budget has increased several fold but, in relation to the prevailing need, the increases have been considered slight. Those who would expand the research effort have had to struggle against the traditional attitude of Congress and of the Park Service itself that the Service is not an agency with major research requirements. Some research is carried on in the parks by scientists whose work is not supported by the Park Service, but such research cannot be directed to park management problems.

The park naturalists once played an important research role, but in recent years their time has been increasingly taken up by administrative duties and the shepherding of park visitors. According to qualified observers, the job of park naturalist has lost most of its appeal for men with an urge to do scientific research.

The NAS committee reported that, because of the lack of research, the Park Service has made a number of mistakes in planning. The construction of a new road and parking area in Yellowstone Park contributed to the dormancy of the Daisy Geyser, it said. Among other examples cited was a water system project in Mount McKinley Park which entailed cutting a 50-foot swath through virgin forest for more than a mile. This scar on the wilderness proved useless for the purpose intended.

One member of the NAS committee was Stanley A. Cain, an ecologist who was then chairman of the University of Michigan's Department of Conservation and who is now Assistant Secretary of the Interior for fish, wildlife, and parks. Cain is still deeply concerned by the inadequacy of the Park Service's research program. In his view, one of the few encouraging developments of recent years has been the start made in preparing research plans for the parks. This program was begun by George Sprugel, an environmental biologist brought over from NSF to head the Park Service's natural science research. So far only the research plan for Isle Royale Park in Lake Superior has been completed, but plans for seven other parks, including Great Smoky, are in preparation. University scientists, such as the biologists and ecologists from Duke and the University of Tennessee who visited Great Smoky in May, are taking a major part in this work. A central question that will have to be posed in the research plans for most parks is, How large must the wilderness tracts be if a wilderness ecology is to be maintained?

The Great Smoky master plan containing the controversial road was substantially completed in 1964, nearly 2 years before development of a research plan was begun. The team that developed the master plan consisted of a Park Service superintendent, a retired Service official, a design engineer, a state parks director, and a former Park Service naturalist and geologist who now heads the Service's overall research program as assistant director for resource studies. No professional biologist or ecologist with extensive research experience in the ecology of the Great Smokies took part in the preparation of the master plan.

In defending the plan, the Park Service has noted that, for much of its route, the transmountain road would go through an area which was cut and burned over before it achieved park status. The Canadian spruce-fir forest for which the Smokies are famous does not extend into the area to be crossed by the road. However, an area need not be covered by virgin forest to be classified as wilderness, and conservationists have noted that the once-abused areas of pre-park days have made a remarkable recovery.

While many conservationists would concede that the Park Service has done a generally good job of protecting the park to date, they fear that construction of a road across the park's west end inevitably would be followed by the construction of spur roads, camp grounds, and other facilities which would subject this area to intensive public use. Moreover, they insist that the ever-increasing tourist traffic—the park had nearly 6 million visitors last year—would clog the new transmountain road just as it has clogged the existing road. Conservationists feel that the park should be viewed in context as a part of the overall Southern Appalachian and Blue Ridge Mountains system—much of which does have scenic drives for motorists. For example, motorists soon will be able to take the Blue Ridge Parkway all the way from Great Smoky to the north end of Shenandoah National Park in Virginia, for a distance of 574 miles.

Radical solutions to Great Smoky's traffic problem, such as banning cars from the park and inaugurating a bus system, have been proposed by conservationists, but Park Service officials give no indication they will seek such solutions until a crisis demands them.

The NAS committee found the Park Service management philosophy confused 3 years ago. To judge from the Service's Great Smoky master plan, that philosophy is no clearer today. Of all that conservationists might wish from the Wilderness Act, perhaps nothing could be of greater importance than its potential for shaking complacency. Pressures are being generated which ultimately may force the Park Service and its departmental overlord, Secretary Udall, to establish clear and compatible Park Service objectives and to pursue them through an adequate program of research and planning.

—LUTHER J. CARTER

Announcements

The Pacific Science Center, Seattle, recently opened its regional **Mathematics Learning Center** for the Pacific Northwest. The facility, available both to the public and school groups, includes a classroom, reference library, film library and preview room, and a large section of exhibits demonstrating various mathematics principles and theories. The center was made possible through grants from the Carnegie Corporation of New York and the Alfred P. Sloan Foundation; the exhibits are sponsored by IBM Corporation.

Columbia University is accepting nominations for a new award for **basic research in biology or biochemistry**. A prize of about $20,000 will be given annually to an individual or a group of investigators for outstanding contributions; preference will be shown for work done in the recent past. Nomination forms and additional information are available from John V. Taggart, Columbia University College of Physicians and Surgeons, 630 West 168 Street, New York 10032. Deadline: *1 October*. The prize, named for Louisa Gross Horwitz, was made possible under the terms of the will left by her son, S. G. Horwitz.

