The President then went on to state a proposition that some midwesterners feel is worth the loss of the MURA machine:

> I share fully your strong desire to support the development of centers of scientific strength in the midwest, and I feel certain that with the right cooperation between the government and the universities we can do a great deal to build at Argonne the nucleus of one of the finest research centers in the world.

In conclusion, he referred to a Bureau of the Budget compilation which showed that the eight midwestern states (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin), with 26 percent of the nation's population, have been receiving about 23 percent of the funds dispensed by the major federal research agencies for on-campus research. (Excluded from the compilation were such major institutions as Cal Tech's Jet Propulsion Laboratory, which received $220 million last year. Though the Midwest is not without such facilities —Argonne is one of them—they predominate on the East and West coasts, a fact that midwestern legislators are quick to point out.) And the President observed, in connection with the presentation of these figures, "I think you will agree that this area [the Midwest] has been treated with fairness." This may or may not be the case, but the observation would seem to derive from the notion that "fairness" in the allocation of research funds is somehow based on per-capita computations, which is a notion with nightmarish implications for any federal research administrator.

Several days after the President's letter to Humphrey, the AEC announced, in a press release titled "Plans for Continued Support of Accelerator Design Announced," that it would not continue support for the MURA accelerator. Having done its best to portray a goat as a show dog, the AEC proceeded to disclose the future for MURA. Under the AEC plan, MURA and its longtime antagonist to the south, Argonne, would team up to join in the design work now being conducted by New York's Brookhaven National Laboratory for an accelerator of up to 1000 Bev. The announcement, worthy of the State Department's most astute communique writers, did not disclose the advance in the hybrid-breeding art that makes it seem worthwhile to bring these three traditionally warring groups together.

It was also noted by the AEC that sites had not yet been selected for the 1000-Bev machine or the 200-Bev machine now under design at the Lawrence Radiation Laboratory in Berkeley, California. This is undoubtedly reassuring to the Midwest, but when the message gets to the East and West coasts it is quite possible that President Johnson will feel compelled to ask the Arms Control and Disarmament Agency to set up a division to promote peace in high-energy physics.

At the moment, MURA says it has assurances that it will receive its usual budget of around $2 million to plan a new life on the premises of Argonne. This is news to the AEC, but MURA officials seem happy with it. And midwestern legislators feel that they have lost an accelerator but gained a principle, which they fully intend to exploit in the new era of pork-barrel science.

—D. S. GREENBERG

Library of Congress: Automation Urged for Bibliographic Control But Not Prescribed as a Panacea

The major significance of the report *Automation and the Library of Congress*, released last week, may lie not in its proposals for automation of some operations of the library, which seems inevitable, but rather in what it adds to pressures now being exerted on the venerable "LC" to assert greater leadership in a national research library system.

After a 2½-year study of the library and of equipment and techniques now available, the study panel came up with recommendations which make it clear that automation offers no *deus-ex-machina* solution to the difficulties of research libraries, but that it can, "within the next decade, augment and accelerate the services rendered by large research libraries and can have a profound effect upon their responsiveness to the needs of library users."

In short, the report says that the immediate future for automation lies in the area of bibliographic control. In two key conclusions the report says, "1) Automation of bibliographic processing, catalog searching, and document searching is technically and economically feasible in large research libraries," and "2) The retrieval of the intellectual content of books by automatic methods is not now feasible for large collections, but progress in that direction will be advanced by effective automation of cataloging and indexing functions."

Another conclusion of the panel is that "automation will enhance the adaptability of the libraries to changes in the national research environment and will facilitate the development of a national library system."

Underlying this carefully worded prediction is the clear assumption that the Library of Congress will not only pioneer automation but will develop as the heart and nerve center of a national research library system. And in fact in the final words of the report the panel states this premise by saying, "It is also strongly recommended that the Library of Congress, because of its central role in the Nation's library system, take the lead in the automation venture."

