to a landing in the South Atlantic near Ascension Island were given page-1 treatment.

A much smaller group of newsmen saw ESSA II off, and the event landed on the inside pages of the newspapers and was given fairly short shrift in the aerospace trade press. It was clear that interest in Saturn IB was generated not only by its size but also by the awareness that astronauts one day will be up there on the end of one.

Moreover, ESSA II was put in the shade the day after its launch by the Soviet announcement that one of its unmanned spacecraft had hit Venus and another had recorded a near miss. The "Venik" which scored the hit, the Russians now indicate, was a failed attempt to make a soft landing.

The Venus landing puts the Soviets one up in interplanetary marksmanship. American space program officials point out that, while the Soviets have scored a measure of success with two spacecraft out of an estimated 16 aimed at Venus and Mars, the United States score stands at two successes, with data-producing flybys of Mars and Venus, out of four attempts. The scoresheet on interplanetary exploration is, therefore, not clear at the moment, but the Soviet success in achieving a soft landing on the moon and what appears to be the Russian intention to continue to put much heavier emphasis on unmanned exploration of Venus and Mars (*Science*, 25 February) than the United States has, would seem to augur more Soviet firsts.

In nearer space, very solid if less spectacular American advances seem to be in the offing. In the next month or so the first orbiting astronomical observatory (OAO) is scheduled to be put into an earth orbit. The OAO has been called by NASA the "primary instrument of space astronomy for at least the next decade." The first one, which weighs nearly 2 tons, would be the largest and bulkiest scientific payload yet to be put in orbit by the United States. OAO-A1, as it is called, will carry four telescopes of 8-inch (20-centimeter) aperture and one of 16-inch aperture, and ultraviolet, gamma-ray, and x-ray experiments. A third orbiting geophysical laboratory (OGO) is also being readied.

Scheduled for launching within the next 6 months, also, are two other satellite "firsts" for NASA. Both are designed to contribute directly to the moon-landing mission. A lunar orbiter is intended to photograph the moon's surface to provide information necessary in the selection of a landing site. A first "biosatellite" is to be "a recoverable orbiting biological laboratory designed to study the effects of radiation, weightlessness, and other stresses of space on plants, animals and other forms of life."

Comparisons between U.S. and Soviet programs in respect to scientific investigations in space are perennially unsatisfactory because the Russians are so rigorously noncommital about their efforts and because the United States is equally uncommunicative about some of its own space activities, particularly Air Force launchings.

The moon race, however, remains the main event, and while sustained rendezvous achieved by the United States the last time out is regarded as a significant accomplishment, there seems to be a feeling current that the Soviets may be planning a new extravaganza in their manned program fairly soon.

It is worth noting that the space programs of the two countries have grown so large and so highly ramified that it is becoming increasingly hard to define what being "ahead" means.

One thing that can be said is that, in the field which NASA calls "satellite applications," the United States is continuing to do well. This country is credited with having launched the first weather satellite, the first active communications satellite, the first passive communications satellite, and the first navigation satellite. We also put up the first missile-detection and nuclear-explosion-detection satellites, which have practical uses of a different order. Now we have inaugurated the TOS system. These satellite applications, in addition to representing a remarkable technological effort, rate also as probably the most palpable evidence of a utilitarian payoff from the space program.—JOHN WALSH

Pollution Abatement: President Seeks River-Basin Approach

Public awareness of water pollution as an ugly despoiler of the environment has been rapidly increasing, as evidenced by the quickening evolution of federal policy and legislation in the water-pollution field. Events of the next few years should indicate, however, whether the citizenry—and the politicians whom they elect—are ready for the giant steps toward better pollution control which the Johnson Administration is now advocating.

Administration strategy for combating water pollution has been drastically revised. President Johnson recently outlined much of the new strategy in his proposals for coordinated regional attacks on pollution within each river basin. Major structural changes in governmental machinery are prescribed.

