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The Atomic Bomb Casualty Commission in retrospect

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ABSTRACT For 50 years, the Atomic Bomb Casualty Commission (ABCC) and its successor, the Radiation Effects Research Foundation (RERF), have conducted epidemiological and genetic studies of the survivors of the atomic bombs and of their children. This research program has provided the primary basis for radiation health standards. Both ABCC (1947–1975) and RERF (1975 to date) have been a joint enterprise of the United States (through the National Academy of Sciences) and of Japan. ABCC began in devastated, occupied Japan. Its mission had to be defined and refined. Early research revealed the urgent need for long term study. In 1946, a Directive of President Truman enjoined the National Research Council of the National Academy of Sciences to develop the program. By 1950, ABCC staff exceeded 1,000, and clinical and genetic studies were underway. Budgetary difficulties and other problems almost forced closure in 1953. In 1955, the Francis Report led to a unified epidemiological study. Much progress was made in the next decade, but changing times required founding of a binational nonprofit organization (RERF) with equal participation by Japan and the United States. New programs have been developed and existing ones have been extended in what is the longest continuing health survey ever undertaken.

The Origins of the Atomic Bomb Casualty Commission (ABCC)

The world knows too little about the history and accomplishments of the ABCC and of its successor, the Radiation Research Effects Foundation (RERF). Fortunately, as the 50th anniversary of the founding of ABCC approached, a number of books and papers were published (1–7). These and others (8–10) describe the early trials and the successful evolution of a unified research program—a program that has provided the primary basis for radiation health standards throughout the world.

For 50 years—in the longest continuing investigation of its kind—medical and scientific studies have been done of the survivors of the atomic bombing of Hiroshima and Nagasaki and of the survivors' children. Throughout this period, the National Academy of Sciences (NAS) via its operating arm, the National Research Council (NRC), has shared responsibility for undertaking these studies with the Japanese government. Initially, this work was done through the founding and supervision of ABCC; later, it was done through oversight of the American role in RERF, the successor to ABCC. Of course, ABCC was always a partnership enterprise of NAS and the Japan National Institute of Health (JNIH), and RERF still is supported equally by the Japan Ministry of Health and Welfare and the United States government. The focus of this paper

will be on the early history of ABCC rather than on RERF. For brevity, reference frequently will be made to the Academy (i.e., NAS) or to NRC, rather than to the NRC–NAS complex.

ABCC began in a period of chaos in Japan, which was recovering from the devastation of war and the anguish of defeat and military occupation. ABCC had no precedent in the history of medicine, nor had the Academy ever undertaken an investigation of such magnitude before—nor has it since. Indeed, the Academy had no idea of what it was getting into; if it did, it probably would have never founded ABCC. One measure of the magnitude of the enterprise is that the Academy had approximately the same number of employees at ABCC in Japan in 1950 (1,061, of whom only 143 were not Japanese) as it has today in the entire NRC–NAS complex ($\approx 1,100$).

There were conflicting objectives in the undertaking. On the American side, there was recognition of the urgent need for research on the medical and genetic aftereffects of radiation, but the military authorities also had interest in the offensive and defensive implications of atomic radiation. On the Japanese side, there was an unmet expectation of medical care coupled with a suspicion of the American motives. There were other problems: the uncertain commitment within the Atomic Energy Commission (AEC), which was the funding agency (and at times uncertainty also within NAS), the resulting financial problems, and the changing direction of the research. Japan was under military occupation (the Occupation). Hiroshima and Nagasaki had been destroyed. The country was in chaos, and the civil structure and infrastructure had to be restored. All of these elements led to a troubled first decade for ABCC.

Year One after the Bombing

Within days after the bombing of Hiroshima on August 6, 1945 and of Nagasaki on August 9, the Japanese sent in medical and scientific teams. Under the leadership of Dr. Masao Tsuzuki, head of the Japanese National Research Council, they collected much critical clinical data in the first month. Their studies were invaluable but were largely suppressed from publication by the Occupation. Nominally, this was because Dr. Tsuzuki had the rank of rear admiral in the Japanese Navy, but the more likely cause was the military penchant for secrecy.

