

providing justification for OMB's move is a draft report by a panel of the White House Science Council, which was chaired by D. Allan Bromley of Yale University and David Packard of Hewlett-Packard (*Science*, 31 January, p. 447). The report recommended a fixed ceiling on administrative costs, to be phased in over a 2-year period. However, it also recommended offsetting changes in the way infrastructure costs are estimated, essentially arguing for more rapid depreciation of buildings and equipment. Implementing the administrative cost cap without allowing changes in infrastructure costs "could result in significant damage to the academic enterprise," the panel warned.

The university lobby groups are as much concerned about the way OMB has gone about things as they are about the impact of the proposed rules. The OMB proposals were signaled in the Administration's budget on 5 February (*Science*, 21 February, p. 785), but were not spelled out until 12

February, when they were published in the *Federal Register*. The proposals, which formally amend Circular A-21, are open for comment for 30 days and are scheduled to take effect on 1 April.

In the past, when changes have been made in A-21, OMB has entered into extended negotiations with university representatives. This time, it is imposing a cut unilaterally without any consultation. Thomas Kennedy, a senior official of the Association of American Medical Colleges, charges that OMB is acting with "unseemly haste." And in a telegram to OMB, the four top elected officials of the AAAS warned that "such inflexible action would have disruptive and seriously damaging consequences for research universities."

The proposal appears to have been thrown together quickly, and OMB itself is not clear on some of the details of how it will be implemented. For example, federal agencies do not know whether the ceiling

will apply only to new grants issued after 1 April or whether it will also apply to existing grants.

What seems to have happened is that the Administration saw a political opportunity in the current obsession with cutting the federal deficit to do something it has wanted to do for some time. It made an attempt to curb growth in indirect costs of NIH grants in 1983, when HHS proposed an across-the-board cut of 10 percent. After heavy lobbying from university groups, however, Congress decreed that indirect costs should be paid in full, but asked for a study of the issue. This year, with the focus on holding down federal expenditure, the political climate may be on the Administration's side.

A week after publication of the proposal, university groups were trying to coordinate a response. Rosenzweig says the prime objective is to secure an extension in the time for public comments and to delay implementation of the rule. ■ COLIN NORMAN

French Science Policy Breaking 300-Year Mold

Moves to loosen central control over technology are likely to be accelerated if the conservatives win the coming election

Paris.

FOR the past 300 years, French policies toward technology—whether designed by governments of the left or the right—have been dominated by the legacy of Jean Baptiste Colbert, Louis XIV's powerful minister who argued that national independence could only be achieved through strong state direction of projects that ranged from the construction of the national canal system to the equipping of the French Navy.

In the early 1960's, President Charles de Gaulle drew heavily on this tradition to argue that France should master both the civilian and military applications of nuclear technology to avoid sustained dependence on the United States. And when the present socialist government came to power in 1981, it, too, invoked the name of Colbert to justify both a substantial increase in support for science and technology, and the detailed specification of where the most rapid expansion of research and development should take place to make France

competitive in international markets.

But Colbert's days may now be numbered. In the past few years, as a report on French innovation published last week by the Organization for Economic Cooperation and Development makes clear,* it has become increasingly obvious that policies that worked well for the development of fast-breeder reactors or satellite launchers cannot necessarily achieve the same results in microelectronics or biotechnology.

How things should be changed will be a key point of dispute in the general elections that will take place on 16 March. The present government wants to continue its policy of reducing the direct centralized control of research and technology—for example, by giving greater autonomy to universities and research institutes, and more responsibility to regional authorities—but under broad guidelines laid down by the state.

*Review of Innovation Policies: France. Book I (Examiners Report) and Book II (Background Report). Directorate for Science, Technology, and Industry, OECD.

The conservative opposition has already pledged itself to move even faster toward reducing state control if, as is widely expected, it wins the general election. Indeed, some opposition spokesmen are already suggesting that flexibility can only be achieved by dramatic actions such as dismantling the Centre Nationale de la Recherche Scientifique (CNRS), the main government agency responsible for the support of research.

The conservatives will have a strong record to match. The present government has not managed to achieve all that it promised for science in the first flush of postelection enthusiasm 5 years ago. Yet it has successfully restored a sense of optimism and purpose in the scientific community that were at a low ebb when it came to power, partly because of the previous right-wing government's distrust of the academic community.

The most obvious indicator of achievement has been the size of the research budget. In a law passed in the summer of 1982, the government pledged itself to raising national expenditure on research and development to 2.5 percent of the gross national product by 1985, compared to 1.8 percent in 1980 (with the proviso that achieving this target was predicated on a sustained period of economic growth).

The target has not been reached; indeed, the figure for 1986 will still be less than 2.4 percent of GNP. But research funding has remained a top spending priority, and has risen on average by almost 5 percent a year in real terms since 1981—faster than in the United States and, perhaps more significant-

ly, enough to close the gap separating France from its main European partners, the United Kingdom and West Germany.