The new Federal Water Pollution Control Administration (FWPCA) would be transferred from the Department of Health, Education, and Welfare (HEW) to the Department of the Interior. The transfer is at least mildly controversial, but it seems unlikely that either house of Congress will surprise Johnson by voting down the reorganization plan within the 60 days allowed.

The President also seeks a fundamental and far-reaching structural change in the administration of anti-pollution programs at the state and regional levels. President Johnson hopes that the states, instead of trying to cope piecemeal with pollution problems, will work through river-basin agencies (such as interstate "compact" commissions) amply endowed with authority to build and operate treatment facilities, levy service charges, and obtain compliance with water-quality standards. The objective is to create local and regional pollution-control systems which eventually will become self-sustaining and will not be dependent on massive federal grants.

In addition, President Johnson wants greater pollution abatement powers to be exercised by states, interstate agencies, and the federal government. His proposals are ambitious, and even his powers of persuasion, though indisputably great, are likely to be taxed before Congress adopts the proposed measures.

Abatement procedures, now inevitably long and tortuous as the result of numerous "safeguards" written into the law, would be shortened by the elimination of two mandatory 6-month procedural delays. These delays help explain why half of the 37 federal abatement actions begun as long ago as 1957 still had not been completed by the first of the year.

In situations where pollution constitutes an "imminent danger" to public health and welfare, the government would be given authority to bring suit immediately and to ignore the usual abatement conference procedures. The government also would be accorded the right to initiate abatement proceedings against pollution of "navigable" waters, whether intrastate or interstate. (Now the government—unless requested by a state—can only act against a polluter in one state who is creating a nuisance in another state downstream.) Moreover, private citizens would be allowed to bring suit in federal court to obtain relief from pollution. Johnson also has proposed that the government have the right to subpoena witnesses to appear at administrative hearings, and that courts give more weight to the evidence produced by such hearings.

The administration wants states and river-basin authorities to consider two devices which might change the whole strategy of water pollution control. They are the "effluent tax" and the requirement of a permit for the discharging of effluents. Under the President's proposed legislation, planning bodies which prepared comprehensive river-basin plans would consider the imposition of an effluent tax on cities and industries discharging inadequately treated wastes.

Such a tax, which is being used in Germany, is viewed cynically by some students of pollution problems as comparable to the medieval church practice of selling indulgences. Ideally, however, the tax—if stiff enough—could be used to discourage polluters, and, at the same time, help finance waste treatment works. The difficulty municipalities often encounter in making financial arrangements for the construction of treatment plants has been a prime factor in slowing down pollution abatement. The effluent tax was studied by the interagency task force, headed by Gardner Ackley, chairman of the Council of Economic Advisers, whose report to the President is understood to have provided many of the ideas in Johnson's antipollution program. Consideration of the effluent tax also was recommended by a panel of the President's Science Advisory Committee, in a report on pollution issued last November (*Science*, 19 November 1965).

The "effluent permit" requirement, the second device of possibly revolutionary potential, would mean that states or their river-basin authorities, or perhaps even the federal government, would not allow discharges of effluents unless pollutants were eliminated or kept to tolerable limits. Polluters would find their permits withheld or revoked. Some states require permits already, but, as one FWPCA official observed, in some instances the requirement is so laxly enforced that the permit amounts to a license to pollute.

President Johnson has not asked that a permit system be adopted, but he has proposed what could turn out to be a preliminary step toward such a system. The administration bill provides that any public or private facility which discharges an effluent into interstate or navigable waters must notify the government of the nature, quantity, and point of discharge of the effluent.

One of the key provisions of a "model" pollution-control law the government urged upon the states last fall called for the adoption of a permit system. The use of permits was seen as a logical accompaniment to the use of water-quality standards. The amendments adopted last year to the Federal Water Pollution Control Act (*Science*, 8 October 1965) require the adoption of such standards. If the states fail to adopt acceptable standards by 30 June 1967, then the federal government may prescribe them.

The proposal to transfer FWPCA to Interior is being looked at skeptically by Senator Edmund S. Muskie, the Maine Democrat who chairs the Special Subcommittee on Air and Water Pollution of the Senate Public Works Committee.

