This being said, I should like to add that I did not reach this decision lightheartedly, as I fully realize that it means cutting myself partially away from a country which I love, and to which I am attached by very strong links. Not only am I half American, but I have many very close friends in your country. I have learned by experience to respect and admire American science. Indeed, I owe much to several American scientific or other institutions, such as the Rockefeller Foundation, and I may perhaps venture to say that, as a scientist, I have had more recognition in the U. S. than in my own country.

However, all this is strictly personal, and I would like to mention another more general aspect of these problems. Scientists themselves are quite unimportant. But science, its development and welfare, are overwhelmingly important. Isolation is the worst enemy of scientific progress. (If proof of this statement were needed, I would point to the strange and profound deterioration of Russian biology in recent years.) Measures and laws such as you are now obliged to enforce, will contribute in no small extent to erecting barriers between American and European science. I do not pretend to know whether such measures are justified in general, and in any case I have no right to express an opinion. But I can say, because it is a plain fact, that such measures represent a rather serious danger to the development of science, and that, to that extent at least, they must be contrary to the best interests of the United States itself.

Thanking you again for your courteous help,

I remain,

Sincerely yours,

JACQUES MONOD

THE recent action of the State Department in denying a passport to Linus Pauling to visit Great Britain represents the latest step in an increasingly dangerous sequence of events, which can only result in the throttling of the free exchange of information so essential to the continued success of scientific research in this country and the rest of the free world. In the belief that the full significance and exceedingly shortsighted implications of this and previous actions of a similar nature have escaped the public attention they deserve, and in the conviction that only through the mobilization of public opinion can this dangerous policy be abrogated, members of the chemistry faculty of the Florida State University, acting as individuals, have formed the "Florida Committee on Science and Public Affairs." The primary purpose of the committee is ". . . to disseminate information on critical issues involving science and public affairs, . . . [and] the interpretation of social issues involving science and the scientist within the democratic tradition of this country."

It is the firm conviction of the committee that only through the concerted action of all scientists in this country directed toward arousing public interest in matters of this nature and bringing to public attention the facts involved and the seriousness of the ultimate consequences in terms of decreased scientific productivity can the fabrication of an American "Iron Curtain" be halted. To this end the committee cannot too strongly urge that scientific workers everywhere make every effort, in terms of dissemination of information to the public and in direct protest to responsible agencies, to halt this dangerous trend which can culminate only in the material weakening of this country's scientific potential.

RUSSELL H. JOHNSON
EARL FRIEDEN
RAYMOND K. SHELINE
WERNER HERZ
H. M. WALBORSKY
ERNEST GRUNWALD
JACK EICHINGER
ROWLAND E. JOHNSON
KARL DITTMER
JOHN E. LEFFLER
MICHAEL KASHA
RUSSELL J. KEIRS
F. J. KEARLEY, JR.

The Florida Committee on Science and Public Affairs
Tallahassee

Culture Collections of Microorganisms

THE establishment and maintenance of museums of natural history and of herbaria in which are preserved collections of animals and plants for study and comparison have long been recognized as a proper responsibility of governments and universities. In a very real sense these collections constitute the principal bases upon which rest our knowledge of the relationships, phylogeny, and taxonomy of the higher plants and animals.

The myriads of microorganisms in the environment of man are quite as significant to him as are these higher forms. Yet, in spite of various efforts, the gathering, study, and maintenance of collections of microscopic forms have never been accomplished on a comparable scale. Individuals or teams of investigators regularly assemble and maintain extensive collections of microorganisms representing special fields of interest. Too often, however, these collections are lost when the individuals or teams cease to work actively with them. Subsequent investigators, wishing to work in the same or related fields, may spend much time and effort in attempts to isolate similar organisms, and not infrequently they fail to duplicate or extend earlier work because of the impossibility of regaining living specimens of the particular species or strains upon which previous work was based.