What the report tactfully avoids discussing is that the Library of Congress has one set of problems relating to the rising tide of information, which it shares with other research libraries, and quite another set of problems produced by the LC's peculiar relationship to its patron and boss, the U.S. Congress.

The Library of Congress is called on to play multiple roles, which are not all fully sanctioned by statute or the sentiment of the legislators. In 1962, a memorandum on "what the Library of Congress does and what it ought to do for the Government and the Nation generally," prepared for Senator Claiborne Pell (D–R.I.) by the Harvard Library associate director, Douglas W. Bryant, set forth what might be fairly described as the general views of the research librarians and researchers concerned with information problems.

(For the Library of Congress, the research librarians from major universities and industry have served as both claque and critics. As their own problems in dealing with the postwar flood of information have become more acute, they have grown more concerned and more united in prodding LC to more decisive action.)

The Bryant memorandum points out that the Library of Congress by design and by accident has come to serve four main functions.

1) As the name implies, LC is a congressional library founded to provide a reference service to the legislative branch.

2) It serves other federal agencies, as well, as a reference library.

3) The Library of Congress has received all American publications by copyright deposit for more than a cen-

tury and has evolved into the nearest thing we have to a national library.

4) Through its sale of catalog cards, and various bibliographic reference and consultive services, it has become a "national bibliographic center and the keystone in a national system of research libraries."

Within its recently cleaned gray walls, the imposing neo-Renaissance main LC building, with its 19th-century grandeur and waste space, also accommodates exhibits, lectures, concerts, and poetry and drama readings, and, as a national monument, attracts droves of tourists.

But while Congress as a whole takes a proprietary pride in LC, it seems to regard it primarily as a club library. Most legislators probably tend to view the Library of Congress as a great archive—a depository with literally millions of books on its shelves—instead of seeing it in terms of the services it performs for other libraries and for scholars around the country.

While many congressmen and senators are aware of the situation for which "information explosion" is probably the leading cliché, few think of the LC as being centrally involved.

The typical legislator's main contact with LC comes through the Legislative Reference Service, which was established in 1914 to make available data bearing on legislation and render such data serviceable to Congress and its committees. LRS became a separate department under the congressional reorganization act of 1946 and now has some 220 of the 7000 employees of LC.

The demands on LRS from Congress range, more than figuratively, from the sublime to the ridiculous. On the one hand, the specialists in LRS, who can call on their colleagues in other departments of the library, are often asked to write committee studies and reports and to make budget analyses which may directly affect the course of legislation. Then they are relied on by senators and congressmen for a mixed bag of duties which can include research on matters of real substance, providing material for puffs in the *Congressional Record*, or ghosting speeches for home consumption. Then there are the constituents' requests for information about anything on earth or elsewhere. And the motto of LRS might well be, "Ours not to reason why."

LRS is divided into six subject-matter divisions and, in addition, has a corps of about 30 "senior specialists" and lawyers who take on more demanding assignments. It is noteworthy that LRS has only a single senior specialist in science and technology, and no division of science and technology. The senior specialist in science was added only in the '50's. He, however, draws on the science and technology division of the library's regular reference department. The division employs 73 people; three of them, people with professional backgrounds, are assigned specifically to assist with queries from Congress.

LRS answers more than 100,000 inquiries a year from Congress, which vary from very simple to very complex. The number of inquiries about science is growing rapidly, but a library official readily acknowledges that, under present arrangements, the staff is decidedly overburdened in this area.

Science and LC

The point in all this is that Congress tends to think of the Library of Congress in terms of the Legislative Reference Service. And most legislators, when they think of science, still do not think of the Library of Congress.

Individual members of the House and Senate have shown concern over LC's role in the national information dilemma. For example, Senator Humphrey has called attention to the subject in hearings of the reorganization subcommittee which he heads, and this summer the matter was discussed, at least tangentially, in hearings before a House ad hoc subcommittee headed by Representative Roman Pucinski (D–Ill.) which was considering the merits of establishing a national data-processing and information-retrieval center.