In September 1945, the U.S. Army, the Navy, and the Manhattan District sent teams to Hiroshima and Nagasaki to study the medical effects of the atomic bombs. These were headed by Col. Ashley W. Oughterson for the Army, Capt.

Abbreviations: ABCC, Atomic Bomb Casualty Commission; RERF, Radiation Effects Research Foundation; NAS, National Academy of Sciences; NRC, National Research Council; JNIH, Japanese National Institute of Health; AEC, Atomic Energy Commission; CAC, Committee on Atomic Casualties.

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Shields Warren for the Navy, and Col. Stafford L. Warren for the Manhattan District. By order of General Douglas MacArthur, the Supreme Commander, these units and the Japanese groups under Dr. Tsuzuki were merged on October 12, 1945 to form the Joint Commission for the Investigation of the Effects of the Atomic Bombs. The American personnel consisted of more than 60 specialists. Dr. Tsuzuki assembled more than 90 Japanese physicians and scientists. A preliminary report was issued by the Joint Commission; however, the vast amount of data collected was filed as a series of classified reports, some of which were published much later (9). Nonetheless, it was soon clear that a careful long term follow-up study of the survivors and their children was needed and that the Joint Commission set up by the military was not the appropriate agency to do this.

The Truman Directive, November 26, 1946

Ever since the military occupation, the Truman directive of November 26, 1946 has been cited as the mandate for NAS oversight of ABCC and thus of RERF. The origins of the letter from Secretary of the Navy James Forrestal to Truman, which was signed as a Presidential Directive, are as follows.

On May 28, 1946 after the Joint Commission had returned to the United States and rendered its report, Norman T. Kirk, the Surgeon General of the Army, wrote to Lewis H. Weed, the Chairman of the NRC-NAS Division of Medical Sciences. General Kirk pointed out the desirability of a careful follow-up study of the Japanese casualties, and he suggested that NRC appoint a group to plan the study. In response, NRC convened a conference with both civilians and representatives of the services in attendance. One recommendation of the conference was for "the establishment of a permanent organization for continuing long term study of the biological and medical effects of the atomic bomb."

At General Kirk's request, the Division of Medical Sciences suggested a number of possible consultants. Those selected were Dr. Austin M. Brues, a radiobiologist from the University of Chicago, Dr. Paul S. Henshaw of the Manhattan District, Lt. Col. Carl F. Tessmer, Medical Corps, Army of the United States (later the first permanent Director of ABCC), and Lt. James V. Neel, Medical Corps, Army of the United States (an M.D.—Ph.D. geneticist). Neel was the first Director, albeit in an Acting capacity, and ever since he has directed the genetics program of the children of the survivors. This group met in Japan in November 1946. According to anecdotes, it called itself the "Atomic Bomb Casualty Commission" for lack of an official title. Soon after, the Academy received the Presidential Directive (Fig. 1); the critical phrase from that directive is:

That the Presidential Directive instruct the National Academy of Sciences - National Research Council - to undertake a long range, continuing study of the biological and medical effects of the atomic bomb on man.

In a January 2, 1980 letter to Gilbert W. Beebe [who had attended that first meeting of the Committee on Atomic Casualties (CAC)], Shields Warren stated "The November 26, 1946 directive of Truman's was one that I had written and had persuaded Ross McIntire [Surgeon General of the Navy] to take to Truman for his signature." Whatever its origin, the Presidential Directive became the charter for the founding of ABCC by NAS. Because ABCC did not initially have official status in the Occupation, Lt. Neel sometimes had to show a copy of this letter to staff of the Occupation or to the Japanese local authorities to overcome red tape and to obtain cooperation.