Muskie has expressed concern that the transfer may delay antipollution efforts unnecessarily. But his concern goes still deeper. Administration officials will be questioned in detail by the subcommittee about the justification for the transfer and the problems possibly associated with it.

In his message to Congress on the reorganization plan, President Johnson said that the antipollution program no longer should be organizationally separate from the water conservation and use programs. Johnson observed that Interior has been engaged in water-resource development for years and, in addition, conducts the water desalination program and administers the Water Resources Research Act.

The President noted that the Secretary of Interior is chairman of the Water Resources Council, an interagency body which is supposed to coordinate federal water programs, and that the Secretary would lead federal participation in the proposed effort to establish comprehensive river-basin programs to combat pollution. Johnson called it "wise management" to move FWPCA to Interior.

(Consistency and good logic suggest that, under the management philosophy Johnson has set forth, many functions of the U.S. Army Corps of Engineers, a giant among water-resource agencies, also should go to Interior. But the Corps of Engineers has a special place in the highly ramified politics of water resource projects—politics which are pursued by localities, states, and their congressional spokesmen with great zeal. The Corps is a cow so sacred that, unless disturbed by a force of nature, it may graze forever in its accustomed pastures.)

The FWPCA is only a few months old, having been established under the 1965 Water Pollution Control Act Amendments. The new agency was carved out of the Public Health Service (PHS), which had frequently been accused, partly because of its close ties with state health departments, of failing to initiate abatement action in situations where state officials were tolerating polluters. In Interior, FWPCA would continue to share with PHS responsibility for pollution problems which affect health.

However, among the questions the Muskie subcommittee is likely to put to the administration are these: (i) Will the transfer impede cooperation between FWPCA and PHS in pollution-research activities?; (ii) How will the Secretary of Interior determine, in pollution cases, that "health and welfare" are endangered? FWPCA officials probably will reply that arranging for interagency cooperation should pose no difficulty, and that, furthermore,

Biologists attempting to seine live specimens after a fishkill last summer on the Great Miami River, a tributary of the Ohio. Fishkills, an increasingly common phenomenon on the nation's streams, pose complex research problems. For example, the numerous fishkills on the Great Miami have resulted from fuel oil discharges, food-processing wastes, paper mill wastes, hot-water discharges by power stations, and causes "unknown."

FWPCA has a sizable and growing research program of its own.

The agency is now authorized about 470 professional research positions, as compared with 310 in the last fiscal year. Somewhat less than 100 positions remain to be filled. FWPCA reports no difficulty in recruiting qualified research personnel, except for a few high-level positions. Directors of seven research and field laboratories are yet to be named, and a few senior research project directors must be recruited.

The agency will increase its research productivity by doing more contracting as well as by expanding its staff. In the past, contract research has represented no more than 20 percent of the total research effort. In the future, the volume of research done for FWPCA by universities and industry may exceed "in-house" research.

Another question likely to be asked by the Muskie subcommittee—and one perhaps less easily answered—is, Why move FWPCA from HEW, where pollution control conflicts with no other departmental interests, to Interior, where conflicts are possible. Within Interior are the Bureau of Mines, the Office of Oil and Gas, and the Bureau of Reclamation, which is concerned with water storage and irrigation. Irrigation, mining, and oil interests can, and sometimes do, conflict with pollution control.

Conceivably, the water pollution program might suffer from a paralysis of indecision if the Secretary tried constantly to balance off such conflicts. Secretary Stewart L. Udall, regarded as a dedicated conservationist, might place a high premium on clean waters, but would a successor be equally enthusiastic?

FWPCA officials favor the transfer, however, and are not afraid their interests will be slighted. On the contrary, some seem to feel that, if anything, their agency will become Interior's fair-haired boy. Outside the West, where its largest programs are found, Interior does not cut much of a figure. It has a number of nationwide programs, such as its parks, monuments, and wildlife refuges, but in many areas these activities are small and relatively unimportant. In FWPCA Secretary Udall would have a fast-growing agency which could give Interior a new presence in every region of the country.

