

## Reporter Visits RERF and A-Bomb Hospital

# JAPANESE SCIENTISTS AND A-BOMB SURVIVORS SPEND LIFETIME IN RADIATION STUDIES

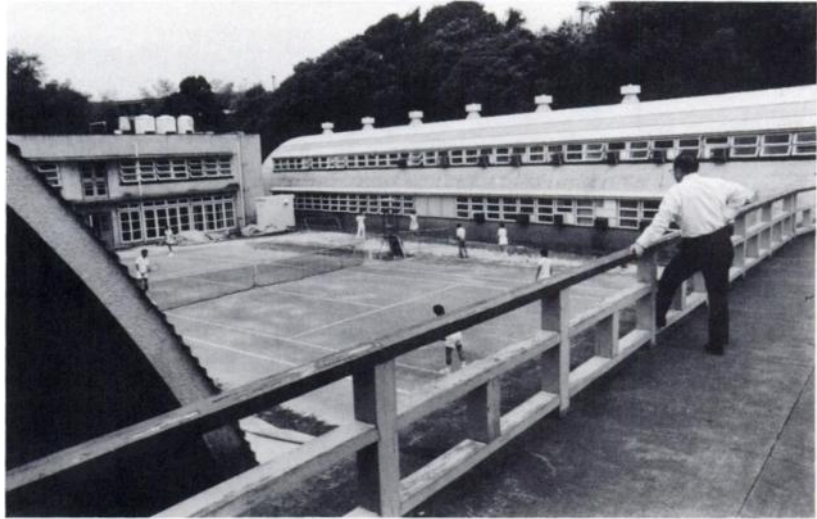
Visitors come to Mt. Hijiya for its cherry blossoms, its wooded park, and for the view. Every month, several hundred atomic bomb survivors also come to Mt. Hijiya to undergo medical examinations at the Radiation Effects Research Foundation (RERF). The RERF, formerly the Atomic Bomb Casualty Commission, sits atop Mt. Hijiya. Hidden by cherry trees, the RERF provides a vantage point from where one can look at all of Hiroshima, which lies in a natural bowl formed by hills and mountains.

Despite some initial resentment from feeling "like guinea pigs," tens of thousands of survivors still participate in these examinations, which began almost 40 years ago, as a way to contribute their painful experiences to a positive endeavor (see pp. 833-836).

### Resistant to autopsies

Even the selection of the RERF's location was controversial because Mt. Hijiya was the site of a military cemetery and a sacred shrine to an ancient emperor. The United States chose the location, 500 feet above the city, to escape flooding by typhoons.

In the seven corrugated tin buildings that make up the RERF, about 100 autopsies a year are performed on atomic bomb victims. "The Japanese are very resistant to autopsies because of Buddhist teachings," said Itsuzo Shigematsu, MD, an epidemiologist who became chairman of the RERF in 1981. Families who agree to autopsies, however, are able to learn the



*A view of the RERF facility and courtyard. The Japanese did not want the Americans to occupy such a visible position when they established the research center in 1947, which is why the buildings are only two stories high and surrounded by trees.*

(Robert Del Tredici)

true cause of a relative's death.

The pathologists at the RERF examine surgically removed tissues to confirm diagnoses and to provide pathology support for many studies of late radiation effects. Emphasis is now placed on immunopathology to determine the late effects of ionizing radiation at the cellular level.

Abraham Kagan, MD, worked on the epidemiologic studies in the United States for the RERF before assuming his post as vice chairman of the Hiroshima facility in 1983.

"The atomic bomb experience is something that must never happen again—but we need to get as much good out of it as possible. It's most important to help establish radiation standards for the world at large.

"The controversy in medical circles over how to extrapolate high-level radiation exposures to low-level experience is still not settled. We can only provide data," said Dr. Kagan.

### Japanese originated studies

On August 6, 1945, the day of the bombing, the Kure Naval Base's survey team came to Hiroshima to determine the nature of the bomb and assess damages.

Two days later, survey teams from the Japanese Technology Agency, the Imperial Headquarters, the Japan War Department, and the Japan Navy Command were dispatched to Hiroshima.

On August 9, the Western Japan Army Command sent its survey team

to Hiroshima, followed by investigators from Kyoto and Osaka Imperial Universities on August 10.

Nagasaki was bombed on August 9, and the Nagasaki District Military Police sent out its survey team the next day. Yoshio Nishina, then Japan's leading atomic physicist, reached Nagasaki on August 14, as well as another survey team from the Kure Naval Base.

By examining the casualties and the exposures of stored film, Dr. Nishina confirmed that the weapon was an atomic bomb, and he sent materials to the Institute of Physical and Chemical Research to be measured for radioactivity.

Several universities and research institutes began to conduct hematologic surveys and surgical studies on thermal burns and trauma. A medical team from Tokyo Imperial University arrived in Hiroshima on August 30 and performed autopsies for pathologic studies.

A team of 40 physicians and scientists from Kyoto Imperial University began to organize a large-scale, comprehensive survey of Hiroshima survivors at the beginning of September. When the Makurazaki typhoon hit the city on September 17, however, an avalanche killed 11 members of this group, including the leaders in pathology and internal medicine, and ended plans for this study.

A group from the Hiroshima University of Literature and Science took measurements on residual radioactivity below the hypocenter in the middle of September. Physicists from the Hiroshima City Technical College measured radioactivity at various locations in the city, and prepared a chart of the distribution of radiation intensity.

Members of the Ministry of Education's Science and Education Bureau, working with Dr. Nishina, began to assess the research scope and criteria of the atomic bomb investigations.