But Congress as a whole tends to run the library in the same offhand way it runs the District of Columbia and the Botanic Garden, apparently on the principle of doing what is necessary so long as it doesn't cost too much.

The legislative committee responsible for the library is the House-Senate Joint Committee on the Library, now headed by Representative Omar Burleson, Jr. (D–Tex.), who alternates in the chairmanship from congress to congress with the ranking senate member, currently Senator B. Everett Jordan (D-N.C.). Recruits to the joint committee are provided by the House Government Operations and the Senate Rules Committees.

In recent years, as a matter of fact, the library committee has asked for and received more staff and more money for LC: the operating budget rose from about $16 million in 1961 to $20 million in the current fiscal year, with a request for $23 million posted for fiscal 1965.

What this means, say observers, is that LC has now apparently emerged from a period when Congress looked upon the library unsympathetically. There was a period after World War II when Congress was displeased with the library and showed it by cutting its budget.

The present Librarian of Congress, L. Quincy Mumford, in the view of these observers, has had to spend much of the decade since he took office in quiet administrative reconstruction work and fence-mending with Congress.

Mumford himself, in a published reply to the Bryant memorandum, hinted at something like this when he said, "The Library of Congress has not abrogated its leadership in the library world. It has been necessary, however, for it to concentrate on strengthening its own collections and services during the past several years—to put its house in better order. To have neglected to do this would be a greater disservice to the library and scholarly communities, because so central is the Library of Congress to the library economy and research efforts of the country that, to the extent that the institution is weak, the whole fabric of library service is weakened."

Whether or not the Library of Congress is now to enter a more assertive phase of leadership will be indicated by what is done about the new automation report.

The automation survey was no perfunctory undertaking. It was financed by a grant of $100,000 from the Council on Library Resources as the agent of the Ford Foundation, which has spent several million dollars in the past several years on the problems of mechanization and modernization of library techniques. The seven men with industry and university backgrounds who signed the report muster an imposing competence in such fields as information retrieval, computer design, automatic translation techniques, and indexing and abstracting theory. The panel seems to have had the wholehearted cooperation of the LC staff and of an array of expert consultants. Chairman of the panel was Gilbert W. King, vice president and research director of the Itek Corporation.

While the report draws a decidedly gloomy picture of the situation in the

research libraries, it does not recommend solving the problems by a leap beyond the technological horizon. King says that the survey represents "a calm look at the library's needs." The current state of technology and the costs of varying degrees of automation were also given close attention, as the highly detailed and documented report shows. (The 88-page *Automation and the Library of Congress* is available for $2 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., LC card 64–60015).

Research Library Ills

The report certainly doesn't dwell on whatever weaknesses LC may now suffer; it makes its points by discussing the ills of research libraries in general.

The trouble centers around the card catalog, which, in the big libraries at least, seems to be going the way of the dinosaur. Card catalogs have simply grown too big. The report says that more intensive subject analysis by catalogers is necessary if the searcher is to be guided efficiently to his reference. And there is too much duplication of effort among libraries in cataloging and evaluation.

It is difficult to determine whether the plight is worse in science and technology than, say, in medieval history, because librarians and information specialists appear reluctant to recognize boundaries within the information problem. But horrible examples always seem to be drawn from science and technology, and the most spectacular growth in literature has occurred in this field.

Publication patterns also have complicated matters in the technical fields. Monographs and journals and technical reports on government-sponsored work have grown more important, and these are harder to subject to bibliographical control than books. The research libraries have long since ceded most abstracting and indexing functions to professional societies and private services.

Speedy access to new material seems also to be a matter of greater urgency in technical fields than in others.

For a research library, the standard of success is making material easily accessible to users, not collecting it, and the automation study says the result of the impact of the literature of science and technology on the research libraries has been "an almost impossibly complex reference maze which is growing more complex."

The way out of this maze cannot be found by a simple decision to automate. The mechanized information "revolution" is little more than a decade old, and as in the case of other specialized technologies, "nucleonics," for example, expectations have exceeded performance.

