spection and control of manufacturing, distribution, and trade in synthetic drugs.

To bring the day closer when an end to growing of the opium poppy could be realistically contemplated, the President is asking for funds for research on synthetic substitutes for opium derivatives (such as morphine and codeine) with legitimate medical uses. He is also requesting money to assist training of foreign narcotics enforcement officers.

Although the Administration program has won a generally favorable reception, there has been some negative reaction, notably from Senator Harold E. Hughes (D–Iowa). Hughes, chairman of the Senate Subcommittee on Alcoholism and Narcotics, lauded Nixon for the scope of his proposals but noted some "critical omissions." Hughes chided the Administration for not funding existing programs adequately and expressed special misgivings about the possibility that programs to control alcohol abuse would suffer from the emphasis on the narcotics control program.

It was Hughes again who last week raised the question of whether VA drug programs might be undermined by a threat to confidentiality of information provided by patients. Federal law requires that the VA provide information on criminal activities acknowledged by patients in the course of treatment if enforcement agencies request it. VA officials testified that enforcement officials indicated they would not press for such information, but this hardly seems to resolve the problem.

Much of the detail of the President's proposals remains to be filled in, and the working out of relationships between the new White House office and the operating agencies in the narcotics and drug-abuse field is likely to require more than an easy summer campaign. But, at least and at last, government policy acknowledges at the highest level the other half of the problem.

—JOHN WALSH

Britain: Successor to "Mintech" Loses Jurisdiction over Research

London—Within a year after its unexpected electoral victory, Prime Minister Edward Heath's Conservative government has quietly dismantled the biggest research empire ever built up in Britain. As part of its policy of "disengagement" from activities it believes are best left to private enterprise, the Conservatives have dispersed much of the power of the Ministry of Technology, which was one of Labour's proudest creations.

Heath has said that Britain needs "less government, not more," echoing Sir Winston Churchill's 1951 promise to set the people free. What is more, the Prime Minister really seems to mean it —a fact that has quickly given his government a distinctive style, a break from the consensus politics of the Tory governments of the late 1950's and early 1960's.

When the new ministers applied this philosophy to the Ministry of Technology, most of the old policies were turned on their heads. The result is a department very different from the one the Conservatives inherited.

The purpose of the old Ministry of Technology was to attempt to do for British industry what massive space and defense spending seemed to have done in the United States—but to do it in a much more direct and deliberate way. Much of the success of the American electronics, computer, and aviation industries was, it seemed, due to the indirect effects of the bounties of the Pentagon and NASA. Britain, with less to spend, would have to tackle the problem more directly, by putting money straight into selected firms rather than waiting for it to filter down as an indirect result of defense and space spending. The policy might not have worked, but at least the rationale was clear.

By the end of the Labour administration, "Mintech" (a name coined by the Minister Anthony Wedgwood Benn) had emerged as a powerful force, though many people were still confused about where it was heading. It controlled most of Britain's research establishments, including many with a defense function. It was responsible for sponsoring a wide range of different industries, from shipbuilding to aviation. It was the main procurement agency for the Ministry of Defence. By the direct injection of finance and the control of government purchasing policy, it had kept the British computer industry above water, and it was responsible for a controversial reorganization of the nuclear industry.

The Conservatives could hardly dismantle all this at once, though they did immediately promise to dispose of the Industrial Reorganisation Corporation, the major channel through which government money had been fed into industry, chiefly to encourage mergers. One of the first things the Tories did, in fact, was to make Mintech even bigger, by merging it with the Board of Trade and changing its name to the Department of Trade and Industry. After an interregnum under Geoffrey Rippon (who then left to negotiate with the Eurocrats in Brussels), the massive department fell into the hands of a man who had been a member of Parliament for less than 4 months and had made only one 15-minute speech—John Davies.

Davies thus became, at a stroke, one of the most important members of Heath's Cabinet. His personality remains something of an enigma. His background is business: first in Shell Mex and British Petroleum, where he rose to be vice-chairman and managing director, and then as director-general of the Confederation of British Industry, spokesman for the employers. He can be a pugnacious speaker. Once he described Labour budget proposals as "damaging, retrograde and incompetent," but his own political convictions —beyond a single-minded devotion to private enterprise—remain unknown.

In British politics, the personality of a minister and the extent to which he can impose himself on the House of Commons are crucial. Power springs from an ability to dominate proceedings, to shrug aside interruptions from the Opposition, or to use them to sharpen your own case. Davies shot to prominence before he had time to find his parliamentary feet, and his performance so far has ranged from bad to downright awful. In his first major speech, he allowed interrupters to destroy his

rhythm and train of thought; in his next, he went to the other extreme, ploughing on for 50 minutes through a boring Civil Service brief. It was rather like the chairman of the board addressing shareholders, and Liberal Leader Jeremy Thorpe suggested: "It would be preferable if the chairman's remarks are printed, circulated in advance and kept reasonably brief."

