

Colin Munro MacLeod (1909–1972) Chairman of the U.S. Delegation 1965–1972

It is to be assumed that the medical scientists concerned with this program are not significantly better (nor worse) than investigators working in other fields. But the structure and management of this program have clearly permitted...even fostered...scientific progress....[T]here is an equitable balance between the relative scientific contributions coming from investigators of the two nations involved. This is not one country scientifically assisting another, but rather an equality of input from both sides. Moreover, the identification and further definition of research goals is mutual, a joint activity rather than unilateral scientific domination and direction.

— *Dr. Colin M. MacLeod, in written comments about the USJCMSP*¹

The idea to create the USJCMSP is most often traced to Dr. Colin MacLeod² (1909–1972), a talented and prominent scientist who worked in the worlds of research, academia, and government during an illustrious and productive career. At the time of the formation of the U.S.–Japan program in 1965, Dr. MacLeod was Deputy Director of the White House Office of Science and Technology and a scientific advisor to President Lyndon B. Johnson. Dr. MacLeod served as Chair of the U.S. Delegation of the USJCMSP from 1965 until his death in 1972. His role in the formation of the USJCMSP was inspired and perhaps inevitable, given his multilayered interests in service to science, international health problems, and science policy.

Born in Port Hastings, Nova Scotia, Dr. MacLeod entered McGill University at the age of 16 (having skipped three grades in primary school), and completed his medical studies by age 23. In 1934, after a residency at Montreal General Hospital, he joined the staff of the Hospital at Rockefeller Institute for Medical Research (now Rockefeller University), where he worked in the laboratory of Drs. Oswald Avery and Rufus Cole on the problem of bacterial transformation in *Streptococcus pneumoniae* bacteria, which cause pneumonia.

In his early years as a research scientist, Dr. MacLeod, together with Drs. Avery and Maclyn McCarty, discovered that genes are made of DNA. In 1941, Drs. Avery and MacLeod had separated a crude extract from the pneumonia-causing S (‘smooth’) strain of the bacteria. The S strain extract could convert the far more benign R (‘rough’) strain of pneumococci to the disease-causing S form. Later that year, Dr. McCarty joined the Avery laboratory, and in 1942, the group began to focus on DNA as the elusive ingredient in the S strain extract that could transform R pneumococcus into S pneumococcus. By early 1943, Drs. Avery, MacLeod, and McCarty had shown that DNA was indeed the transforming principle. In February 1944, the trio published the first of a series of scientific papers in the *Journal of Experimental Medicine* demonstrating that DNA was the transforming principle.³ Subsequent experiments confirmed DNA as a universal bearer of genetic information. Despite the scientific importance of this work, Drs. Avery, MacLeod, and McCarty were never awarded a Nobel Prize for their discovery.⁴

Dr. MacLeod, meanwhile, had been diverted to war-related health and science issues. At the time, microbial diseases such as typhus fever, malaria, and pneumonia posed significant threats to the health of U.S. military personnel. During World War II, Dr. MacLeod was one of many university-based scientists and physicians who advised the Federal government on medical matters “when asked.” In 1941, he had been appointed Chairman of the Department of Microbiology at New York University (NYU) School of Medicine, and also worked as a consultant to the U.S. Secretary of War. He became an official member of the Army Epidemiological Board, which in 1949 was enlarged to include all the armed forces and renamed the Armed Forces Epidemiological Board (AFEB).⁵ Dr. MacLeod became president of the Army board in 1947, a position he held until 1955. The organization of the AFEB into 12 disease-related commissions foreshadowed the organization of the USJCMSP into its disease-related panels.

At the end of World War II, Congress gave the National Institutes of Health (NIH) the authority to make external research awards, thereby creating its extramural programs, which today constitute almost 90 percent

of NIH funding. The NIH took over the funding of various research projects that had begun during the war, and Dr. MacLeod, from 1946–1949, served as a member of the first NIH study section, the Antibiotics Study Section. Given his background with the newly renamed Department of Defense, Dr. MacLeod grew into the role of informal advisor to several NIH directors and served on various grant committees, commissions, and task forces. Thus, Dr. MacLeod had entered the third phase of his highly successful career—the first two being a laboratory research scientist and academic department head—with multiple forays into the realm of science policy and international health.

Dr. MacLeod was elected to membership in the National Academy of Sciences in 1955. In 1956, he gave up his position as head of microbiology at NYU, spent several years at the University of Pennsylvania, and then returned in 1960 to NYU as a professor of medicine. The same year, NIH Director Dr. James Shannon asked Dr. MacLeod to work with the Southeast Asia Treaty Organization (SEATO) to find ways to address the problem of cholera. Other scientists on the project were Dr. Joseph Smadel of the NIH, and Drs. Theodore Woodward and Fred L. Soper.⁶ (Dr. Woodward served as a U.S. Delegation Member from 1965–1995 and is now emeritus member.) Drs. MacLeod, Smadel, Woodward, Soper, and the other scientific advisors to SEATO recommended the establishment of a laboratory in Dacca, East Pakistan (now Dhaka, Bangladesh), that could conduct field research on cholera. Dr. Soper became the first director of the facility, initially called the Cholera Research Laboratory, and later renamed the International Center of Diarrhoeal Diseases Research, Bangladesh (ICDDR, B).⁷ Several years later, the newly formed USJCMSP Cholera Panels coordinated their cholera research and treatment activities with the Cholera Research Laboratory.