Fundamental research has been an important beneficiary of this extra funding. At a time when Britain's research councils, for example, have been held to virtually zero-growth budgets, support for basic research in France has been growing at more than 6 percent a year, allowing the recruitment of several thousand scientists into agencies such as the CNRS.

According to CNRS director-general, Pierre Papon, the importance of these additional funds is not merely quantitative, but the fact that they have allowed the agency to pursue new initiatives and identify new priorities "without having to make excessive sacrifices."

One priority to which much time and effort has been devoted is the creation of interdisciplinary research programs in fields such as communications science and new materials. These are attempting to overcome the rigid boundaries that tend to separate different disciplines, particularly in universities.

Papon is also proud of the links that he has been able to establish between the CNRS research laboratories and industrial companies, both private and public. "Since 1981, we have signed cooperation agreements with 27 separate enterprises; when I arrived here, there was only one," he says.

Complementing these has been a strong policy of decentralization, giving regional authorities greater control over and responsibility for the research carried out in their local institutions.

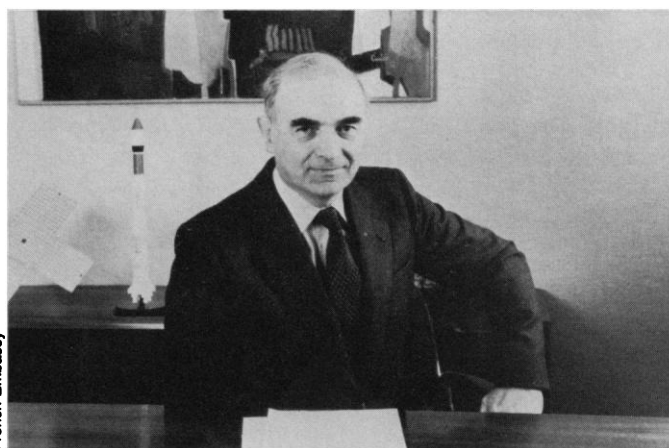
Such moves reflect the government's attempts to break down barriers at all levels between the research community and the outside world, a need pinpointed in the OECD report, which claimed that "entrenched barriers" dividing the national pool of educated manpower—including those which have traditionally separated the scientific community from industry—remain a "major obstacle hindering France from reaping all the economic benefit of its intellectual investment."

Given both the fierce independence and militant political traditions of part of this community, it is noteworthy that the evolution has occurred without major dissent. This is in sharp contrast to the late 1970's, when the CNRS's first attempts to link up with industry were abandoned following a strike by its research staff.

Some argue that this is the result of a change in mentality caused by the public confidence that the government has been expressing in its scientific community. Equally important in political terms, howev-

er, has been the deal that was struck between the government and the different labor unions representing research scientists, under which all scientists supported by agencies such as the CNRS were given full job security by being made government employees.

This move was also part of a strategy through which the government has sought to increase its influence over the content of research through the activities of research scientists. The main political device used to pursue this objective was the creation in 1981 of a single Ministry of Research and Technology, bringing together under one organizational roof a wide range of research agencies, but distributing its funds not according to the demands of these separate



Hubert Curien

"Much remains to be done" to put the government's research policies into effect.

agencies but in the form of different "mobilizing programs" covering areas such as biotechnology or industrial technologies.

Part of the intent was to challenge the "baronies" that tend to have dominated research policy in the past. For, despite the mythology of a strongly centralized (and hence tightly controlled) government administration, many of the agencies responsible for major state-funded technological programs, staffed almost exclusively by graduates from a small number of France's prestigious grandes écoles, have, in the past, remained fiercely independent in their internal operations.

The system has worked well when it has been a question of giving one of the so-called "grands corps" a major technological objective—such as the creation of an independent nuclear or space program—with the government as the main customer. But it has been less successful in moving rapidly with the needs of the market in fields like microelectronics and biotechnology.

"The new technologies require a 'bottom-up' attitude that has not been France's strong point up to now" says one of the authors of the OECD report, Umberto Co-

lombo, chairman of Italy's Nuclear and Alternative Energy Commission.

Furthermore, the protection of government-funded research laboratories from outside scrutiny has given rise to a large proportion of the research budget being spent on what one sociologist describes as *recherche appliquée non-applicable* ("nonapplicable applied research").

The government's achievements in confronting the structural obstacles, despite developments such as those described by Papon of the CNRS, have been modest. In many cases, for example, officials in the research ministry have lacked sufficient weight to be effective against the opposition of entrenched research groups.

Second, the government's research pro-

gram remains heavily oriented around major technological projects, the latest being its proposal for the space-plane Hermès (*Science*, 17 January, p. 209). Although acknowledged as a useful focus for research in a range of advanced technologies, the high costs of these projects remains a heavy burden on the rest of the research budget.

"We must be aware that France cannot do everything, even within the limits of its economic growth," says François Kourilsky, vice chairman of the government's main research policy advisory committee, the Conseil Supérieur de la Recherche et de la Technique, which recently issued a public warning that excessive commitments to prestigious programs such as Hermès threatened to starve funds for other areas.