The first laboratory was established in coaches on a train that the U.S. military had set up to handle unexpected disasters or possible epidemics (Fig. 2). From January 1948 until 1950,

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON

18 NOV 1946



The President
The White House

Dear Mr. President:

At the earliest practicable date following the capitulation of Japan, scientific groups effected a survey of damage produced by the atomic bombs on Hiroshima and Nagasaki. Medical scientists studied the effect on personnel. Those observations were conducted under the auspices of the Army and Navy through the agencies of the Manhattan District and the Naval Technical Mission in Japan.

Preliminary surveys involve about 14,000 Japanese who were exposed to the radiation of atomic fission. It is considered that the group and others yet to be identified offer a unique opportunity for the study of the medical and biological effects of radiation which is of utmost importance to the United States. Such a study should continue for a span of time as yet undeterminable. However, the study is beyond the scope of military and naval affairs, involving as it does humanity in general, not only in war but in anticipated problems of peaceful industry and agriculture. In addition, demobilization and consequent loss of military scientific personnel engaged in this study prevent its continuation.

In order that the studies might be followed to their logical conclusion, a conference group of the Division of Medical Sciences, National Research Council, convened to discuss the problem. The group recommended that appropriate action be taken toward the evolution of a Presidential Directive to effect the study. The recommendation with which the Surgeon General of the Navy, the Vice Chief of Naval Operations, and the Chief of Naval Research Concur is as follows:

"That the Presidential Directive instruct the National Academy of Sciences - National Research Council - to undertake a long range, continuing study of the biological and medical effects of the atomic bomb on man. That in this directive the council be authorized to enlist the aid of governmental agencies and personnel, and such civilian agencies and personnel as may be needed. Further, that those governmental agencies whose aid is requested by the Council be authorized and requested to provide the needed cooperation."

In view of the above, it is respectfully recommended that the National Academy of Sciences - National Research Council - be so directed.

Sincerely yours,

James Forrestal

Approved
Harry H. Wood
November 26, 1946

FIG. 1. The Presidential Directive. The original is in the archives of the United States Navy in Washington, DC.

ABCC was located in a requisitioned building (the Gai-senkan) in Hiroshima. Finally, in 1950, a permanent laboratory consisting of modified Quonset huts was constructed on the top of Hijiyama Hill overlooking the gutted city (Fig. 3). These buildings remain to this day, as does the controversy about their site, which had a Shinto memorial and a military cemetery (1, 2).

Until recently, historical accounts of ABCC and RERF were sparse, and the archives were unorganized. However, as this Symposium shows, there is renewed interest that has been evoked by the 50th anniversary of the A-bombs and the half-century of research on the survivors and their children by ABCC and RERF. A series of publications has come out in the past few years, including important books by speakers in this Symposium (1-3, 7). Much other useful information can be found on the RERF home page on the Internet (search Yahoo for RERF or go to <http://www.rerf.or.jp/eigo/experhp/rerfhome.htm>). There are also important archival resources at NAS, at the Texas Medical Center in Houston, and at RERF in Hiroshima. The most valuable resources are the memories of the pioneers of ABCC and RERF, many of whom contrib-



FIG. 2. View of railroad coach named “Troy” that was the “traveling laboratory” of the ABCC in December, 1946. On the right is James Neel, on the left are Masao Tsuzuki, Melvin Block, and Austin Brues. (Photograph received from James V. Neel and reproduced with his permission.) [Photograph also shown on the RERF home page (<http://www.rerf.or.jp/eigo/experhp/rerfhome.htm>).]

uted brief anecdotal vignettes in a special issue of the *RERF Newsletter* (10)

The Troubled First Decade (1947–1957)

The first decade of ABCC was a period of uncertainty, marked by some important accomplishments but marred by financial problems and lack of a clear scientific direction. The design and the results of the clinical and scientific studies are described elsewhere in this issue of *Proceedings* (11–13). Here, the emphasis will be on the early history of ABCC and how its relationship to NAS affected the ongoing program at Hiroshima and Nagasaki.

