

THE ESTABLISHMENT OF THE SCIENCE FUNCTION IN THE US DEPARTMENT OF STATE AND IN AMERICAN EMBASSIES 1945–1975

BACKGROUND

While the present science program in the Department of State is relatively new, there is nothing new about the relationship between science and foreign affairs in American diplomatic history. Since the earliest days of the Republic, there have been a number of men involved in foreign policy who also demonstrated a notable interest and capability in the field of science.

The stature of our first major emissary abroad, Benjamin Franklin, was enhanced by the scientific reputation that preceded him to the court of Louis XVI. It is perhaps less widely known that Thomas Jefferson, also a distinguished diplomat, and our first Secretary of State – and third President of the United States – also made valuable contributions to scientific development in the New World. As Governor of Virginia, Jefferson introduced anatomy, medicine, chemistry, and natural history into the curriculum of the College of William and Mary. While serving as Minister to France (1785–1789) he made a scientific selection of seeds, trees, plants, and livestock for propagation in the United States; and as Secretary of State he was responsible for the operation of the Patent Office.

The scientific reputation enjoyed by diplomats such as Franklin and Jefferson undoubtedly contributed to their effectiveness in representing the United States abroad in the late 18th century. However, their scientific activities were really incidental to their principal task – diplomacy – and were not their chief concern. By the mid-1960s, however, Secretary of State Dean Rusk could legitimately tell a gathering at the National Academy of Sciences «that science and diplomacy are becoming allied.»

THE IMPACT OF WORLD WAR II

It was not until after World War II that adequate recognition was given to the need for the services of diplomatic personnel whose principal responsibility would be both science and foreign relations, and the interaction between the two. The development and use of the atomic bomb during the final stages of World War II was not only of military significance. In another sense, it also signaled the emergence of advanced technology as a significant factor in international diplomacy. As the war ended, however, the Department of State really was not attuned to all the potential

implications that scientific advancement held for diplomacy, and it played a reactive, rather than a proactive role in US science policy.

The creation of a science office in the Department of State, and of a corps of science officers abroad, had its origins in several studies undertaken during and after the Second World War. The earliest of these studies, entitled *Science, The Endless Frontier*, was carried out under Dr. Vannevar Bush, Director of the Office of Scientific Research and Development (OSRD), and submitted in July 1945. The report suggested that, as an experiment, scientific attachés be selected to serve at certain US embassies.

In October 1946, President Harry S. Truman created the President's Scientific Research Board, to make a study of governmental and private scientific research, development, and training programs. Its chairman, Dr. John R. Steelman, submitted the Board's five-volume report in August 1947, under the title *Science and Public Policy*. This new group also stressed the importance of maintaining scientific missions abroad, and recommended that «appropriate development of this kind of scientific foreign service be considered an essential part of the national science program.»

THE LONDON EXPERIMENT

In 1947, the Department of State established a small staff of scientists at our Embassy in London, who represented various scientific disciplines. The object of this project, which was carried out on an experimental basis, was the continuation of the liaison relationship between British and American scientists that had begun during the war, when technical teams from the two countries had worked together to obtain the benefits of seized enemy scientific and technical data.

After the war, the continued exchange of such information had been carried on through the US Mission for the Exchange of Industrial Technology (MEIT), under the Department of Commerce. These functions of MEIT, expanded to include a wide variety of scientific and technological information, had been subsequently transferred to the Department of State.

There was ample precedent for the Department's London experiment in the continuing exchange of scientific information between Britain and the United States, which was being effected by other Government agencies as well. For example, the Office of Naval Research, which was organized in 1946, carried on the work of the war-time Office of Scientific Research and Development by maintaining a staff of scientists in London. Similarly, a reciprocal mission maintained in the United States by Britain during the war continued to operate in Washington after the war as a science office.

During the London experiment, more than a dozen scientists – representing the fields of chemistry, biology, medicine, and engineering – served as an integral part of the US Embassy for periods ranging up to 2 years. This experience was significant for two reasons. First, it established the function of reporting on sci-

entific developments as a legitimate activity of the Foreign Service, comparable to the time-honored reporting on political and economic matters. Second, it demonstrated that such a program had a potential value beyond that of reporting – namely, to provide the Department with machinery whereby, in developing policy, it could take into account scientific factors that affected our international relations.