Davies might have found it easier to make an impression if he had had anything positive to report. But his first few months were unfortunate; he seemed to be dashing around like a fireman from one conflagration to the next in an attempt to douse the flames. First the Rolls-Royce collapse, then the admission that confidential information from his department about an insurance company bankruptcy had been leaked, finally an over-candid statement about import tariffs on automobiles—it seemed that Davies was forever responding to events rather than shaping them.

He recognizes the danger. "I know I'm going to be a disappointment to a lot of people for a long time," he told an interviewer recently. "You see, there's so much to be done in the way of long-term decision making that it would be madness for me to make any moves until we've done extensive research and programming on each major problem. That's not a particulary popular line, because, of course, it's easier to produce quick-flash reactions and solutions, but I'm here to carry through really major changes, and those need a lot of preparation."

Research Dispersed

Davies was perhaps being overmodest. What has been done already is the complete dismantling of the research side of the department. What is left is only the rump of the old ministry, which had gathered together almost all the British government research establishments and the Atomic Energy Authority to form an unrivaled center for research and technical information—though coordination between the different establishments always looked better on paper than it was in fact.

One of the last proposals of the old government, one never put into practice, would have integrated the establishments even more closely under a new British Research and Development Corporation. Successive British governments have been embarrassed by the size of their in-house research expenditure, and Benn's idea was to attract industrial money into the establishments to pay for research carried out under contract. The Research and Development Corporation, if it had ever been set up, would have employed 5000 qualified staff spending £70 million a year; the hope, an optimistic one, was that about a third of this money would come from industry. This would have saved the government both money and the trouble of having to slim down its research establishments and fire scientists.

The Tories never approved of this idea and immediately dropped it. In fact, the new government has gone to the opposite extreme. Instead of concentrating the establishments under one roof, it has split them up and farmed them out to other ministries. Thus six laboratories have gone to the Ministry of Defence, including two of the biggest, the Royal Aircraft Establishment and the Royal Radar Establishment. (The others are the Explosive Research and Development Establishment, the National Gas Turbine Establishment, the Rocket Propulsion Establishment, and the Signals Research and Development Establishment.)

Four laboratories now come under the Department of the Environment—they are the laboratories concerned with water pollution, hydraulics research, fire research, and timber. Trade and industry has hung on to only six—the National Physical Laboratory, the National Engineering Laboratory, the Laboratory of the Government Chemist, the Safety in Mines Research Establishment, the Torrey Research Station, and the Warren Spring Laboratory. Nobody would be surprised if these last two were also to disappear, the first to the Department of Agriculture, Fisheries, and Food, and the second to the Department of the Environment.

What this means is that the largest research empire ever established in Britain has been quietly demolished. More important, perhaps, is the effect the changes may have on the scale and quality of the work that gets done. So far, the government has issued no policy directives, although it is known that the ministries involved are taking a close look at their research programs.

In defense research, there have been convincing rumors of cuts, both in money and manpower. Although Britain's defense budget declined throughout the Labour government's term of office, research continued at much the same level. The new distribution of laboratories will probably bring the defense establishments under closer scrutiny, and the result could well be a long-overdue reduction in their strength. In particular, it is known that the Ministry of Defence is taking a close look at the areas of overlap between the different establishments. Another possibility is that defense establishments will be told firmly to stick to work with a defense application; civil research projects will be terminated. If this happens, redundancies seem certain.

The establishments that have fallen into the lap of the Department of the Environment may well be more fortunate. For the moment, environmental questions are riding high in British politics, and cuts in laboratories concerned with pollution control would be unpopular.

Mission-Oriented Research

Otherwise, the signs are that any change in the British research budgets will be downward. Davies has said that "All government research establishments are being reviewed, and loans to private enterprise for research are unlikely." The key word seems to be "mission-oriented," and it is likely that the mission will be much more closely defined than ever before.

The same philosophy may also be applied to basic research, though this is not part of Davies' empire. The money for basic research, in universities and research laboratories, comes from five independent research councils. An article of faith ever since the first research council was set up has been that they are not administered by the ministry to which their work is most relevant. This principle, enunciated by Lord Haldane almost 50 years ago, may now, it seems, be thrown overboard. There have been strong rumors that responsibility for the Medical Research Council will pass to the Department of Health and Social Security, and responsibility for the Natural Environment Research Council will go to the Department of the Environment. The Agricultural Research Council would then disappear into the Ministry of Agriculture, Fisheries, and Food.

An inquiry under the chairmanship of Sir Frederick Dainton is now considering what is to be done with the research councils, which spend about £100 million a year. Most research workers would oppose any move to bring them under the wing of the ministries. As one agricultural scientist put it, if the Agricultural Research Council becomes part of the Ministry of Agriculture, it

will be "a tool of policy" rather than a genuine research organization.