The NRC–NAS Committee on Atomic Casualties in the Division of Medical Sciences had the initial responsibility for oversight of the ABCC program. The Committee was founded on March 1, 1947 and held its first meeting March 25, 1947. (The minutes of this and subsequent meetings are referred to here by date as CAC Minutes and are on file in the NAS Archives.) This first meeting was attended by representatives of the armed services who gave reports on the observations made thus far and offered suggestions on how the future investigation should be designed and conducted. Dr. Thomas



FIG. 3. Quonset huts on Hijiyama Hill constructed in 1950 comprised the first permanent laboratory of ABCC. In 1997, they still remained in use as part of an enlarged laboratory (Photograph from the Archives of NAS.)

M. Rivers, the Chairman, called on Drs. Brues and Henshaw for a report on the activities and observations of ABCC, which by now had accepted ABCC as the official name. Funding was an urgent item of business.

Indeed, funding has been a problem since the very inception of ABCC. The Presidential Directive did not provide a source for financing. The Academy bore some initial expenses and assumed that support would come from the Army, Navy, and the AEC. However, the Bureau of the Budget ruled that funds could not be provided by the Army or Navy for external grants, so the AEC was approached even though it also was just being established as the successor to the Manhattan Engineering District (the Manhattan Project) (CAC Minutes, 6 June, 1947).

The initial ABCC team functioned as an interim organization until the AEC was organized. Much of the early expense was borne by the Occupation. Indeed, the first contract of the AEC with NAS was not signed until April 13, 1948, but it was made retroactive to July 1, 1947 for a 2-year period. The contract was renewed with modifications through March 31, 1975 when ABCC was dissolved and RERF was founded. Thus, the research program of ABCC was funded for a continuous period of almost 28 years by contracts of the AEC with NAS. The original contract—or at least an abbreviated version reproduced by Allen (14)—does not even mention ABCC. Referring to NAS as “the Contractor,” it states:

The Contractor shall make studies and conduct research and experimental investigations, primarily in Japan, in accordance with general programs from time to time approved by the Commission. This shall include investigations of the physiological and biological effects of radiation and such other work as may be necessary or proper to the carrying out of such studies, research and investigation, and also the compilation and dissemination of reports relating thereto.

Under this contract, the Academy had the primary responsibility, the operational authority, and the financial support to conduct the necessary studies, but the outlines of the program still had to be developed. This charge was given to CAC acting for NRC–NAS. One of the most important actions of CAC occurred at its second meeting on May 1, 1947 when it received Neel’s report on genetic studies (CAC Minutes, May 1, 1947). At its third meeting on June 6, 1947, CAC adopted plans for a conference on genetics (CAC Minutes, June 6, 1947). This conference was held and later was published as a CAC report, actually a report of the Subcommittee on Genetics, which was largely prepared by Neel (15). There was much uncertainty at the time whether significant results could be guaranteed from such a large, expensive, and unprecedented study (2). Yet, this report laid the basis for the genetics program, one of the two major research areas of both ABCC and RERF, and an evolving program that continues to this day (12).

ABCC rapidly expanded in the period 1948–1950. In early 1948, ABCC began with a staff of 3 American and 25 Japanese nationals (Fig. 4), and JNII formally joined the studies. In March, NAS appointed Lt. Col. Carl F. Tessmer as the first nonacting Director. A major genetic study ultimately involving some 70,000 children in the two cities was begun by Neel after an accord was reached with the Welfare Ministry and JNII (14). The pediatric program, the ophthalmology study, and the leukemia survey were initiated, and construction of the Hijiyama site in Hiroshima was started. In 1950, the Adult Medical Survey was begun. At the end of that year, the number of personnel had risen to 1,061, including 143 foreign and 918 Japanese, all of whom were employees of NRC–NAS except for 55 Japanese from JNII (14).

As increasingly negative findings accumulated and the Korean War (1950–1953) began, questions about the value of ABCC research were raised and financial constraints ensued.



