programs. Tell us how we can make them better.' "

Thinking back in recent months on his years in Washington, Weinberger, who is continually rumored to be planning a political career of his own, says he now sees a more basic explanation for congressional behavior. "Congressmen hear constantly from special interest groups that want to promote some social cause. They are asking for new money, or more money, and can support their claims with plausible arguments. And Congress responds." In this, Weinberger observes, Congress is indeed following the will of the people—at least those people from whom it hears. Weinberger thinks that Congress needs to hear from more people, namely, from those who will be the 50 percent supporting the other 50 percent of the nation if his grimmest predictions come true. "I think there is increasing public awareness of the dangers of big government. At least I hope that is true. Taxpayers need to be better organized. A few write their congressmen and say 'spend less,' but they don't pinpoint programs and their approach is far less effective than those lobbying *for* a specific social project."

Weinberger puts the scientific community—particularly biomedical researchers with whom he had occasion to deal as HEW secretary—into the same category as all other special interest groups, with only one difference. He takes the recent, politically determined increases in the budgets of the National Cancer Institute and the National Heart and Lung Institute as

Caspar W. Weinberger

an example. From Lyndon Johnson on, he notes, all presidents have written increases for cancer and heart research into their budget requests, and Congress not only has gone along with them but has added to them. "This was a presidential and congressional policy decision," says Weinberger, and not one actively advocated by HEW. In fact, Weinberger claims never to have gone to the White House to push for either program. What bothers him about the scientists who protest those two budget decisions is not that they disagree with the result of the political process but that they challenge the right of the President and the Congress to engage in it. "The argument I hear from scientists that this is not a legitimate part of the political process is *nonsense*, and quite different from their saying that they don't like the decision."

On the matter of stabilizing the budget of the National Institutes of Health (NIH) by assuring it some specified rate of increase every year—something NIH directors have expressed a desire for—Weinberger also sees the research community as a group like any other. "Everybody wants a stabilized budget with guaranteed growth. Defense wants it, for instance. Many states have it, in the form of fixed amounts of gas taxes going to highways and such. But I think the budget planning should be related to programs, which can change."

Weinberger is certainly not optimistic about the prospect of everybody seeing things his way as long as fiscal disaster can be skirted but he does predict that the present monumental troubles facing New York City will have a salutory effect on the nation as a whole by dramatizing the dangers of an all-pervasive government incurring huge deficits for social programs that bring as many burdens as they do benefits.

In the final analysis, however, Weinberger does have a certain faith that the country will act to avert fiscal disaster. He is returning to the world of private enterprise which, he believes, "has brought more benefits to more people at home and throughout the world than any other system since recorded history began." Says Weinberger, who is a Californian, "I'm going back to San Francisco to see if the private sector is as good as I've been saying it is."

—BARBARA J. CULLITON

New Jersey Higher Education: Back from the Brink

Like most states, New Jersey has suffered a shortfall in revenues caused by inflation and recession. In recent months, a clash over how to cover a state budget deficit led to a chaotic political chess game between Governor Brendan T. Byrne and the legislature in which higher education became one of the pawns.

At one point it appeared that 1200 members of the state university staff of 7000 might have to be fired and that agricultural research at the university would, for all intents and purposes, be wiped out. Such drastic action was averted, as most informed people thought it would be, but the compromise reached was actually a stopgap which defers the state financial crisis rather than solves it.

To say simply that New Jersey faces a financial crisis fails to do justice to the complexities and oddities of New Jersey's traditions, prejudices, and politics. More than in most states, government there has been regarded as a local affair and the state government has neither provided the services expected elsewhere nor levied the taxes needed to pay for them. Most notably, New Jersey, a rarity among states, does not have a state income tax.

Not until the middle 1960's did New Jersey make a serious effort to establish a state system of higher education. New Jersey has been known as "the cuckoo bird state" for the numbers of its residents who attend college in other states.

A full-fledged, three-tiered higher education system came into being in New Jersey only in 1967. The main provider of graduate and professional education is Rutgers (officially termed Rutgers, the State University) with a main campus at New Brunswick and new campuses in Newark and Camden. The New Jersey College of Medicine and Dentistry oversees two public medical schools and a school of dentistry, and a New Jersey Institute of Technology is based on the former Newark College of Engineering. There are eight state colleges, including six former teachers' colleges that have undergone major expansion in facilities and programs. Nineteen community colleges are jointly funded by the state and counties.

