawl, with major natural areas such as the Florida Everglades threatened by water projects and proposed jetports, and with power plants built with little regard for protecting air and water quality or scenic amenities.

Recent controversies over the use of timberlands offer striking illustrations of some of the problems that would confront state and federal officials developing and administering land-use policies. Consider the following:

- *The fight over the National Timber Supply Bill.* This measure, which the House last February voted to refuse to consider, called for intensifying timber management in the National Forests and increasing the annual "allowable cut." Conservation groups viewed the bill as a proposal to put the ax quickly to nearly all the virgin

or "old growth" timber not already classified for protection as wilderness. Moreover, some conservationists argued—and this is the relevant point here—that a truly "national" timber supply measure would include provisions for government supervision of cutting on private lands. For instance, a Sierra Club spokesman called for "stringent regulation" to prevent the overcutting which had denuded many large private forests of their stands of commercial timber and which had led to the voracious demands on the public timberlands.

- *Protests over logging practices that abuse land and water resources.* Last February, the Northwest regional office of the Federal Water Quality Administration (FWQA), responding to what it felt was an "urgent need," published an "Industrial Waste Guide on Logging Practices." The FWQA said there was "far too much evidence" of improper, low-cost logging operations resulting in streams becoming turbid and debris-clogged, with their gravel beds smothered with silt and made useless for spawning fish and their banks stripped of the shade trees that keep stream temperatures from rising to fish-killing levels. The FWQA guide recommended such things as the designing of "clear-cuts"—timber blocks from which all trees are removed—to provide buffer strips along streams and the building of haul roads without excessive cuts and fills.

Investigations this year of logging in