In 1961, Dr. MacLeod became the chairman of the Life Sciences Panel of President John F. Kennedy's Science Advisory Committee. In 1963, Kennedy appointed Dr. MacLeod as Deputy Director of the Office of Science and Technology (OST), Executive Office of the President (now the White House Office of Science and Technology Policy). Dr. MacLeod was the first person to hold the position of deputy director of OST and remained there until 1966, serving as an advisor to President Lyndon B. Johnson after Kennedy's assassination.⁸ It has not been possible to find documents that confirm who actually conceived the notion of a collaborative medical research enterprise between the United States and Japan. However, the idea is often attributed to Dr. MacLeod, who became Chair of the first U.S. delegation to the USJCMSP in 1965.

A 1983 article in the National Academy of Sciences publication “Biographical Memoirs,”⁹ describes Dr. MacLeod as follows:

He would give the impression at one and the same time of approaching problems with a light touch, yet of taking them with all appropriate seriousness. He radiated competence. He also gave the impression of great depth of knowledge of his chosen sector of science, microbiology, yet he managed to do this without the slightest hint of intellectual arrogance. The “light touch” was physical as well as behavioral; he would enter a room quickly, get off some bit of quick wit as a salutation, and be ready to go. He gave the impression of being in command of himself physically as well as emotionally and intellectually.

For all of these reasons, he was the perfect chairman and usually ended up in that spot.... Almost invariably, however, he would know much more about the question than the group over which he was presiding, and yet he would not betray that fact. If the situation called for it, MacLeod *would* suffer fools gladly—he would not cause people to lose face. Like a skilled symphony conductor, he always seemed to know just what it was his committee members *did* know; he would extract it and weave it into the fabric of a group contribution. He was absolutely unflappable and he operated in a world—particularly in the last decade of his career—in which one crisis followed another daily as part of the regular business of life.

Dr. MacLeod died on February 12, 1972, while en route to help conduct a scientific review of the Cholera Research Laboratory in Dacca.¹⁰ He served as chair of the U.S. delegation of the USJCMSP until his death, and the second five-year USJCMSP report is dedicated to him. Dr. Ivan L. Bennett, Jr., succeeded Dr. MacLeod as Chairman of the U.S. Delegation, a position he held until his death in 1990.

Footnotes

- ¹ Excerpted from: MacLeod, Colin M. “International Cooperation in Science.” Draft 2 of an editorial for *Science*. 29 June, 1971.
- ² Preface to “The United States–Japan Cooperative Medical Science Program: The Second Five Years, 1970–1975.” Department of State Publication 8864. East Asian and Pacific Series 215. Bureau of Oceans and International Environmental and Scientific Affairs. Released August 1976.
- ³ Avery OT, MacLeod C, and McCarty M. Studies on the chemical nature of the substance inducing transformation of pneumosocial types. *J Exp Med* 1944;79:137–58.
- ⁴ McCarty, M. *The Transforming Principle*, New York, W.W. Norton & Co. Inc., 1985. (Available at - <http://profiles.nlm.nih.gov/CC/A/A/O/F/>).
- ⁵ Woodward, TE. “The Armed Forces Epidemiological Board: Its First Fifty Years,” in: Zajtchuk, R, Jenkins, DP, Bellamy, RF, Ingram, VM, Quick, CMI, and Woodward, TE (eds.). *The Armed Forces Epidemiological Board*, Office of the Surgeon General, Department of the Army, 5111 Leesburg Pike, Falls Church, Virginia, 22041-3258. [Also available at: <http://www.bordeninstitute.army.mil/itsfirst50yrs/default.htm>]
- ⁶ Fred Lowe Soper (1893–1977) was the first director of the Pakistan Southeast Asia Treaty Organization (SEATO) Cholera Research Laboratory, a position he held from 1960-1962. [From: <http://profiles.nlm.nih.gov/VV/Views/Exhibit/narrative/biographical.html>]
- ⁷ In December 1978, the Government of Bangladesh Ordinance renamed and broadened the purview of the Cholera Research Laboratory to become the International Center of Diarrhoeal Diseases Research, Bangladesh (ICDDR, B).
- ⁸ McDermott W. *Biographical Memoirs: Colin Munro MacLeod*, National Academy of Sciences, Volume 54, National Academy Press, Washington, D.C., 1983. Also available at: <http://books.nap.edu/books/0309033918/html/1.html#pagetop>.
- ⁹ *ibid*, p. 200–1.
- ¹⁰ The United States–Japan Cooperative Medical Science Program. The Second Five Years: 1970–1975. Department of State Publication 8864. East Asian and Pacific Series 215. Bureau of Oceans and International Environmental and Scientific Affairs, p. vii.