Planning and coordination for the state

system are provided by a State Department of Higher Education, headed by a chancellor, who is advised by a State Board of Education created in the 1966 Higher Education Act. The chancellor since the post was first filled in 1967 has been Ralph Dungan, who served on the White House staff and as ambassador to Chile during the Kennedy and Johnson administrations.

As in most states, there has been competition for resources, tension over the question of institutional autonomy versus central control, and friction over accountability, and these in some cases have been heightened by conflict over the budget.

The battle fought in the statehouse between Byrne and the legislators was, in fact, another skirmish in a long, losing campaign by the governor to achieve dual objectives of tax reform and increased revenues for state programs. The basic issue has been the conflict between the governor and the state senate over the passage of an income tax measure.

For a state to lack an income tax these days will strike most observers as, at the very least, anachronistic. But in New Jersey, the idea of a state income tax arouses such hostile emotions that to espouse it has been to flaunt a political death wish. In New Jersey, the early American custom of relying on town and county government to provide whatever public services were necessary has been perpetuated. As a result, property taxes are among the highest in the nation, with the schools, for example, financed largely through them. It was not until well into the 1960's that a state sales tax was grudgingly enacted.

Abhorrence of the state income tax is not all historical reflex. New Jersey is the most suburban of states. A substantial majority of the people of the state live in the densely populated New Jersey suburbs of New York and Philadelphia. A population map of New Jersey would show two suburban agglomerations connected by the Pennsylvania Railroad and the New Jersey Turnpike.

New Jersey's poor, many of them black and Puerto Rican, are concentrated in the state's cities, notably Newark, which has a prominent place in the casebooks on urban pathology. The affluent suburbs of New Jersey, on the other hand, have high property values, high property taxes, excellent school systems, and all the pleasures and pressures of supersuburbs. But the typical New Jersey citizen is a different sort of suburbanite. Many have moved out from tenements in New York or Philadelphia —or from Newark or Camden or Paterson—to own modest homes in the suburbs. These homes may be, for example, in the dreary neighborhoods of two- and three-family frame houses in the old towns and small cities of Hudson, Bergen, and Essex counties west of New York, or further out in the new subdivisions made possible by the GI Bill and the FHA.

Many of these suburbs are bedroom communities which lack industrial and commercial property to broaden the tax rate, so the burden of paying for the schools and other municipal services falls heavily on the lower middle income householders.

Under these circumstances, one might expect broad support for a movement to change the state's tax structure to reduce reliance on regressive sales and property taxes. But such is not the case, as the fate of income tax proposals in this and earlier legislatures confirms.

Some observers ascribe this reluctance to change the tax structure to a conditioned mistrust of government. New Jersey, after all, has provided classic examples of municipal corruption, from the traditional machine politics of Jersey City and Hudson County to the newer style in Newark which mixed ethnic politics with the contributions of organized crime and corrupt unions.

Cynicism about Government

This and the disillusionments of Watergate are perhaps sufficient to inspire cynicism about government, but in New Jersey there are other dimensions to the fear and loathing of a state income tax. It is significant that the unions in New Jersey—the state work force is heavily unionized—have never pushed for a state income tax—which, as a progressive tax, would presumably benefit their members. Union policy seems to reflect a feeling of many union members that revenue from an income tax would be used mainly to create a bigger state bureaucracy and to finance programs which would chiefly benefit people in cities such as Newark.

State legislators reflect this anti-bureaucrat, anti-welfare feeling, which is being evidenced in other states these days, and it has certainly contributed to the legislature's balking on the income tax. At the same time, the public over the past decade solidly supported expansion of the higher education system, which has involved a half billion dollar capital investment and a rapidly growing operating budget. One fairly unusual aspect of the recent contest over the budget was that it provided a direct test of the comparative feelings of the public, or at least of their elected representatives, toward higher education and the income tax. For the short term, at least, the result showed sentiment more against the income tax than for higher education.