If the suggested organization goes through, really fundamental work—like nuclear physics, radio astronomy, and molecular biology—would probably emerge in a reformed Science Research Council. More applied work would be done under the aegis of the appropriate ministry and would be more closely tied to the needs of the department—in line with the mission-oriented approach to research funding.

So far, these are no more than strong rumors, but they seem to fit in with the government's general philosophy. Until the situation becomes clearer, research workers are crossing their fingers and hoping for the best. But the indications are that the years of rapid growth have come to an end.—NIGEL HAWKES

Princeton-Pennsylvania Accelerator: End of an Era in Particle Physics

While high energy physicists eagerly await the birth of the $250 million National Accelerator Laboratory (NAL) near Batavia, Illinois, an older machine approaches the end of its federal funds. The lifeblood supplied to the Princeton-Pennsylvania Accelerator (PPA) by the Atomic Energy Commission (AEC) was cut off 1 July, perhaps only a few days before its giant successor comes to life with tests of its full energy beam. Thanks to a small transfusion of private funds, the PPA lingers on and hopes for an Indian summer of cancer-therapy research. But it has passed from the great world of high energy physics.

Its passing has stirred much less excitement than the arrival of NAL, but it, too, is a signpost that marks the turning point now reached by research into "the fundamental building blocks of matter." About a dozen smaller accelerators have been shut down in the past, but these closings were much less traumatic than the shutting off of the $40 million machine, which at its peak provided employment to 356 people and which cost $5 million annually to operate.

The PPA is located on highway 1 about 4 miles from the main campus of Princeton University. The University of Pennsylvania shared administration and use of the accelerator with Princeton, although AEC's contract was with the latter institution. The facility was also used by experimenters from other universities, whose share of the operating time rose to about 50 percent by 1970.

Paul W. McDaniel, director of research for the AEC, told a House appropriations subcommittee that the 1970 decision to close the PPA, only 7 years after it began operations, had caused "consternation" in the high energy physics and educational communities. The event brought home to particle physicists a reality that was already making them uncomfortable. The enthusiasm with which the 500 billion electron volt (Gev) NAL was awaited was tempered by chagrin at the growing realization that its cost would eat into the money available for smaller machines. In the days of rapidly expanding research budgets, the typical physicist had not dwelt on the sacrifices his local accelerator might have to make to the hungry god of higher energy.

The Princeton experience has already had a major impact on the way high energy physics is being planned, according to one Washington official. He calls it a "trigger" to compel long-range perspective and cost consciousness, adding: "It is used as the classical example of what you don't do."

The PPA was still pursuing an ambitious research program when it was caught in the vise between rising particle research costs and budget pressures on science. But there was general consensus among physicists that, if one of the high energy machines had to be sacrificed, PPA, whose 3-Gev energy level was the lowest among them, should be the first to go. Even Milton G. White, director of the Princeton accelerator, feels that the choice was not unreasonable, although he is unhappy with the timing.

Given more advance warning on the shutdown, White says, more research could have been accomplished at lower cost. Asked if the timing was the result of poor planning, White replied: "No one had any idea of the abruptness and depth of the cut-off of funds."

In July 1969 the AEC had asked White what the effect would be if PPA's budget were cut from $5 million to an annual outlay of $3.5 million or $2.5 million. The reply indicated that the smaller cut would make operations difficult, and the larger cut would make them almost impossible. In November 1969 PPA was told that, beginning in January 1970, they would be funded at the $3.5 million rate for the remainder of the fiscal year. The news came as a relief, but when January came, PPA was informed that its operations were to be altogether terminated.* "January was very much of a surprise after November," PPA's associate director Walter Wales told *Science*.

Between those dates, AEC's proposed funding for the machine had been rejected by the Bureau of the Budget, which allocated $2 million for fiscal 1971 to complete important experiments under way and close down the facility. The accelerator's fate was proclaimed in President Nixon's fiscal 1971 budget under "Reductions in Outmoded or Uneconomic Programs." Physicists at other accelerators may not have wept to see a competitor for scarce funds face cutbacks, but some of them, at least, were shaken by the death sentence. Their subsequent pleas to keep PPA alive, reportedly pressed even at the highest level, fell on deaf ears.

Phase-Out Policy

Wales regrets that there was not more time to "run the accelerator into the ground." The most economical way to phase out such a machine, he says, is to stop spending on improvements and treat it like an old car, to "live with the squeaks." Not only is the amount of experimentation per dollar spent greater when the cost of improve-

* At the same time, the 6-Gev Cambridge Electron Accelerator, shared by Harvard and the Massachusetts Institute of Technology, was cut from $3.5 million to $2.4 million. Research there is now limited to experimentation with the colliding beam.