with fancy rhetoric and not given the practical support they need, their initiative will die and their interests will be diverted to other matters. At this writing neither HEW officials nor their critics are too doctrinaire on the subject of how to fund family planning; the major difference is that the administration still believes the comprehensive approach will work—although officials admit there is scanty evidence for this view—and the others feel it has already been tried and found wanting.

In a slightly different sense the argument about earmarking of funds is also surfacing with respect to the poverty program. The analogue to HEW's belief in comprehensive health programs is OEO's belief in unified community action activities. The OEO believes that family-planning money appropriated in a community-action context helps strengthen local agencies, and that it may help build other organizations among the poor, such as welfare-rights groups. The popular family-planning program also helps to preserve the unpopular OEO, which is constantly threatened with dismemberment. If both OEO and HEW ended up with earmarked family planning programs (and a bill roughly analogous to the Tydings plan for HEW has been introduced in the House, directed at OEO), it would be only a matter of time before someone suggested putting them together. And the logical home for such a joint program would be HEW. Aside from further weakening the poverty program, such a move might easily have an unfortunate effect on family planning, because OEO, in its comparatively spontaneous and unbureaucratic fashion, is by far the more enterprising, innovative, and responsive of the two agencies. What would happen if its programs got mired down in the much more cautious and slow-moving Public Health Service is not a prospect that enthusiasts of strong federal action enjoy contemplating.—ELINOR LANGER

France: First the Bomb, Then the "Plan Calcul"

Paris. The appointment last September of Robert Galley as *délégué à l'informatique* was confirmation, if any were needed, that the French government is in earnest about its announced intention to promote a viable national computer industry.

Galley is a technocrat rather than a politician. In a decade of responsible posts with France's atomic energy authority he has earned the reputation of being France's leading talent in the organization of large scientific and technical enterprises. The French atomic energy program has been a top-priority effort, and observers feel that Galley would not have taken the new job without assurance of the same sort of support.

Informatique is a coined word with no direct equivalent in English, although "information sciences" comes fairly close. The French didn't have a word for the techniques of logical and automatic handling of information, and *informatique* has been gaining currency in recent years. (To the man in the street, *informatique* denotes everything related to computers and to their design, manufacture, and use.) In France, defenders of the language stoutly resist neologisms, but they prefer domestic barbarisms to foreign ones, and *informatique* appears to have completed its period of probation now that it is used officially in Galley's title.

To the interested public, Galley is known as the administrator of the government's new "Plan Calcul," which is a frank effort to bring the French computer industry to within competitive distance of American firms and their overseas subsidiaries. The French never lacked appreciation of the importance of computers to science and industry, but their new push is prompted by political aspirations as well as scientific and economic considerations. President de Gaulle's conception of national independence (*Science*, 5 May) requires a French national computer industry.

Precipitating factors in the government's decision to intervene were the state of the French computer industry, symptomatized in 1964 by the acquisition of half ownership of the biggest independent French company, Machines Bull, by American General Electric, and a U.S. government embargo on delivery of American giant computers. Grounds for the embargo were that such computers could abet French nuclear-weapons development, and that delivery should be forbidden under the nondissemination provisions of the Moscow Test Ban Treaty.

The wrangle lasted for 2 years, ending last October when the lifting of the ban on export licenses was announced. Some observers believe that the row contributed to the French decision to withdraw selectively from NATO. While this is questionable, the incident may well help to account for the abruptness with which U.S. forces were given their walking papers.

Details are not easy to come by, but it seems that by early 1965 French scientists were familiar with the specifications of the new IBM 360-92, and high-energy-physics research teams, projecting their requirements 3 or more years ahead, wanted the machine. The French Atomic Energy Commission (CEA) ordered two of the big IBM machines and also two CDC 6600's, the type CERN contracted for. The obvious capacity of these machines for doing calculations relevant to nuclear weapons development raised the question of conflict with the test-ban treaty, and the embargo was levied.

Security on the French nuclear-weapons development program has been tight, but it was assumed that the big computers could help French military scientists in their efforts to improve the weight-to-yield ratio of atomic warheads as well as in the development of thermonuclear weapons. Friction between the two countries was most severe during 1966 as the need for the computers became more pronounced. One of the ironies of the situation was that French physicists planned to use the big computer in cooperative experiments with Soviet physicists at Serpukhov.