With these factors in mind, during its reorganization in 1949, the Department of State recognized the advisability of reviewing its responsibilities in international science. A survey was made by Dr. Lloyd V. Berkner, then on the staff of the Carnegie Institution of Washington, who served as a Special Consultant to the Secretary of State. Berkner's survey was published in June 1950 under the title *Science and Foreign Relations*. It called on the Department to «take science and technology into consideration in the formulation of foreign policy and the administration of foreign affairs at all levels.» The Berkner Report recommended the creation of a science staff in the Department, to be headed by a Scientific Adviser appointed as a Special Assistant to the Under Secretary of State. It also proposed the establishment of science staffs at selected US diplomatic missions abroad, which would be integrated into the normal Foreign Service structure of the missions. This was the first comprehensive effort to assess the importance of science and technology (S&T) issues to US diplomacy.

Acting on the Berkner report, in February 1951, the Department of State established the Office of the Science Adviser and Special Assistant. Dr. Joseph B. Koepfli, of the California Institute of Technology, was appointed Science Adviser, and was made directly responsible to the Under Secretary of State. He was assisted by a small staff, composed principally of scientists. In addition, science staffs were established at several missions abroad, to which scientists of international reputation were assigned as attachés.

Among this early staff were men such as Dr. Harald H. Nielsen, a physicist from Ohio State University, who – during his tour of duty at Stockholm – developed close relations with many outstanding laboratories and observatories in Denmark, Norway, Sweden, and Finland. Another was Dr. Hans T. Clarke, a professor of biochemistry at Columbia University and an international authority on the chemistry of biological compounds, who was responsible for coordinating the program of chemical studies in penicillin in the United States and Great Britain during World War II. Dr. Clarke was assigned to London, along with Dr. Larkin H. Farinholt, a chemist on the faculty at Columbia University, who had participated in the war-time program of the Office of Scientific Research and Development. In all, under the original program, more than 14 American scientists served at various posts abroad, for an average period of 15 months, as members of the US Foreign Service Reserve.

Despite its successful operation, however, the program was curtailed after a few years due to a number of factors, principally the competing demands of other activities for a share of a limited Departmental budget. Dr. Koepfli returned to the

California Institute of Technology in July 1953, and Dr. J. W. Joyce, who served as Acting Science Adviser after that time, resigned in February 1954.

However, the Office of the Science Adviser continued to operate actively in the Department, under the guidance of Walter M. Rudolph, a foreign affairs officer. Three scientific attachés – who by 1954 had completed their tours of duty in London, Paris, and Stockholm – were replaced with three other distinguished scientists, and a fourth position was established with the assignment of a scientific attaché to Tokyo in October 1954. After these attachés returned to Washington at the end of 1955, however, their positions abroad were not filled. Meanwhile, the Science Adviser's Office was maintained in the Department and was constantly being called on by other Department units – and by other agencies – for advice and assistance on foreign relations questions in which scientific factors were involved.

However, the new office was soon overtaken by a Departmental retrenchment, and, by 1956, the Department's entire science staff had dwindled down to a single Foreign Service Officer and two secretaries.

As a result, the roles of science and technology – and their implications for US foreign policy – still received relatively little attention in the Department of State prior to the Soviet Union's successful launch of its Sputnik I satellite on October 4, 1957. Following that event – which was a shock to both the US Government and the national psyche – scientific and technological issues were upgraded in the Department.

That year, with the new imperative of Cold war competition – and with support from the Special Assistant to the President for Science and Technology – Secretary of State John Foster Dulles reestablished the departmental post of Science Adviser.

Following a review of the Department's science program, the decision was made in the summer of 1957 that the growing importance of scientific developments as an element in formulating foreign policy and carrying on relations with other governments called for a new emphasis in this field.

The first task was to obtain the services of a notable scientific administrator with a worldwide reputation in his discipline, who enjoyed the respect of the international scientific community. In January 1958, Dr. Wallace R. Brode was appointed Science Adviser to the Secretary. Dr. Brode had been Associate Director of the National Bureau of Standards of the US Department of Commerce and president of the American Association for the Advancement of Science.