The essential elements in the imbroglio are as follows. A year ago the state assembly actually passed a Byrne income tax measure. The state senate, however, promptly defeated the measure and then repeated the action in four further votes. Early this year the governor presented his 1975–1976 fiscal year budget for a total $2.8 billion, along with revenue estimates of about $2.4 billion. New Jersey law requires a balanced state budget, so when the new fiscal year began on 1 July, Byrne announced budget cuts amounting to $384 million to balance the budget.

It appeared obvious to observers that Byrne's strategy was to pick programs in which cuts would trigger strong public reaction, thus exerting pressure on legislators to enact an income tax measure. Among the cuts, for example, were about $62 million from the $369 million state higher education budget, including $21 million out of the Rutgers University state budget of about $90 million. Nearly $65 million in transportation subsidies were also on the list of budget cuts. Carrying out this action would have meant savage cutbacks, in many cases discontinuance, of commuter bus and train service on which hundreds of thousands of commuters rely. In the case of both education and transportation funds, the total effect would have been greater, since cuts in state outlays would have caused loss of substantial federal matching funds.

Byrne's brinkmanship failed. The state senate stood firm against the income tax. But when the senate proposed full restoration of the $384 million in cuts, essentially by adding a penny to the 5-cent sales tax, assembly members, who face an election in November, held out against such an increase.

Byrne said he would veto any tax package which would not provide revenue to cover the deficit and to satisfy a state supreme court order to make more funds available for poorer school districts. The ruling was based on a requirement in the New Jersey constitution that the state provide "thorough and efficient" education. The cost of carrying out the mandate is put at about $325 million, and Byrne has argued that an income tax is necessary to provide revenue necessary to comply with the order and to provide relief from local property taxes. Implementation of the court decision has been delayed several times, and the state faces a fall deadline for informing school districts on amounts of new funds they should budget. As July wore on, the dialogue declined into confused bargaining over various packages of "nuisance" taxes.

Finally, agreement was reached on a tax package adequate to support restoration of

$260 million of the $384 million in cuts. Major elements of the package were a 2 percent increase in the corporation business tax, counted on to raise $95 million, and a boost in motor vehicle registration fees, expected to bring in $25 million.

The governor did win the legislature's agreement to return after the election to take up the problem of additional funds for the schools. But if Byrne hopes to see an income tax enacted then, skeptics think he will be disappointed. They expect many of those who supported Byrne on the income tax to return as lame ducks, which will further isolate the governor.

Byrne, who was elected in 1974, has neither dominated the legislature nor appealed successfully over the legislators' heads to the public in behalf of his tax program. He was a prosecutor and judge and had never held elective office before winning the governorship by a record margin. He rejected the old politics, which involved wheeling and dealing and, for some, even stealing, but his critics say he has failed to evolve an effective new style of his own. Nobody questions Byrne's integrity, and many of his opponents will concede the logic of the case he makes for tax reform, but even some of his admirers are now questioning his capacity, even his inclination, to govern.

It is reasonable to ask whether too much has been made of the effect of the political impasse on higher education in New Jersey. Some knowledgeable people deny that there is a crisis—they say that New Jersey is a wealthy state, that higher education is popular, and that the wrangle in Trenton is only a temporary perturbation. After all, most of the dollar cuts were restored, no hefty tuition increase was imposed, and there have been no mass firings.

It is possible, in fact, to find people who think that the alarm has had a healthy effect on the complacency and lethargy of many tenured academics. Some legislators thought that a good scare wouldn't hurt the profs.

It is hard to estimate the damage. Most people inside the system seem mainly relieved that the worst did not happen, and many have gone off on the annual August vacation to recuperate. But it is difficult to take the view that no harm was done if you are a college or university administrator who was ordered to fire a lot of people, or a

Nuclear Critics Escalate the War of Numbers

The American research community is showing new signs of polarization over nuclear power and its pace of development. Last January, Nobel physicist Hans Bethe served the White House with a statement of unequivocal advocacy of nuclear power signed by 34 prominent scientists. Now, the small but effective Union of Concerned Scientists in Cambridge has gotten up a declaration urging a "drastic reduction" in new starts on construction of nuclear plants and an end to their exportation. Signed by some 2300 scientists, engineers, and physicians, the UCS statement was delivered to the White House on 6 August, by no coincidence the 30th anniversary of the bombing of Hiroshima.