Accommodation on the issue was reached when the French for the first

NEWS IN BRIEF

● **CLASSIFIED RESEARCH**: Concern about the involvement of institutions of higher education in classified research projects has recently prompted a series of policy statements from various sectors of the academic community. The statements generally attempt to discourage classified research while still leaving a way open for its performance under certain circumstances. The American Association of University Professors, in a general session at its annual meeting in Cleveland last month, adopted a resolution urging "that institutions of higher learning inspect with great care the consequences of their research relationships in the area of defense with respect to the autonomy and freedom of academic societies."

The Board of Trustees of New York University adopted a policy statement which requires that all classified research have the prior approval of the president of the University. It further says that such research must be consistent with the university's concern "with the preservation and enrichment of human life rather than its destruction" and that "the university's involvement must demonstrably outweigh the disadvantages of having to subject the project to security requirements and possible publications restrictions."

A statement drafted by the Massachusetts Institute of Technology Academic Council and endorsed by the faculty, affirms "the merits of open research and free interchange of information among scholars," but it "recognizes that in a very few cases the pursuit of knowledge may require access to data or literature of a classified nature, or yields results whose immediate distribution would not be in the best interests of society." Future classified projects there must be approved by the president or provost.

At the University of Pennsylvania, the trustees adopted a resolution, recommended by University President Gaylord Harnwell, that two secret germ and chemical warfare research programs—Air Force Project Spice Rack and Army Project Summit—be terminated or transferred. The board supported Harnwell's recommendation that "it would be undesirable" to transfer the projects to the University City Science Center, because of the "misapprehension that the University exercises control of the Science Center."

● **MOHOLE REVIVAL MEETING**: There is little hope at present for reviving Project Mohole. This was the conclusion that a group of earth scientists arrived at last month in an informal discussion held during the annual meeting of the National Academy of Sciences. The group, which met at the invitation of Harry Hess of Princeton, one of the founders of the original Mohole venture, generally agreed that federal research budgets are now too tight to accommodate the controversial project. The discussion took up the possibility of a reduced-scale deep drilling project to start sometime within the next three or four years, but arrived at no firm conclusions.

● **"SUICIDOLOGY" PROGRAM**: The National Institute of Mental Health (NIMH) has granted $110,515 to the Henry Phipps Psychiatric Clinic of the Johns Hopkins School of Medicine to support a program in "suicidology"—defined by NIMH as "the scientific and humane study of suicide and suicide prevention." The funds will be used to develop a curriculum, to recruit teaching personnel, and as support for students. NIMH plans four more years of support totaling $852,338. The program will begin in September with the awarding of four 1-year fellowships, to be expanded to eight fellows in subsequent years. Seymour Perlin, professor of psychiatry at the school of medicine, will be project director.

● **WATER RESOURCES RESEARCH**: The Office of Water Resources Research, Department of the Interior, has selected 31 projects, for a total funding of $2 million, to initiate its water resources research program, authorized under Title II of the Water Resources Research Act of 1964. More than half the projects selected were proposed by colleges and universities, with the remainder coming from private foundations, institutions, or firms, plus a state conservation department and a local watershed district. The projects, chosen from 244 proposals, include water resources planning and management, socioeconomic aspects of water resources problems, the hydrologic cycle, conservation of water quantity and quality, municipal and industrial water problems, estuarine problems, flood control, and water-based recreation.

time identified research centers where military work is being done. Saclay, a large CEA research center near Paris, which figured prominently in the discussions, was described as being devoted exclusively to nonmilitary research. An agreement provided that the French would get the computers if guarantees were given that they would not be installed at weapons development centers.

Other Europeans tend to take a skeptical view of this gentleman's agreement. *The Economist,* on 29 October, noted, "It is magnificently irrelevant, in getting calculations done, where the computers actually come to rest so long as they are physically in France." As for the effect of the embargo, it appears to have lent weight to French warnings to other European nations against dependence on the United States for critical materials, high-technology equipment, or technical information. It is suggested in France that disagreement with U.S. policy in Vietnam, for example, might have disagreeable consequences in this sphere, even for U.S. allies. For American policy makers the computer incident has been a painful reminder that consistency may be a virtue in foreign policy but is often difficult to achieve.

It now appears that the French will get about a dozen of the king-size computers from three or four companies, such customers as Electricité de France (EDF), the national electricity company, having put in their bids. This may mollify IBM and other American business interests, which put very strong pressure on the State Department to relent, not simply because of the sales involved but also because of unfavorable effects on other American interests in France. But it is going to divert the French from their national program.

Origins of this effort can perhaps be traced directly to the GE acquisition of a half interest in Machines Bull in 1964. Machines Bull is the largest independent producer of electronic calculators and business-machines in France. The chagrin of President de Gaulle was well known at the time, but the takeover was permitted, apparently because of Bull's operating deficit and internal difficulties. An agreement was reached under which, for example, GE promised to maintain Bull's research capacity, and it was hoped that a transfusion of American technology and managerial skill would put the company back on its feet.