During World War II, Dr. Brode had taken leave from his position as professor of chemistry at Ohio State University to become a member of the London mission of the Office of Scientific Research and Development. With the liberation of France, he had been sent to Paris to head the OSRD liaison office there.

At the time of Dr. Brode's appointment, the Department announced that it would augment embassy offices by the assignment of scientific attachés to certain foreign capitals. During 1958, an intensive effort was made to obtain the services

of qualified scientists for these positions. In December, the Department's overseas Science Officer Program was firmly reestablished, with the appointment of seven distinguished American scientists to serve as scientific attachés at US embassies in Europe and the Far East. An additional group of seven scientists was appointed in February 1960, and the area of coverage was extended to South Asia and Latin America.

Meanwhile, Dr. Brode had also recruited a group of top-level scientists to staff the Office of the Science Adviser in the Department of State, including Dr. Larkin H. Farinholt, who served in London from 1951 to 1952 as scientific attaché, to be Deputy Science Adviser; Dr. Raymund L. Zwemer, a zoologist, who was chief of the Division of International Cooperation and Scientific Research at UNESCO in Paris for 3 years; and Dr. Eugene G. Kovach, an organic chemist, who was associated with the National Science Foundation. Mr. Rudolph, who had been associated with the science program since its inception, rounded out the Department's science team in Washington.

Dr. Brode retired in September 1960, and was succeeded by Walter G. Whitman, who formerly was Chairman of the Department of Chemical Engineering of Massachusetts Institute of Technology. And, over time, thinking about the role of the office continued to evolve.

In September 1962, a memorandum set forth the proposed organization, structure, and staffing for international scientific affairs in the Department of State, «in response to the Department's recognized need for strengthening the role of science in foreign policy.» The memorandum proposed that the Director of International Scientific Affairs be a «Principal Officer» of the Department, with administrative rank equivalent to that of a bureau head, serve as an adviser to the Secretary of State, and direct the work of the office, which would have bureau status. His primary role would be «to bring to bear the impact of science and technology in foreign policy development and decision-making,» and to provide «advice and guidance» to the Department, other government organizations, and the science community on matters concerning science and technology in foreign affairs.

In November 1964, Arthur E. Pardee, Jr., the Executive Director of the Office of International Scientific Affairs, described the responsibility of the office, in part, as attempting «to educate the non-scientists in the Department of State and the Foreign Service on the changes which are taking place in science and technology which have an important effect upon the foreign policy and foreign relations of the United States.» Pardee believed that SCI faced a basic problem: «In their day to day work,» he explained, «officers of the Department and the Foreign Service are coming into association with many technical subjects and programs of which they do not even have basic understandings or acquaintance.»

On April 23, 1965, the Office of the Science Adviser was upgraded to «bureau» status, and renamed the Office of International Scientific and Technological Affairs (SCI), with its Director designated as the «equivalent» of an Assistant Secretary of

State in rank and authority. In general, SCI formulated and implemented policies and proposals for US international science and technology programs.

Additional burdens were later imposed on SCI as a result of shifts and realignments in the presidential science advisory functions. Among the duties transferred to SCI were those of the Office of Science and Technology (OST), the President's Science Advisory Committee (PASC), and management of the Federal Council for Science and Technology (FCST).

The overseas arm of the Office of the Science Adviser was the corps of science officers who served at US embassies in Europe, Asia, and Latin America. The original corps of seven distinguished American scientists was appointed in December 1958 and represented a variety of scientific disciplines. These scientists, accredited with the diplomatic title «attaché», acted essentially as the overseas counterpart of the Science Adviser, advising and collaborating with the ambassador and other embassy officers on foreign relations questions in which scientific considerations played a part.

Science officers were generally recruited from American laboratories and universities and appointed for 2-year periods as Foreign Service Reserve officers. Like all members of an embassy's staff, a scientific attaché ultimately was directly responsible to the Ambassador, through the Deputy Chief of Mission (DCM). His reports went through them, of course, back to the Department and the Secretary of State. In effect, however, an attaché reported to the Science Adviser, whose office in turn provided guidance and assistance to the attachés in the field.