The National Science Foundation will give about $16.5 million in grants over the next 3 years to strengthen the research and education programs at five universities. The grants are the most recent to be made in NSF's **science development** program, which was begun last year as part of an effort to increase the number of first-

rate science institutions in the U.S. The number of recipients now totals 17, each of which supplements NSF grants from other sources. The new awards will go to:

North Carolina State: $3,555,000 for graduate research and training in engineering and biomathematics, with about two-thirds of the money to go for personnel.

Purdue: $3,600,000 to complete and renovate its life-science facility and to install a tandem Van de Graaff accelerator.

Rutgers: $3,708,000 for personnel and equipment to help develop both the mathematics and physics departments.

Tulane: $3,685,000 for faculty, facilities, and equipment in the biology, mathematics, and psychology departments.

The University of Rochester: $1,950,000 to supplement the $2.5 million received from NSF last year; the supplemental funds will be used to enlarge the biology faculty and to help finance construction of a new science building.

Publications

The Manufacturing Chemists' Association has released a 39-page publication called "Source Materials for **Air Pollution Control** Laws." The booklet, prepared by the association's air quality committee, outlines the basic provisions desirable in air pollution laws; and to illustrate the different approaches to control programs, it presents the full texts of legislation passed by several states. In addition it contains a listing, by states, of all relevant statutes in effect 1 January 1966. The booklet is available free of charge from the Manufacturing Chemists' Association, 1825 Connecticut Avenue, NW, Washington, D.C. 20009.

Quarterly Reports on Sulphur Chemistry. Interpretative bibliographies of topics of current interest; each issue to feature a different topic. Vol. 1, No. 1, March 1966. Norman Kharasch, editor. (Intra-Science Research Foundation, P.O. Box 2428, Santa Monica, California 90405. $12 a year, individuals; $24, institutions)

Visual Medicine. Developments and applications of audiovisual techniques for communication in the medical and dental sciences. Vol. 1, No. 1, March 1966. Biagio J. Melloni, Editor, (Appleton-Century-Crofts, 440 Park Avenue South, New York 10016. Quarterly; $12 a year, U.S. and Canada; $14 elsewhere)

Scientists in the News

J. Graham Sullivan will join the U.S. Office of Education this summer as Deputy Commissioner of Education, replacing **Henry Loomis** who resigned in March to enter private business. Sullivan had been assistant superintendent of public instruction for the California Department of Education.

REPORTS FROM EUROPE

Franco-Russian Collaboration in Science: De Gaulle's Visit

London, 23 June. Charles de Gaulle, president of France, is giving the world an elegant lesson in how to use cooperation in science and technology as a tool of diplomacy.

General de Gaulle will come home from his 12-day state visit to the Soviet Union, the first by a major Western head of state, with agreements to expand still further the scientific and technological collaboration between France and Russia.

Some will regard these agreements as window-dressing for the fact that the talks between General de Gaulle and Soviet leaders produced nothing concrete about those questions of East-West politics which are so often called "fundamental," such as the division of Germany. Also window-dressing, it will be felt, were De Gaulle's moving address to the university of Moscow on 22 June (see box), his flight to Novosibirsk and the nearby "science city," Akademgorodok, on 23 June, and his visit, the first by a Westerner, to the Asian rocket-launching base of Baikonur.

But this is to misunderstand things. There are real limitations on what any leader of France, no matter how nimble or ambitious, can achieve. These limitations are imposed by the number of people in France, the natural resources at their disposal, such social factors as the supply of investment funds through a stock market, and the adequacy not only of the French research effort but also of the organization for applying it to industry. These are the limitations which have pushed France to join international collaborative efforts in big-scale technological development; such limitations have forced France, even while employing a nationalist rhetoric and forcing certain modifications of the international programs, to remain in these programs and even to move vigorously to force Britain to stay in them (*Science*, 10 September 1965).

Presumably these limitations are what the acerbic McGeorge Bundy had in mind when he said in his Senate testimony the other day that the United States could "endure" General de Gaulle's mistaken view of the Atlantic alliance.

As to the "fundamental" political questions concerning which General de Gaulle initiated what turned out to be a rather philosophical discussion in Moscow, it must be remembered that most of these questions are so "fundamental" that they must rest without solutions unless one wishes a major war to occur.

In such a situation, agreements on specific matters, especially scientific and technical matters, become more significant. They can represent an end run around apparently insoluble problems. They certainly will have some economic impact; two examples are the 1965 Franco-Soviet agreement on developing a French modification (called SECAM) of the RCA color television process and agreement on transmissions between the Soviet Union and France