FIG. 4. Members of the first “mission” who arrived in Japan on November 25, 1946 pictured together with Dr. Masao Tsuzuki. From left to right: Lieutenant (junior grade) Frederick Ulrich, Lieutenant James V. Neel, Captain Melvin Block, Dr. Paul S. Henshaw, Dr. Masao Tsuzuki, and Dr. Austin Brues. (Ulrich left Japan in January 1947 because of illness). (Photograph received from James V. Neel and reproduced with his permission.)

Even Detlev W. Bronk, then President of NAS and an early supporter of ABCC, now voiced concern. In 1950 and again in 1951, the AEC sent a number of consultants to Japan to review ABCC, and they issued critical reports. Thereupon, AEC denied budgetary increases requested by NAS. Other consultants such as John Z. Bowers and Joseph Wearn, both medical deans, questioned the justification for ABCC. As a result, AEC decided to reduce the NAS-proposed budget for fiscal year 1952 from 3.5 million dollars to 1 million. Dr. Thomas M. Rivers, Chairman of CAC, interpreted this action as an obvious order by AEC to discontinue ABCC. Bronk, as President of NAS, was ambiguous about the future of ABCC. In exasperation, CAC, on February 3, 1951, voted to terminate ABCC (CAC Minutes). The motion ordered “that the ABCC be discontinued because of lack of financial support.”

In time, the furor subsided as AEC and NAS worked out their problems; CAC was reorganized to include AEC representatives, and it became an advisory group, losing its operational responsibility. However, lingering doubts remained that prompted a thorough review of the entire program by an NRC–NAS committee, later known as the Francis Committee.

The Francis Committee

Many problems confronted ABCC during the early years and thwarted its development and the systematic planning of research. These include the devastation of Japan, the constraints of the military occupation, cultural clash, difficulty in attaining subject cooperation, and activist opposition that incited distrust of ABCC motives. Abetted by budgetary uncertainty, these problems led to sagging staff morale and difficulty in recruiting and retaining American staff. Added to this was the uncertain legal status of ABCC as the Occupation began to unwind. Fortunately, the ambiguous status of ABCC was resolved by establishing it as an agency attached to the U.S. Embassy through an exchange of *notes verbales* with the Japanese government on October 22–23, 1952 (reproduced in Allen, ref. 14). However, most of the other problems had to be solved at the local level.

Throughout this period, and despite the geographical distance, the Academy aided ABCC in many ways. The prestige and political independence of NAS was a major factor in gaining confidence of the Japanese. As described later, the

most important actions of the Academy were the appointment of the Francis Committee in 1955 and of Dr. George B. Darling as Director in 1957. The conjunction of these actions led to a decisive turning point in the program.

During this uncertain period, ABCC was kept alive and then reinvigorated by Dr. R. Keith Cannan, a biochemist, who became chairman of the NRC Division of Medical Sciences and thus the executive director of ABCC for NRC–NAS. Cannan proved to be a key leader in the design and development of the role of ABCC. Veterans of the program affirm that, without his determined support and resolute guidance, ABCC might have closed its doors. However, at first he was discouraged by the deteriorating state of ABCC and by the financial problems. He was on the verge of recommending termination of ABCC but was restrained by Bronk. Then came the Woodbury mortality report in 1954 (16). Gilbert Beebe and Seymour Jablon, who were reviewers of the report, have asserted to me that it was a deciding factor in the continuance and restructuring of ABCC. The report noted an increased mortality for exposed survivors and indicated the need for systematic study of the mortality situation in the two cities, but little was being done.

Cannan recognized the need for a thorough scientific review of the ABCC program that would produce recommendations for its reorganization and future strategy. At his direction, an *ad hoc* NRC–NAS committee was formed that came to be known as the Francis Committee. The committee was chaired by Thomas Francis, Jr., an eminent epidemiologist and virologist, from the University of Michigan. The other members were Seymour Jablon of the Follow-Up Agency, NRC–NAS, and Felix E. Moore, from the National Heart Institute. Accompanied by Cannan, the committee made a 3-week visit to Japan in October, 1955 and conducted an intensive review of the objectives of ABCC and of its research program (17). Their report, the “Francis Report,” made sweeping recommendations for reorganization of the program and for focus on integrated epidemiological and genetic study of a fixed population defined by a “Master Sample.”