However, in the early years, the structure and the lines of authority varied a bit from embassy to embassy. For example, in May 1964, at a regional science attaché meeting in Bonn, the various science attachés explained the organizational structure at their respective missions. In Bonn, the Attaché's office was part of the Embassy's Economic Division. In Moscow, the Science Officer was also part of the Economic Division, but attended the Ambassador's weekly staff meeting. In Stockholm, the Attaché reported directly to the Ambassador through the Deputy Chief of Mission, but also had a close connection to the Political Counselor. In Paris, the Attaché was responsible to the Ambassador, but also participated in policy and operational level embassy meetings. In London, the Attaché was part of the Political Division. In Rome, the Attaché was part of the Embassy's Executive Section, and reported to the Ambassador and the DCM.

In these early years, it was perhaps inevitable that the foreign scientific communities would tend to equate the level of American scientific achievement with the caliber of the men we sent abroad as science attachés. However, recruitment of qualified scientific attachés was no simple task. Not only did the Department of State have to compete with private industry and educational institutions for the services of the country's top scientists who might be available, but the people chosen had to possess a unique combination of scientific discipline, administrative ability, foreign language proficiency, and foreign experience, which would qualify

them for particular posts. Moreover, they also required such personal traits as tact, discretion, personality, and adaptability, all of which would equip them for the particular needs of the Foreign Service.

In the staffing of science officer posts abroad, the Department sought to select for appointment as senior science officer and deputy science officer, scientists with experience in markedly different fields, such as the physical sciences and engineering for one and the biological sciences for the other. Over time, these early science officers represented scientific disciplines as diverse as physics, geophysics, chemistry, engineering, zoology, bacteriology, electronics, biophysics, genetics, and oceanography.

From the beginning, the duties of the scientific attaché were viewed as falling into three general categories: reportorial, advisory, and representational. Of these duties, the reporting function was undoubtedly the most widely known, and, unfortunately, also the most often misunderstood. According to popular conception, the job of the scientific attaché was to ferret out scientific discoveries and developments in other countries and to report them to Washington, so that they might be available to interested scientists and technologists in the United States. He was thus visualized as a sort of transmission belt for the exchange of scientific information.

However, the sheer volume of the exchange of scientific information between the major scientific countries would, in itself, preclude such a function for the science officer abroad. Moreover, such a fact-gathering role would constitute a duplication by the State Department of an activity in which the National Science Foundation and numerous other private and governmental agencies already were engaged. While it is true that the scientific attaché, in carrying out his reportorial function, did take note of significant scientific or technical developments abroad, he did so primarily because of their implications for the development or execution of US foreign policy.

In fact, the principal reporting activity of the scientific attaché was considered to be the evaluation of the influence that various developments involving science abroad might have on US policy. For example, reporting on the development by a foreign country of a synthetic material capable of substituting for a product that the United States had been importing or exporting. If such a product were an important element in US trade, the development of a synthetic could have significant repercussions for American producers or importers. The ability of the scientific attaché to recognize the potential of such a development at an early stage could provide the time required to make any adjustment to meet the new situation.

The attachés also reported on developments in fundamental research in such fields as oceanography, which might have an important bearing on the US position concerning the law of the sea, or on research in radio-astronomy, which might be linked to the working out of an international telecommunications agreement.

In the late 1960s and early 1970s, concern grew in Congress about the increasingly complex global challenges raised by international scientific, technologi-

cal, and environmental issues. As the primary federal agency responsible for the conduct of US foreign policy, the Department of State was viewed as the logical point for the centralization of US efforts in these areas.

In an October 1973 appropriations authorization, Congress broadened the legislative mandate of the Department to cover a number of areas of responsibility, including the environment, conservation, health, population, weather, atmosphere, space technology, fisheries, wildlife, atomic energy, and other advanced technologies – except those that were primarily defense-related. Congress did this by creating a new Bureau of Oceans and International Environmental and Scientific Affairs (OES), headed by an Assistant Secretary of State. OES was formally established on October 8, 1974. The new bureau was designed to coordinate its activities with other federal agencies on international scientific, technological, and environmental questions. The Bureau would operate in coordination with the National Aeronautics and Space Administration (NASA), the Department of Defense (DOD), the Environmental Protection Agency (EPA), and other domestic agencies and commissions that dealt with relevant international science and technology matters.