Indeed, if the size of current budget requests is taken as the criterion, FWPCA would be Interior's most important agency. A total of $307 million is budgeted for FWPCA, with $300 million for the Bureau of Reclamation, which would be its nearest rival.

Moreover, in terms of relative bureaucratic weight, it may be better to be a large program in a small department (Interior) than a small program in a big department (HEW). Interior has a total fiscal-1967 budget of only $1.4 billion, compared with HEW's budget of $11.7 billion.

FWPCA should be attractive to Udall as a good growth stock. What direction the antipollution effort will take is uncertain, but nothing could be clearer than that it is likely to fail unless it is supported by billions of federal dollars. In a report issued in January, the Muskie subcommittee estimated the cost of sewage-treatment-plant construction needed over the next 6 years at $20 billion, of which $6 billion should come from federal grants. Senator Muskie has introduced a bill authorizing just such a 6-year program. The government grants would cover 30 percent of the cost of a project. The present $1.2-million ceiling on grants for single-city plants would be removed.

The total annual grant program, budgeted at $150 million for the coming year, would be authorized to reach $600 million in the succeeding year and $1.5 billion by 1971. Congress may be slow to enact so large a program, but the needs Muskie has identified will persist and serve as a goad to action.

President Johnson's proposal, though more concerned with restructuring the administration of water pollution control than with grants-in-aid, would provide financial incentive for those states which establish the appropriate river-basin agencies. A third of the $150 million budgeted for construction grants next year would be earmarked for treatment-plant projects undertaken under comprehensive river-basin plans. The projects would be entitled to full 30-percent matching grants. The usual dollar ceiling would not apply.

The success of the river-basin approach to water pollution control would seem to depend largely on what kind of basin organizations are set up. Several interstate basin commissions already exist which have pollution control as a major, if not their sole, function. But, with the possible exception of the Delaware River Basin Commission, they are regarded by most federal water pollution officials as too timid or weak to be useful for much besides planning tasks. In fact, the suspicion is strong that an unspoken, but well understood, objective of most of these commissions is to "keep the feds out."

The planning of the river-basin programs contemplated under the Johnson program would be initiated by either a state governor or the Secretary of the Interior. The planning agency could be either a commission established under the Water Resources Planning Act or any other appropriate body on which federal, state, interstate, local, and (when indicated) international interests were represented.

The Secretary of Interior would approve, for planning purposes, only

those river basins where the governors concerned agreed to seek the state legislation required to establish strong river-basin organizations. The basin organizations would have to be given authority to raise capital by sale of bonds, to levy charges for sewage collection and treatment, and to take other necessary actions. These would have to include some means of obtaining compliance with water-quality standards.

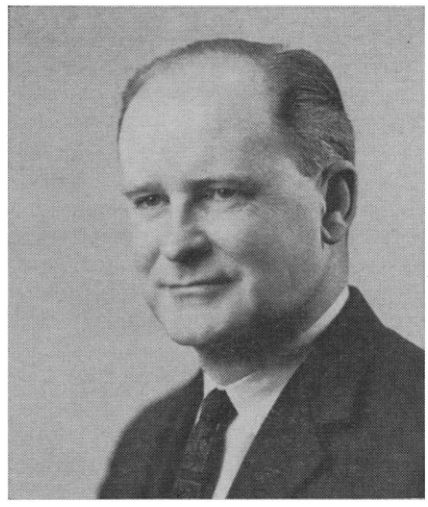
The Delaware River Basin Commission, established about 4 years ago, seems to have most, if not all, of the attributes that would be required under the Johnson program. A spokesman said that the commission had not met since the President made his proposal but that the staff had discussed it. "There's been a good deal of informal thinking that we fit into it ideally," he said.

Federal officials observe wryly that the government has, at one time or another, brought abatement actions against polluters in four river-basin-commission jurisdictions. These actions involved pollution of the Potomac, the Hudson, several New England rivers (the Connecticut, Merrimack, Androscoggin, Blackstone, and Ten Mile), and Raritan Bay south of Staten Island.