The UCS declaration is part of a propaganda war of growing intensity and sophistication between nuclear critics and proponents. The target of this particular salvo of names was the oft-stated contention of proponents that few reputable scientists seriously subscribed to UCS's dark view of nuclear technology. In countering that claim, MIT physicist Henry Kendall and his associate Daniel Ford, the leading lights of the UCS, say they succeeded beyond their expectations. The 2300 signers of the UCS statement are widely distributed by geography and profession and include some prominent names not usually identified as nuclear critics—among them James B. Conant, president emeritus of Harvard; George B. Kistiakowsky, a science adviser to President Eisenhower; Victor Weisskopf, former chairman of physics at MIT; Julian Schwinger, a Nobel physicist at UCLA; and Richard F. Post, a deputy associate director of fusion research at the Lawrence Livermore Laboratory.

The declaration is clear enough about its philosophy but is vague in its prescription. A preamble notes that "many thoughtful members" of the technical community, as well as some government agencies, hold a variety of reservations about assurances of nuclear safety—chiefly concerning the quality of reactor design and manufacture, the hazards of radioactive waste, and the potential connection between civilian nuclear programs and the proliferation of atomic weapons.

Declaring that the problems currently besetting nuclear technology are "grave but not irremediable," the statement calls for a drastic but undefined reduction in construction starts until stepped-up research efforts can resolve some of the safety questions.

In a Washington news conference, Kendall said he wouldn't presume to define the word "drastic" for all 2300 signers. The basic message, he said, was merely that a considerable number of scientists and engineers believed the all-out construction of nuclear plants being advocated by the Ford Administration was imprudent. On the other hand, Kendall said, abruptly shutting down the 55 operable plants and stopping construction of some 170 others now under way would be impractical. "What we're calling for instead is a change of policy, a pause so that the nuclear industry can get its house in order."

The UCS has unquestionably tapped a body of critical opinion, but its petition is by no means a representative sample of the entire community. Names were recruited by a mass mailing effort to some 12,000 members of the Federation of American Scientists and readers of the *Bulletin of Atomic Scientists*, who make up perhaps the most liberal and socially active segment of the research community. Kendall, however, said no attempt was made to preselect recipients of the statement and that only a dozen or so had sent back negative replies. Consumer advocate Ralph Nader, who watched the news conference from the back of the room, told *Science* that he thought peer pressure had kept many researchers from voicing concern about the unresolved problems of nuclear technology but that the UCS petition had now "broken the ice."

It may also stimulate still more energetic efforts by nuclear advocates. Still to be heard from are two new lobbying groups supported predominantly by the nuclear industry. In Washington, the industry has set up a lobbying unit called the American Nuclear Energy Council with a budget of $500,000 and former California congressman Craig Hosmer as its head. Across the Potomac in Arlington, Virginia, retired Admiral Elmo Zumwalt has taken command of Americans for Energy Independence, whose contributors range from the Westinghouse corporation to a passel of major utilities. Chairman of the 23-member board is Hans Bethe, and its most recent recruit is former Atomic Energy Commission chairman Dixy Lee Ray.—R.G.

faculty member who got a letter informing you that you might be fired, as occurred in New Jersey in July. While things never quite reached the panic stage, the atmosphere was hardly favorable for planning for a new term that was little more than a month away. Under such conditions, it is probably true, as several university sources claimed, that people get concerned not only about their jobs but also about the general stability of the university, and that it is the best of the younger people who get the job offers and actually leave.

A special problem for New Jersey, which is not easily documented in terms of dollars, of faculty fired, or of students refused admission, is that the system is a relatively new one which is still in the process of expansion. Other state higher education budgets have been sharply curbed in recent years, but by the standards of California and many Midwestern states the New Jersey system is still underdeveloped.

The recent compromise in Trenton provides a respite for higher education, but no promise of higher financial horizons. What then are the lessons of the last few months?