The writers of the report set the general limits of mechanization in this way. "Present automation techniques do not deal adequately with raw text. At the outset, only catalogs, inventory files, and indexes should be considered for automation. But here, to use them in a sophisticated manner, it may be necessary (and there should be no reluctance) to insert manual processing and human decisions when they are essential or too expensive to replace." King says the panel foresees a system in which bibliographical data are fed into a central computer and library patrons are able to conduct "dialogues" through individual consoles with the computer memory, much in the way that someone today might search the card catalog with the help of an extremely knowledgeable research librarian.

Such consoles are now obtainable, but the panelists feel that the cost is very high and the machines are not entirely satisfactory. Hardware improvements and reductions in cost appear well within reach, however, if a mass demand develops as research libraries move concertedly toward automation. The technical situation appears to be similar in regard to the instantaneous transmission of documents and bibliographic data among libraries.

All of this would cost money, of course, and the study panel has made the following three-point recommendation for LC.

"1. Request $750,000 to be devoted to securing system specifications for the automation of the internal operations of the Library of Congress and the functions it performs for other libraries.

"2. Request funds for implementing the system specified by the above design effort immediately upon its completion.

"3. Establish a group within the Library to administer the automation project and to assume responsibility for its continuing implementation."

The panel estimates that automation of LC's central bibliographic system would cost about $30 million, but it strongly recommends that the library "go beyond the minimum automation of its operations and work toward a network of libraries which it serves in a central capacity." This means development of a communications network among research libraries and automation of a graphic storage system and of LC's card distribution services. The panel's estimate for the cost of this automated library system is $50 to $70 million, or about three times the library's present annual budget. The report takes some of the sting out of this, however, by pointing out that by 1972 cumulative costs for automation would be equaled by the climbing costs of continuing under the present manual system.

The next decisive move is up to Congress, which has been talking about building a third building for the library on Capitol Hill; this presumably could be designed with automation in mind. The matter, however, has been snarled in a discussion of the merits of a proposed $39 million Madison Memorial, which would house presidential papers but would be more monument than library and would preempt both site and money for library expansion.

Third Force Threatened

Outside government, among research librarians, who tend to see the national library situation in heightened terms of "difficult" progressing toward "disastrous," there is some sentiment for creating a "third force" in the library community if LC fails to exercise adequate leadership. Setting up a separate bibliographic control center would, in practical terms, be an extremely formidable task without federal funds. Main complaints from research librarians seem to be that LC does not collect enough material, especially material published abroad, and that because of these gaps and slowness in processing material, individual research libraries must catalog and evaluate nearly 50 percent of their intake of material, for which LC cards are not available. This results, they say, in expensive and unnecessary duplication.

There have been proposals to solve the problem of LC's fragmented personality by transferring it to the authority of the executive branch, to make a true national library out of it. The Department of Agriculture Library and the National Library of Medicine in Washington serve as precedents, since, in a sense, they broke away from LC and now serve as national libraries in their fields. There is no sign, however,

that Congress is disposed to give its library a divorce.

Despite implications for national security and economic progress, Congress has not really thought much about LC as the keystone of a national information system. And the job of convincing Congress may not be made much easier by the report, which offers no mechanization millennium for information but, rather, comes through with an honest two cheers for automation.

—JOHN WALSH

Cooperative Research: Biologists Plan International Study Program

Plans for American participation in a projected international program of cooperative research in basic biology are currently under study by a special committee appointed by the National Academy of Sciences.

The proposal for an International Biological Programme (IBP) was developed by the International Council of Scientific Unions (ICSU) and its affiliated unions in the life sciences, particularly the International Union of Biological Sciences (IUBS). The proposal grows out of a feeling among biologists that certain significant biological problems might best be explored on an international basis.

While discussions on how to organize a coordinated program preceded the International Geophysical Year, the success of IGY provided added impetus and the belief that "it could be done." What is planned now is not, like the IGY, an intense effort compressed into a brief time but a program of cooperative research, at preselected sites over a period of perhaps 5 years.