In addition, actions were brought against polluters of the Monongahela and the Mahoning rivers, both within the jurisdiction of the Ohio River Valley Water Sanitation Commission (ORSANCO). The commission and federal water pollution officials were at cross purposes at a pollution-abatement conference about a year ago. The federal conferee declared that discharges from municipal and industrial sources in Ohio had polluted the Mahoning, endangering the health and welfare of persons in Pennsylvania.

A PHS report said that, from Warren, Ohio, to the point in Pennsylvania where the Mahoning enters the Beaver River, the stream was covered with an oily film. "Oily sludge lined the banks and masses of [greasy] materials hung from bushes and tree limbs," the report said. "In and below the Youngstown area, gobs of dark, greasy material bobbed up and down in the water as they moved along with the current." Not only had the scenic and recreational values of the Mahoning been destroyed, the report stated, but the pollution posed a menace to health.

The ORSANCO conferee, whose views were similar to those of the conferees for Ohio and Pennsylvania,



James M. Quigley

seemed to be talking about a different river from that described in the PHS report. "Impressive accomplishments in curbing pollution of the Mahoning River have resulted from the efforts of ORSANCO in furthering [the] program," he said. He conceded that the task had not been completed, but said that further progress was assured. "We regard the conclusion of the federal conferee—that all sewage discharged into the Mahoning River should be provided with secondary (85 percent) treatment—as a premature and arbitrary determination," he said.

The ORSANCO compact was established in 1948 by the states of Illinois, Indiana, Kentucky, New York, Pennsylvania, Virginia, West Virginia, and Ohio and approved by Congress. Unlike the Delaware compact, ORSANCO does not include the federal government as a signatory party, although three federal representatives sit on the commission. The terms of the compact plainly indicate that the eight states were jealous of their sovereignties.

The commission may promulgate regulations for the control of pollution, but it has no authority or funds to construct treatment works, and its authority to bring a polluter into court depends, in effect, upon the consent of the state in which the offensive discharge occurs. Court actions have been few and initiated always at state request. It would seem that if organizations such as ORSANCO are to play a major role in the President's proposed river-basin program, the compact states must be willing to delegate greater authority to them.

Because of its complexity and controversial enforcement provisions, the Johnson program is assured of an agonizing examination by the Congress. Last year's water pollution legislation was the product of a lengthy and painful process of compromise; yet some of the features eliminated were milder than certain provisions now proposed, such as the right of the government to bring immediate court action in "imminent" danger cases. Much of what Johnson has requested may not be passed this year or even next year—perhaps never.

However, FWPCA officials point out that there is opportunity for federal abatement actions under existing law. In some 80 interstate situations around the country pollution is believed bad enough to warrant federal intervention. The federal enforcement program has been at a virtual standstill for several months. A principal reason appears to have been that the new agency, FWPCA, lacked a commissioner.

Two weeks ago, the President, after an unaccountably long delay, named James M. Quigley to the commissionership. Quigley, who has been an Assistant Secretary of HEW, with jurisdiction over pollution problems, is regarded as an exponent of a vigorous abatement program. Once FWPCA finds its departmental home, there should be no reason why the hard task of reducing the backlog of potential abatement cases should not begin. Such action could sharpen public interest in water pollution control and perhaps influence the outcome of President Johnson's ambitious proposals.

—LUTHER J. CARTER

Announcements

On 17 February a dinner was held in Cleveland to announce the creation of what is to be known as the **Stouffer Prize**. It was attended by representatives of all major medical and scientific organizations concerned with heart and vascular disease, such as Surgeon General William Stewart, James Shannon (National Institutes of Health), Charles Hudson (American Medical Association), C. Walton Lillehei (American College of Cardiology), Keith Cannan (National Academy of Sciences), Howard Patterson (American College of Surgeons), Carlton Ernstene (American College of Physicians), Kenneth G. Kohlstaedt (Council for High Blood