The government itself is well aware of the problems that it still faces. Hubert Curien, the current Minister for Research and Education, admits that the government's efforts to put its policies into effect "may not always have been optimal," and that "much remains to be done."

The opposition parties, however, have been quick to exploit current weaknesses in the government's position to argue that

a radically different approach is needed.

In the case of universities, for example, the two main opposition parties have issued a joint pledge to significantly increase their freedom from state controls, if necessary by repealing the higher education law introduced after much controversy at the beginning of 1984 and allowing the creation of private universities modeled on the American system.

"The best thing that could happen for French science would be a progressive move toward a system of properly autonomous universities" says Pierre Aigrain, minister of research in the previous administration and currently chief scientific adviser to the electronics company Thomson.

Plans for the reorganization of the CNRS are likely to be equally controversial. With its 23,500 employees covering all branches of science and represented by strong labor unions, CNRS is seen by its critics as epitomizing the excessively centralized and "corporatist" organization of French science. For this reason, it is likely to become one of the first symbolic targets of the opposition if voted into power.

Several opposition members have recently stated their opinion that the CNRS should become less of an executive agency and more of a granting body like the National Science Foundation. This could be achieved, they argue, by transferring control of many of the laboratories currently run by the CNRS to universities with which they are already associated, as well as by creating new granting agencies for specialized research areas (for example, social sciences).

The real test for whichever party forms the next government, however, is likely to lie not in areas where change can be relatively easily brought about, such as the universities and CNRS, but in selling new research styles and new research priorities to those parts of the scientific community that have prospered most from the Colbertian legacy.

The right argues that the necessary change can be brought about by encouraging more competition between public institutions (for example, between universities for the best students) and a greater openness to market pressures. However, it remains seduced by the political attractions of a powerful state-backed technology that Colbert offered Louis XIV.

The left counters that the opposition's program for "liberalizing" the research community risks allowing entrenched interests to dig themselves in still further, and that—given the particular traditions of French society—American-style solutions are inappropriate, since only strong state direction can bring about the necessary changes. ■

DAVID DICKSON

After the Spydust Settled . . .

THE "spydust" crisis in U.S.-Soviet affairs has ended. The fanfare was less than deafening on 14 February when the State Department released its final report on the case, perhaps because there was so little to release.

The State Department says that Soviet agents have been sprinkling a chemical called NPPD* in places where Americans would come in contact with it, creating a chemical trail they could follow later. Last year, the U.S. government warned that NPPD might pose a cancer threat and spent 6 months researching the proposition. In February, the department came up empty handed. The bottom line, said department spokesman Charles Redman on 14 February, is that NPPD "does not pose a health hazard" to anyone.



Arthur Hartman, U.S. Ambassador to Moscow Ordered a "pointed" search for spydust after EPA found none.

Six months earlier, on 21 August, Redman told the press that the United States was protesting "in the strongest terms" the "use of chemical substances against its diplomatic representatives in the USSR." Redman said that NPPD tested positive in the Ames test, which uses bacteria to check a chemical's ability to cause genetic mutations. U.S. diplomats, it seemed, were work-

ing in a biohazard zone. The department's assistant medical director, Charles Brodine, flew to Moscow to break the news to the American community and give counsel to those who might be alarmed. U.S. senators inveighed against the assault. One said the Moscow embassy should be closed, not a good omen for the Reagan-Gorbachev summit scheduled to take place 3 months from then.

In late August, following the initial blast of invective, the United States sent a team of scientists to Moscow to find the evidence. The experts collected samples, analyzed the data, and wrote up several reports in December. The central paper, by Karen Hammerstrom and Richard Levy of the Environmental Protection Agency, was not released until February.

Hammerstrom directed the sample collecting effort, which she described in her paper as a random survey aimed at discovering the extent of exposure to NPPD in the entire U.S. community. The scientific team collected 418 "surface wipe" samples and 18 samples of lint or vacuumed material. Each was analyzed at Versar, Inc., a laboratory in Springfield, Virginia. The results were negative. "NPPD was not found in any of the samples," the report said. It concluded that "no purpose would be served by further random sampling of the general population."

However, the authors guessed that the State Department might be dissatisfied with the results and might want to continue looking for evidence. In this case, it said, the department should "identify those individuals and locations most likely to be exposed to NPPD and conduct sampling only among the members of that group." That is just what happened, on orders from U.S. Ambassador Arthur Hartman, who demanded "a more pointed sample."

Accordingly, the embassy in Moscow resumed the search for NPPD in January. A technician who runs medical tests for the embassy collected 189 additional samples from 30 cars used by officials who might be of interest to the Soviets. The Versar lab analyzed the samples in January and February and found five positive for NPPD. However, the lab noted that the NPPD in the samples had a slightly different spectrographic signature from the laboratory standard NPPD issued by the State Department.

*The chemical is an aromatic aldehyde, 5-(4-nitrophenyl)-2,4-pentadien-1-al.