The Francis Report recommended a comprehensive epidemiologic approach, later called the “Unified Study Program,” that included a continuing morbidity survey, clinical study, postmortem detection, and death certificate analysis. After review by Japanese and American experts, a series of programs (later called platform research protocols) were instituted that continue in modified form to this day. These were the Life Span Study, Adult Health Study, Pathology Study, and F₁ Mortality Study—all of which are described in this Symposium (11–13). The Report also proposed closer association with Hiroshima Medical School and with JNII, and it urged development of relationships with corresponding departments of American medical schools and with the U.S. National Institutes of Health and similar agencies.

The Academy was prompt and effective in developing these interactions. In 1956, members of the Francis Committee returned to Japan for 7 weeks to consult on implementation of the Unified Study Program. In August, four U.S. Public Health Service (USPHS) physicians were assigned to ABCC—the first of many who later served with ABCC. In 1957, Japanese physicians were appointed as Associate Directors at Hiroshima and Nagasaki. One of the most important events was Cannan’s recruitment of Dr. George B. Darling as Director of ABCC in June 1957.

ABCC Redux: George Darling and the Implementation of the Francis Report (1957–1968)

One of the recurrent problems of ABCC had been the lack of continuity in leadership. In the first decade, there were six Directors, most of whom served only for a year or two. Darling’s tenure was for 15 years (1957–1972), and he contin-

ued to advise thereafter. He took many steps to recognize the accomplishments of the Japanese and to further their involvement in joint studies. During his tenure, radiation dosimetry research programs were undertaken. In 1965, this led to the Tentative 1965 Doses, or T65D values, the system that was used until the DS86 dosimetry system was adopted in 1986. The physical facilities of ABCC at Hiroshima and Nagasaki were expanded. With the aid of grants from the governments of the United States and Japan, hospital units were constructed at Hiroshima University and Nagasaki University to facilitate the care of A-bomb survivors. Although not all of these advances could be attributed directly to Darling, they were greatly facilitated by the environment he created and the increasing success of the Unified Study Program.

While Darling worked to cultivate closer associations with the Japanese, Cannan in Washington mobilized the resources of the Academy to develop collaboration with American medical institutions. ABCC departments became associated with corresponding departments in outstanding medical schools; for example, the ABCC Department of Medicine with Yale, Pathology with University of California, Los Angeles, and Statistics with the Medical Follow-Up Agency of NRC-NAS through Gilbert W. Beebe. A total of 54 U.S. Public Health Service physician officers was assigned to various departments of ABCC in the period 1956 through 1975. All of these actions greatly facilitated recruitment of personnel and strengthened the professional staff.

The Radiation Research Foundation

Despite increasing collaboration with Japanese and American medical institutions and the concurrent progress in the epidemiological and genetics programs, all was not well at ABCC. Anti-ABCC resentment was kindled by the resurgent nationalism in Japan and by political activism of the Hibakusha (the atomic bomb survivors). There was an uneasy tension because ABCC was only nominally a joint Japanese—American enterprise. Of course, ABCC always had been a cooperative study by the Americans and Japanese. Some Japanese held important administrative and professional positions. In fact, the majority of the personnel were Japanese. For example, in 1958, the personnel strength of 876 included 50 foreign and 826 Japanese nationals; yet, only 30 of the latter were from JNIH, and the rest were employees of the Academy (14).

Furthermore, in the 1960s, Japan was reestablishing its industrial base and rebuilding its national ethos. Increasingly, there was need for more formal recognition of the Japanese role through an independent binational structure. The situation was exacerbated by financial problems and the need for more secure funding. The economic revival of Japan, inflation, and the declining value of the dollar relative to the yen combined to cause a financial crisis. Budgetary pressures resulted in successive reductions in personnel and limitations on expenditures. It was time to conduct an official review of the administrative structure, the program priorities, and the financing of ABCC, but progress was slow. Undoubtedly, the major driving force was the financial crisis. Only the intervention of the National Institutes of Health National Cancer Institute averted a major reduction in staff in 1972–1973. Anecdotal evidence indicates that action in Tokyo finally was prompted by the AEC threat of a massive layoff of staff, an action unprecedented in Japan.