Although it had not actively pursued such legislation, within the Department this was viewed as an opportunity to rationalize the existing bureaucratic system. In fact, in anticipation of the successful passage of the legislation, departmental studies were generated that examined organizational structures for a new bureau with wide-ranging responsibilities and the possible absorption of existing offices into this new entity.

In later years, the Bureau would also assume other responsibilities, such as the Law of the Sea negotiations and nuclear energy issues. Despite its congressional mandate – which was broader than that enjoyed by many other bureaus and offices – OES struggled persistently to maintain its share of Department resources and to exert its influence within the Department.

With the creation of OES, SCI was abolished and its functions were transferred to the new bureau. In addition to taking on SCI's duties, OES assumed the responsibilities previously held by the Office of the Special Assistant to the Secretary for Fisheries and Wildlife and Coordinator of Ocean Affairs (S/FW-COA), the Office of the Special Assistant to the Secretary for Population Matters (S/PM), and the Special Assistant to the Secretary for Environmental Affairs (SCI/EN). A Deputy Assistant Secretary (DAS) was assigned to each of the newly created offices of Oceans and Fisheries Affairs (OES/OFA), Scientific and Technological Affairs (OES/SCI), and Environmental and Population Affairs (OES/ENP). In 1974, OES had a total personnel complement of 66 people, and its front office was located on the prestigious Seventh Floor of the Department.

However, the search for a scientist/bureaucrat to fill the Assistant Secretary job in OES was frustrated by the perception – as bluntly expressed by a prominent scientist who was a primary candidate for the position, Dr. William Nierenberg –

that no one in the State Department was really interested in the new bureau, and that no one could do the job as it ought to be done. Apparently laying aside similar fears, Dr. Dixie Lee Ray, a former Chairman of the Atomic Energy Commission, took office as Assistant Secretary for OES on January 30, 1975.

Six months later, on June 19, 1975, Dr. Ray resigned from the position. Dr. Ray believed that she had not been given the opportunity to chart a course for OES to play a significant role in the formation of the Department's science policy. In a letter to President Gerald Ford, she asserted that «under present Departmental procedures, the Bureau can do little but acquiesce in the policies set by others, and attempt to implement its broad responsibilities with little authority and few resources.»

The early years of OES's operation saw frequent realignments and restricting of offices as the new bureau sought its place in the Department's organizational hierarchy. Among the important changes were the 1975 additions of the offices of Nuclear Energy and Energy Technology Affairs (OES/NET) and Advanced and Applied Technology Affairs (OES/APT), both headed by Deputy Assistant Secretaries.

The Department's participation in Antarctic Affairs was centered in the Bureau's OES/SCI division. It coordinated and consulted with the National Science Foundation, the Council on Environmental Quality, the Environmental Protection Agency, and other domestic agencies on the development and implementation of US policy toward the polar region.

The important Law of the Sea negotiations and related responsibilities initially were retained within a part of the Office of the Deputy Secretary (D/LOS). It was recommended that this unit eventually be dissolved, and that funds and positions allocated to the unit be transferred to OES at the appropriate time.

A senior DAS position in OES emerged in 1976, although the history of this position is not very clear. It appears to have come about after the duties originally assigned to an approved position of a DAS for Special Affairs were shifted to other bureau officers. The incumbent then became a senior deputy to assist a new Assistant Secretary with his new job. Such an arrangement apparently was never approved by Department management. With the principal DAS, OES thus had a total of six positions (including the Coordinator for Population Affairs) with the equivalent rank of DAS, in a bureau with a 1976 complement of 113 people.

As additional responsibilities were added to the existing OES organizational structure, problems arose when new duties were not fully absorbed within the scope of the overall bureau functions. According to a December 1976 report by Dr. T. Keith Glennan, OES was seriously understaffed, and was unable to cover adequately the Department's needs in the fields assigned to it. In addition to numbers, more top quality people at all levels were needed if the Bureau was to fulfill its responsibilities.