What the French have called *la deuxième affaire Bull* broke out in January when, in the face of continuing deficits, a decision was made to withdraw two Bull computers from the market. The French are concerned not only about layoffs but about implications for the company's research activities. General Electric has made it known that the French research unit could have a share in the development of a new giant computer intended to compete directly with the top of the IBM line, but agitation persists.

IBM France, which dominates the French market, now employs about 12,000 people, has a thriving research element, and operates schools which do much of the essential training in France; it trains perhaps 15,000 people a year, from key punch operators to programers and systems analysts. Although staff and researchers are almost all French, the view, at least among some government officials, is that IBM France is an "American company." Discoveries made in the French research labs, for example, are patented in the United States, but the basic grievance is that IBM France, like Bull–General Electric, is part of a world-wide, interdependent manufacturing and sales combine. Specialization has been introduced to increase efficiency and avoid duplication, and decisions affecting production and, particularly, research are made in the United States. The interests of the French company, therefore, it is argued, are subordinated to the overall interests of the group.

French determination to gain more of a mastery over the fate of their computer industry was given official expression last summer in a decree of the council of ministers creating the post of *délégué* in charge of development of a national computer industry. The *délégué* derives his powers directly from the office of the premier and is charged with coordinating the human, scientific, technical, and financial resources necessary to develop, as the decree puts it, *un industrie du traitement de l'information (informatique).*

Galley's commission is a general one and appears to cover several varieties of intervention. He will be responsible, it seems, for the encouragement of studies in the scientific disciplines necessary to the design, manufacture, and use of computers, particularly in institutions of higher education. Indications are that present activities in universities outside Paris—at Grenoble and Toulouse, for example—will get special encouragement. Galley is also expected to guide the development of the Institut de Recherche d'Informatique et d'Automatique (IRIA), the government organization created principally to develop "software" as a complement to the hardware produced through the Plan Calcul.

In the Plan Calcul, emphasis will be on helping industry help itself. Galley is known as a confirmed free-enterpriser, and his operations are expected to be in the spirit of New Deal pump priming. Troubles in the French computer industry have been ascribed to the prevalence of companies which are too small—and in many cases not brilliantly managed—and which spend too little on research. Galley's first major effort has been to act as a marriage broker, and he has succeeded in bringing about a merger creating a company which most observers think will be the bellwether of the Plan Calcul. This is the Compagnie Internationale d'Informatique (CII), formed by the union of the Société d'Electronique et d'Automatique (SEA) and the Compagnie Européenne d'Automatisme (CAE). Financing has been shared by several major companies in the electrical manufacturing electronics and communications fields.

Plans for CII have been outlined, and they appear to indicate the shape of the Plan Calcul in the years immediately ahead. The company will continue to produce machines which are currently profitable, including one under license from an American company. At the same time, research has been launched on a new family of compatible computers, the first of which, it is hoped, will become available in 1968.

On 13 April a 5-year agreement was signed between CII and the French government under which the government will make available $80 million

Major Telescope To Be Built in Chile

A long campaign by optical astronomers for a major instrument in the Southern Hemisphere came to success last month with the joint announcement by President Johnson and President Frei of Chile that a 150-inch reflecting telescope will be built at the Cerro Tololo Inter-American Observatory in Chile. The telescope will be the largest in the Southern Hemisphere.

Cerro Tololo observatory is located about 300 miles north of Santiago on a 7200-foot mountain in the foothills of the Andes.

The new instrument, which is expected to be in operation around 1973, will be similar to the 150-inch telescope now under construction for the Kitt Peak National Observatory, Tucson, Arizona.

The National Science Foundation (NSF) and the Ford Foundation will finance the construction of the telescope, estimated to cost $10 million, with Ford paying half—up to $5 million.

The largest telescopes now in operation in the Southern Hemisphere, both with 74-inch apertures, are at Pretoria, South Africa and Canberra, Australia.

Construction of the Cerro Tololo observatory was begun in 1963. It has two 16-inch telescopes in use now, with 36- and 60-inch instruments to be put into operation shortly.

Kitt Peak and Cerro Tololo are operated by the Association of Universities for Research in Astronomy, a consortium of nine U.S. universities working under contract with NSF.

in research contracts and about $8 million in other types of aid. If the company achieves its goals, repayment of the money is provided for.