The negotiations for a private binational structure for a successor to ABCC and for equal sharing by Japan and the United States in its financial support were complex, and the principle was unprecedented. Binational negotiations proceeded in 1974. Major impetus was given by Dr. Philip Handler, President of NAS, after his visit to ABCC in October of that year. On November 5–8, 1974, a meeting was held in Tokyo that included representatives of the following: the Japanese Ministries of Foreign Affairs and of Health and Welfare, AEC, NAS, the U.S. Embassy, JNIH, and ABCC (Fig. 5). This meeting led to an agreement now referred to as the Act of Endowment. RERF was created as a private, nonprofit foundation and became the successor to ABCC effective April 1, 1975. The amended English and Japanese versions of the Act are in the files of RERF. An excerpt from the Act is given below:

The objectives of the juristic person shall be to conduct research and studies, for peaceful purposes, on the medical effects of radiation on man and on diseases which may be affected by radiation, with a view to contributing to the maintenance of the health and welfare of atomic bomb survivors and to the enhancement of the health of all mankind.

Organization of RERF

The principal change in the transition of ABCC to RERF was in the organizational structure rather than in the scientific



FIG. 5. On December 27, 1974 Foreign Minister Kiichi Miyazawa of Japan and U.S. Ambassador J. D. Hodgson formally exchanged notes acknowledging the intention of their respective governments to establish a binational nonprofit foundation. (Photograph provided by Itsuzo Shigematsu, Chairman of RERF, and reproduced with his permission.)

program. In anticipation of the changeover, Handler had appointed an *ad hoc* NAS committee to make a scientific review of the laboratories, clinics, and research programs at Hiroshima and Nagasaki. This committee, headed by the eminent geneticist Dr. James F. Crow, visited Japan in February 1975. Their report, known as the Crow Report, recommended continuation and strengthening of the major elements of the ABCC program and the early implementation of a program in biochemical genetics (18). This strengthening and implementation were done and led to many important studies described in this Symposium (11–13).

Financial problems have beset ABCC and RERF from their inception to this very day. The Act of Endowment is a misnomer. For the endowment, the Americans contributed the existing buildings and equipment, and the Japanese gave an equivalent amount of money (¥360 million). For perspective, the latter sum is only approximately one-third of the amount paid by each nation for the 1975 budget. A basic problem is that RERF is funded by annual appropriations and the U.S. share is paid in yen. The exchange rate was ≈ 360 yen to the dollar in the 1970s and now is only approximately one-third of that. Despite the recent recovery of the dollar, the frequent and sometimes precipitous decline in the exchange rate coupled with inflation in Japan and stringency in the U.S. national budget has led to repeated crises that are not described here.

RERF, which replaced ABCC on April 1, 1975 is incorporated as a private nonprofit foundation under Japanese law. At least to this date, RERF has been funded equally by the Government of Japan through the Ministry of Health and Welfare and by the Government of the United States. The American share was provided through NAS under a contract (later a grant) from the Department of Energy (1977 to date) and by its predecessor, the Energy Research and Development Administration (1975–1977). The unique feature of the administrative structure of RERF is the equal sharing of the positions of directors and scientific advisors by Japanese and Americans. The current status and organization of RERF are reported in this issue of *Proceedings* (11); the history of the first decade is summarized elsewhere (19).

In closing, one must give tribute to the veterans of the early days of ABCC and RERF. Some are here today, but only a few have been named above. Without their zeal and unmitigating efforts and without the aid of the loyal Japanese and American staff, NAS participation in ABCC and RERF would have withered, and the half century of studies of the atomic bomb survivors could not have been conducted.

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