Many microorganisms—for example, the bacteria and viruses—cannot be identified by comparison with dried or preserved specimens. For their identification living cultures are essential, since their characterization depends on knowledge of their physiology and antigenic structure, as well as their morphology. A usable collection of microorganisms thus resembles a botanical garden in that it must be a collection of minute living plants, and a zoological garden in that it must be a collection of minute living animals. Such a collection is furthermore unique in that it has as one of its important functions the distribution of sub-

cultures of the populations for the use of scientists. It is also unique in that the opportunities for encountering variations in microorganisms are considerably greater than for other organisms. Because of this fact the successful maintenance of a collection of microorganisms involves not only cataloguing, preservation, and distribution, but also constant examination and control to maintain the integrity of its materials. The facilities for storage and distribution in themselves can never provide a satisfactory collection of microorganisms. The maintenance of such collections has become increasingly critical. Reliably named and identified cultures are not the concern merely of the professional bacteriologist, mycologist, virologist, protozoologist, and algologist, but they are increasingly essential for the worker in physiology, nutrition, biochemistry, therapeutics, pathology, food and feed technology, fermentation, genetics, enzymology, medicine, veterinary medicine, forest technology, sanitary science, public health, waste disposal, textile deterioration, plant pathology, plant breeding, animal breeding, soil technology, and many others.

The need for the development of type culture collections of microorganisms was recognized more than a quarter of a century ago by the Society of American Bacteriologists. Such a collection was instituted under the leadership of C.E-A. Winslow of Yale and the sponsorship of the American Museum of Natural History in New York. Later, sponsorship was transferred to the McCormick Institute in Chicago under the leadership of Dr. Hektoen. Subsequently the collection was moved to Washington, D. C., and sponsorship was vested in a Board of Trustees representing certain of the biological societies directly concerned. The National Research Council has been most helpful in assisting the collection in meeting some of its problems.

The American Type Culture Collection maintains 3422 cultures of strains of microorganisms, principally bacteria, yeasts, and the filamentous fungi. During the year 1951 it distributed 7459 cultures to scientists, educational institutions, and industrial laboratories. It has cordial relationships and exchanges with the several specialized collections in the U. S. and in foreign countries.

It is becoming increasingly evident, however, that the American Type Culture Collection as at present constituted is not performing, and cannot perform satisfactorily, all the functions that are reasonably required by its clientele of researchers, educators, professional workers, and industrialists. It has been seriously handicapped by lack of adequate space and facilities, by lack of adequate support, and by lack of a sufficient number of staff members experienced in the study and handling of the many diverse groups of microorganisms.

Financial support has come in large part from the sale of cultures. Capital funds have been furnished by the General Education Board of the Rockefeller Foundation, international subvention from Unesco, contributions from scientific societies, and gifts from industry. No culture collection, however, can ever be even largely self-supporting and attain its maximum usefulness to science and to the nation it serves, and fulfill reasonably its international obligations as well. No one expects a museum or a herbarium to be self-supporting. Such institutions are staffed by experienced taxonomists whose careers are inextricably woven into the fabric of the collection, and whose services to science cannot be sold piecemeal. The need for able, career employees is no less real for a culture collection. A collection of living microorganisms requires that the cultures be renewed periodically, thus entailing constant work and expense. The specimens are living, mutable organisms, and their continued authenticity rests directly upon the experience and scholarship of the individuals responsible for their perpetuation. The cost of maintaining a large collection of living organisms is considerable, but the benefits to be derived therefrom are much more than commensurate with this cost. The living microorganisms in a collection of the type envisioned provide the tools for experimental investigations in diverse medical, microbiological, and biochemical fields.

The American Type Culture Collection has nearly reached the limit of its usefulness if its support must come principally from the sale of cultures and services. It is believed that the best interests of science, medicine, and industry demand material increases in the service, research, education, and coordinating functions of the collection. Recognition of these needs is fully as important nationally as the recognition of the needs of museums and herbaria.

The trustees of the American Type Culture Collection and persons interested in the problem of a national culture collection of microorganisms have been exploring the means whereby the expanded program so greatly needed in this country could be achieved. It has been the purpose of this communication to call attention to the problem as a step in seeking the interest and the cooperation of individual scientists and scientific organizations in the implementation of plans that may be proposed for solving the problem.

Kenneth B. Raper, *Northern Regional Reearch Laboratory, USDA*

R. E. Buchanan, *Iowa State College*

P. R. Burkholder, *Yale University*

R. E. Cleland, *Indiana University*

R. D. Coghill, *Abbott Laboratories*

John F. Enders, *Children's Hospital, Boston*

Carl Lamanna, *The Johns Hopkins University*

E. H. Lennette, *California Department of Public Health*

H. H. McKinney, *Bureau of Plant Industry, USDA*

Wm. J. Robbins, *New York Botanical Garden*

Joel Warren, *Army Medical Center*