The budget for the Plan Calcul has been put at 104 million francs ($21 million) for this year and a total of 450 million francs ($90 million) by 1970. Most observers think that government funds going to the program could far exceed these figures. The Plan Calcul is designed to mesh with the present Fifth Plan for social and economic development (1966–1970), but it is interesting to note that the Plan Calcul was not called for in the Fifth Plan, which was formulated in 1964 and 1965. The Plan Calcul was presumably an urgent afterthought, prompted by the events of the past 2 years.

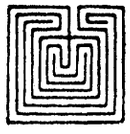
In administering the Plan Calcul, Galley will have not only the funds available under the special budget but other sorts of leverage as well. It is understood, for example, that he will have final approval on purchase of computers by government departments or nationalized industries, in France a very sizable market. He will also be able to draw on his experience of dealing with French industry, gained as chief builder and troubleshooter for the French atomic-energy program.

Galley directed construction of the plant at Marcoule for the extraction of plutonium and then directed construction of the plant at Pierrelatte for the production of enriched uranium. Both were key requirements for fulfillment of the regime's nuclear aspirations, and Pierrelatte is to be completed on schedule this spring.

There may well be some parallels between the French nuclear-energy program and the new effort in the field of computers. The French, like the British, have made a heavy investment of resources in an atomic-energy program, with the French, perhaps even more systematically than the British, shaping their program to meet military requirements. The result in technological terms has been impressive. The most recent accomplishment was the launching on 29 March of the first French nuclear submarine, the *Redoutable*, built with the conspicuous absence of American technological assistance. (The U.S. did sell France enriched uranium, the fuel required by the nuclear submarine.) Militarily, the French deterrent might be said to be credible but, viewed in the perspective of the arsenals of the United States and Soviet Union, not very convincing. How much French technology has suffered or profited, on balance, from the very costly military program is an open question.

In the case of the Plan Calcul, the French feel they are grasping at a last chance. Their intention, it should be emphasized, however, is not to challenge the United States in the production of the giant computers which caused the recent falling out. The French aim to compete at the level of the small and medium-sized computers, where demand is great and growing, and they are thinking in terms principally of French and European markets. They know that they will have to rely partly, in the immediate future, on American technology and even on American components. The French are famous realists, and they are banking on a unique new relationship between government and industry to overcome formidable problems. The recent record shows that, within the limits of what they set out to accomplish, the French should not be underestimated.

—JOHN WALSH



Dædalus: Marking a Decade of Journeys from the Labyrinth

Cambridge, Massachusetts. It was the careful Dædalus who escaped from imprisonment and flew to Sicily on feathered wings. It was his adventurous son Icarus who soared too near the sun and fell to his death in the sea below.

Like the figure of Greek mythology, the quarterly *Dædalus* does not make the mistake of Icarus—it does not surrender to youthful passion. It may not know the heat of the burning sun, but at least it makes its journey in safety.

Considering the precarious nature of the vehicle, it is surprising that *Dædalus* has been able to launch so many flights. At best, the publishing of periodicals in the United States is a chancy business, but the risks are increased with the production of an academic journal which is meant to appeal to all intellectual disciplines.

One of the principal explanations for the quality of *Dædalus* is undoubtedly the deliberative pace of its editorial procedure. From the time of the initiation of the idea for an issue until its publication, an 18- to 24-month gestation period is required. Furthermore, few publications have so highly a structured writing process as does *Dædalus*, or subject their authors' work to as much criticism from fellow contributors.

The success of *Dædalus* has greatly exceeded the expectations of its founders. In its present form, *Dædalus* began life 10 years ago under the editorship of Harvard physicist Gerald Holton. It was originally designed to be an interdisciplinary "house organ" for the select membership of the American Academy of Arts and Sciences. Harvard Law School professor Paul Freund, who is now finishing his term as Academy president, says that "*Dædalus* has become the principal ornament of the Academy." In the last decade, *Dædalus* has increased its circulation more than 20-fold to a current total of 42,000. Ten to twenty thousand additional copies of each issue are ordered after publication date by interested readers. All issues of *Dædalus* are now republished in hard-cover form by Houghton Mifflin Company within 9 months of the original issue and then published again in paperback by the Beacon Press. Part of this growth in public attention to *Dædalus* has been achieved under the direction of historian Stephen R. Graubard, who replaced Holton when he resigned in 1963. Holton still plays a large part in consultations about the publication.

Most issues of *Dædalus* consist of about a dozen essays organized around a single, but rather general, subject. For instance, the first issue of *Dædalus* which Holton published was entitled "Science and the Modern World View" and included contributions by P. W. Bridgman, Philipp Frank, J. Robert Oppenheimer, and Jerome S. Bruner. The latest issue (Spring 1967) deals