Early international consultation in ICSU and IUBS produced agreement that the major biological problem facing the world's population is the world's population. In trying to define a unique contribution that biologists could make in this field, it was agreed that to concentrate on the negative side—population control—would restrict participation to specialists in reproductive physiology and perhaps in sociology. Instead, it was decided to develop a positive study and to focus attention on the natural resources on which human life depends.

In November 1963, after several transmutations in international committees, a plan for an International Biological Programme to be entitled "The Biological Basis of Productivity and Human Welfare" was approved by the executive committee of IUBS and the General Assembly of ICSU. It is this plan that is now being examined by individual nations.

The objectives of the plan are, "ensuring worldwide study of (1) organic production on the land, in fresh waters, and in the seas, so that adequate estimates may be made of the potential yield of new as well as existing natural resources, and (2) human adaptability to the changing conditions." To promote these ends, the proposal outlines five main areas of research: (i) productivity of terrestrial communities (with major subdivisions in ecology, physiology, and conservation); (ii) productivity of fresh-water communities; (iii) productivity of marine communities; (iv) human adaptability; and (v) use and management of biological resources. Special attention is also to be given to problems of public relations and training.

Underlying the research outlines are certain common principles, also approved by IUBS and ICSU: a sense of urgency, both "because of the steadily growing pressures of human population on renewable resources [and] because many of the situations, both biological and human, are changing fast . . . ," and a sense of modesty and limitation. "The proposed program," the report states, "is based largely on existing research . . . so that the functions of the organizers will be to coordinate rather than to direct." The hope is, however, that the program would have a catalytic effect on research in these fields by, among other things, providing at least some training grants to research workers—300 to 500 is the number aimed for at present. Beyond that, the goal of the program is simply to obtain "internationally comparable observations of the basic biological quantities," and international coordination of research methods as well as projects.

Whether the plan will be put into action in the form described depends a good deal on the decisions of the ad hoc committee recently appointed by the National Academy to consider U.S. participation. The charge to the committee is "to review and evaluate the proposed program in relation to the interests of U.S. scientists, and to make recommendations as to its modification, to identify individuals and groups that might wish to be involved, and to arrive at conclusions as to the nature and probable extent of U.S. participation and to formulate recommendations as to the organizational structure necessary to ensure effective coordination of project activities." All this is supposed to be done by the end of 1964, and if no serious problems emerge, the program might get under way not too long after its original target date of 1965. The members of the U.S. committee are Stanley A. Cain (chairman), W. Frank Blair, John E. Cantlon, George K. Davis, Kingsley Davis, Bostwick H. Ketchum, Paul J. Kramer, William S. Laughlin, Thomas Park, and Sid Robinson. Inquiries should be addressed to the Ad Hoc Committee on IBP, Division of Biology and Agriculture, National Academy of Sciences–National Research Council, 2101 Constitution Avenue, Washington 25, D.C.—ELINOR LANGER

Hornig Assumes White House Duties

The Senate last Monday confirmed Donald F. Hornig to succeed Jerome B. Wiesner as director of the Office of Science and Technology. The confirmation was made without a committee hearing, which is often the case with posts below the topmost governmental echelon. Hornig, who is on leave from Princeton, where he headed the chemistry department, will also succeed Wiesner as presidential science adviser; chairman of the 18-member President's Science Advisory Committee (PSAC); and chairman of the Federal Council on Science and Technology, a sub-Cabinet group of government research executives. Wiesner, who has been appointed dean of science at MIT, will continue as a member of PSAC.

Announcements

Princeton University recently combined its departments of aeronautical and mechanical engineering, to form a department of **aerospace and mechanical sciences**. The merger is a move to expand the university's opportunities for training in the newer, interdisciplinary areas of the applied sciences. The department will include undergraduate and graduate programs. Courtland D. Perkins, professor of aeronautical engineering, has been appointed chairman.