First, it is evident that public higher education is not insulated as it has appeared to be in the past—that it must compete for scarce funds with other state services and that faculty and staff are regarded essentially as are other public employees. That a governor plays a crucial role in times of financial stress was proved in New Jersey last fall when the state colleges experienced a system-wide strike of faculty, said to be the first anywhere. Effects of the strike varied among colleges, but the individual institutions were bypassed in the bargaining process, and a settlement, a rather inconclusive one, was negotiated by top union officials and emissaries of the governor.

The New Jersey system, in common with other state systems, is unexpectedly encountering limits to growth. While New Jersey has been faithful in its fashion to higher education since the middle 1960's, it appears that the state system must now adjust to arrested development, at least for a period. The efforts of the past decade, while they have greatly improved the state system, made no dramatic changes in New Jersey's standing relative to other states in the provision of higher education. New Jersey still stands at the top in the percentage of its students attending college in other states and well below the median in per capita expenditures on higher education. Any substantial surge would require major new sources of funding—which in New Jersey automatically returns the discussion to the state income tax. Ironically, even most opponents of the income tax say that its coming is inevitable and then add, "But not now." So the battle of Trenton continues.—JOHN WALSH

A second article will focus on the relation of the state higher education authority to the public institutions of higher education, and particularly to Rutgers, the primary locus of research and graduate education.

NSF: A "Populist" Pattern in Metallurgy, Materials Research?

The National Science Foundation (NSF) seems to be proving the old adage that trouble comes in threes. First Senator William Proxmire (D–Wis.) began mocking the titles of some NSF social and biological research grants. Then Representative John B. Conlan (R–Ariz.) began a campaign against some of NSF's work in social science education. Now some of the foundation's own scientific advisers have raised serious questions regarding the distribution of NSF's funding of basic research in materials science and metallurgy.

The materials science flap reached something of a peak on 29 July when Doris Kuhlmann-Wilsdorf, professor of applied science at the University of Virginia and a member of NSF's advisory panel on metallurgy and materials, testified before a subcommittee of the House Committee on Science and Technology, which has been holding extensive hearings on NSF's operations (*Science*, 8 and 15 August).

Kuhlmann-Wilsdorf presented the results of her own independent study of the funding patterns of one subdivision of NSF, the Metallurgy and Materials Section (known affectionately among researchers in the field as the M and M section), which doles out approximately $10 million a year for basic research. Her conclusion is that the best university departments in the field (including her own University of Virginia) receive a disproportionately small share of the money while middle-ranked departments get the lion's share. In other words, the M and M section of NSF is not supporting basic research on a strictly merit basis; the funding pattern is skewed along what she termed "political" lines. She concluded her testimony with questions about the "basic justice" of this system, the cost effectiveness of NSF's funding research in this manner, and other basic criticisms.

Kuhlmann-Wilsdorf's paper was an expanded, final version of presentations she made in May to the NSF advisory panel and to NSF officials. The advisory panel was sufficiently impressed to request NSF to make its own study. NSF officials, prodded not only by her May presentation but also by the fact that the congressmen who heard her testimony (among them Conlan) appeared sympathetic, are finally getting a study under way.

The M and M section funds $10 million in individual research grants each year, or less than a fourth of NSF's total $43 million support of basic materials research, which is administered by the Division of Materials Research. In addition, government defense and energy agencies support university materials research. The question raised by the Kuhlmann-Wilsdorf study of this one small piece of NSF's pie, however, is whether the pattern is characteristic of the way the foundation operates generally and whether it is a wise pattern in the first place.

The dilemma thus raised is a classic one: whether federal agencies supporting basic research should do so only on a "purely elitist" basis—as another materials advisory panel member, Rustum Roy, of Pennsylvania State University, advocated before the House subcommittee. The alternative—which appears to be currently followed at NSF—is for a federal agency to spread the money around among some good and many mediocre institutions in the name of strengthening American science overall.

Kuhlmann-Wilsdorf concluded that "the best departments are the most underfunded on the national average," on the basis of citation analysis, a tool coming into vogue as an index of the quality of scientific work (*Science*, 2 May). Using a standard list of materials and metallurgical science faculty members in the country, she counted from published citation listings the numbers of times each faculty member had been cited as a first author over a 6-month period. She then divided the number of citations of a given depart-