pean community and for their balance of payments situation as a whole. Like the United States, France wants to maintain and expand its exports in the high technology sector. As in the United States, it is being noted that relatively large expenditures on research and on science education have not conspicuously paid off. And there is the same musing about stimulating innovation, in the sense of fruitful and timely application of research results in industry.

Franco-American science relations provide an instructive study in contrasts. On the one hand, cooperation in the basic sciences has probably never been better, and the same might be said for cooperation on work of a more applied character, such as work on environmental and urban problems. But when it comes to applied research that may have industrial impact, it can be said that the ghost of the technology gap still walks.

Cooperative Spirit

Certainly, general science relations are infinitely better than they were in the middle 1960's, when the American refusal to sell France big computers that might be used for work on the French H-bomb (*Science*, 12 May 1967) seriously chilled the atmosphere. The new spirit of cooperation seems to date from a meeting between presidents Pompidou and Nixon after both had taken office. There followed an exchange of visits between Nixon's science adviser Lee A. DuBridge and France's Francis-Xavier Ortoli, who under Pompidou took over an upgraded portfolio as minister of scientific and industrial development. Agreement was reached on a number of projects of mutual interest, principally dealing with environmental problems and urban questions.

American officials describe the arrangement as very much to the advantage of both sides, with the French, for example, contributing useful experience with performance standards in building, and the Americans offering a lot of experience in modular construction gained by building mobile homes. American officials have also been interested in the progress and the problems of the planned city of Vaudreuil outside Paris (*Science*, 1 October 1971). American observers say that one factor which has given the program special vitality is that contacts have been made directly between scientists at the laboratory level and that projects are funded with regular lab funds on both sides. This ensures that the projects are attractive and competitive. For reasons that are not really clear, the U.S. government preferred not to conclude a formal scientific exchange agreement with France, as it has, for example, with Italy and Japan. This apparently irked the French somewhat, but the program seems to be working to mutual satisfaction.

A couple of examples of rougher sledding in scientific cooperation are worth noting because they drew much greater notice in the press and in government circles in France than in the United States. In both cases space satellites were involved, and the issue had a built-in sensitivity for Europeans because, among Western countries, the United States has a virtual monopoly in space. The more serious case involved "Aerosat," a proposed aviation navigation satellite system. The idea had been under negotiation for some time, with NASA and the European Space Research Organization (ESRO) doing the talking. Early in 1971, the U.S. government decided that it was really a commercial aviation affair and that airlines should share the costs. The matter was then transferred to the Federal Aviation Administration (FAA), a move that the Europeans disapproved of but seem to have gone along with. Then in February the White House rejected the plan worked out by the FAA and the Europeans, and the project seemed effectively scuttled. The Europeans see the decision as having been made in the White House Office of Telecommunications Policy, link it directly with the American balance of payments problems, and cast American industry, particularly COMSAT, as the villain of the piece. Instead of the joint space venture they hoped for, the Europeans have a situation that the Paris morning paper *Figaro* put in the form of a question in a headline: "Has American Industry Compromised Cooperation with Europe?" And now the Europeans are discussing ways and means of developing a system of their own.

The degree of sensitivity created was indicated by the reaction to a 1-day delay by NASA of an ESRO scientific satellite at Vandenberg Air Force Base. The French press reported that the ESRO rocket might actually be used to launch an American weather satellite instead, and this was interpreted as showing what American priorities really were. Much smaller news stories reported the launching of the ESRO satellite the next day.

For the French, the Aerosat incident seems to have crystallized the feeling that, in matters technological, the Americans will act from now on only when they have calculated the net gain or loss for the United States. The French are aware of the "Magruder exercise," and if they are wary of the sharpened U.S. concern about its balance of payments problems, they are also interested in American efforts at coupling research to innovation. In a period when the United States and France share common problems of leveling off, science relations between the two countries are likely to involve a new and volatile combination of cooperation and competition.

—JOHN WALSH

RECENT DEATHS

Glenn L. Alt, 76; former professor of civil engineering, University of Michigan; 17 December.

Charles E. Atkinson, 67; professor of education, Kent State University; 28 November.

George D. Beal, 84; retired director of research, Mellon Institute; 3 January.

Robert R. Bush, 51; former chairman, psychology department, Columbia University; 5 January.

Thomas J. Caruthers, 86; former director of education, Salisbury State College; 30 November.

I. Clyde Cornog, 78; associate professor emeritus of physics, University of Pennsylvania; 11 November.

Edmund W. Fenn, 66; former professor of political science, University of New Hampshire and Dartmouth College; 24 October.

Eduard G. Kreuzhage, 70; executive head, Verlag Chemie, Weinheim, Germany; 7 November.

Clarence C. Little, 83; founder and director emeritus, Roscoe B. Jackson Memorial Laboratory; 22 December.

H. Wallace Peters, 79; former provost, Cornell University; 27 December.

Charles W. Porter, 91; retired professor of chemistry, University of California; 21 October.

Kenneth P. White, 57; president Quincy Junior College; 27 November.

Philip E. Wilcox, 49; professor of biochemistry, University of Washington; 2 November.