On September 14, Dr. Nishina

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helped to establish the Special Committee for the Investigation of A-Bomb Damages within the Scientific Research Council of Japan.

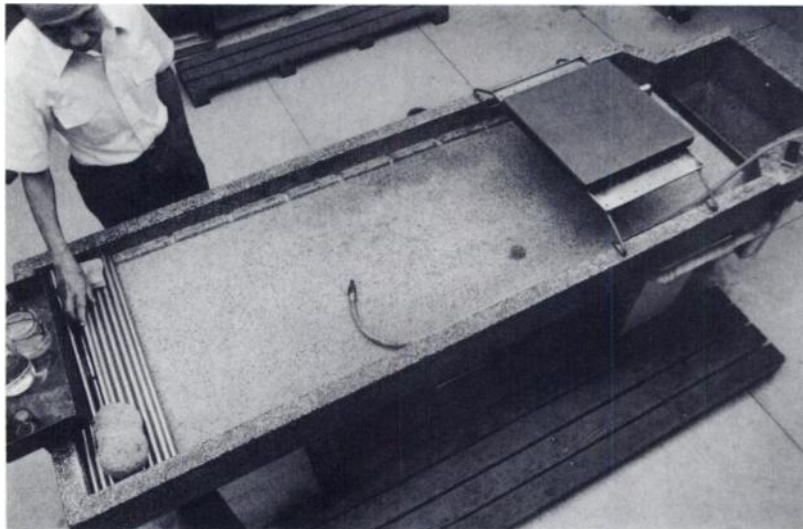
#### **Publishing of data prohibited**

At its first meeting in Tokyo on November 30, 1945, however, the director of the Allied Forces General Headquarters Economic and Scientific Bureau served notice that further surveys and studies of atomic bomb matters by Japanese investigators

would require permission from the occupation forces, and publication of data was prohibited.

Although the Special Committee held two subsequent meetings, the work of Japanese scientists was greatly restricted until the occupation ended in 1951, according to the Committee for the Compilation of Materials on Damage Caused by the Atomic Bombs in Hiroshima and Nagasaki.

*(continued on page 844)*



*From more than 3,000 autopsies performed in this room at the RERF, investigators obtained information that helped determine the validity of death certificate diagnoses for many disorders and data for histologic descriptions of radiation-related tumors.*

**(Robert Del Tredici)**



*This bronze figure of Buddha evinces the intense energy emitted in the thermal wave. Blasts and fires reduced 13 square kilometers in Hiroshima, and 6.7 square kilometers in Nagasaki, to ashes.*  
(Robert Del Tredici)

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The Japan Society for the Promotion of Science published a summary report of the Special Committee's results in 1951. A full report—1,642 pages in two volumes with 130 sections on medicine, 38 on science and engineering, and six on biology—was published in May of 1953.

**A-Bomb Hospital**

After the bombing of Hiroshima, it was estimated that 65 of the city's 150 physicians were killed, and most others wounded. Out of the city's 1,780 nurses, 1,654 were dead or too injured to work.

The Red Cross Hospital was the only hospital in Hiroshima to escape total destruction, and six out of 30 physicians, ten out of 200 nurses, were left to treat at least 10,000 of the city's wounded who flocked to the hospital.

Commonly known today as the A-Bomb Hospital, this 170-bed facility treats more than 30,000 outpatients a year, including many of the atomic

bomb survivors referred by the RERF. It also established the Nuclear Radiation Effects Countermeasure Research Institute in 1960.

Kiyoshi Kuramoto, MD, vice director of the hospital, was sent to Nagasaki when he was a medical student to treat survivors two days after the city was bombed. He has worked at the A-Bomb Hospital for 35 years. "If nuclear weapons are used today, doctors and nurses will be of no use," said Dr. Kuramoto.

Six years ago, Dr. Kuramoto visited the United States to examine 250 atomic bomb survivors who moved to Los Angeles, San Francisco, and Seattle. "They suffered similar effects to survivors in Japan, but were

psychologically different because they have trouble getting treatment paid for by insurance," he said.

Dr. Kuramoto also visited the cancer hospital, which closed in 1974, at the Oak Ridge Associated Universities in Tennessee to learn about "the peaceful use of nuclear energy for cancer treatment."

*Greg Mitchell*

*Greg Mitchell is the editor of Nuclear Times and co-author of the recently published book, Acceptable Risks. He spent a month in Hiroshima and Nagasaki last summer on a grant from the Hiroshima International Cultural Foundation.*

**Major Radionuclides Detected after Detonation of a Nuclear Weapon**

**Induced at the hypocenter immediately after detonation in Hiroshima\***

- Aluminum-28
- Cesium-134
- Cobalt-60
- Manganese-56
- Scandium-46
- Sodium-24

**Major fission products of a nuclear explosion†**

- Strontium-90
- Iodine-129
- Cesium-137

**Approximate average dose received by individuals in the northern hemisphere from 1,000 megatons of fission explosions from atmospheric testing prior to the 1963 partial test-ban treaty†**

- 0.1 rem (Carbon-14)
- 0.1 rem (Cesium-137)
- 0.5 rem (Strontium-90)

**Detected in soil samples from Nagasaki in October 1945\***

- Barium-140
- Celium-144
- Cesium-137
- Plutonium-239
- Praseodymium-144
- Strontium-89
- Strontium-90
- Zirconium-95

**Actinide products present in the debris from a nuclear fission explosion†**

- Plutonium-239
- Plutonium-240
- Americium-241

**Excess neutrons which escape into the biosphere‡**

- Hydrogen-3
- Carbon-14
- Sodium-24
- Chlorine-36

\* Source: The Committee for the Compilation of Materials on Damage Caused by the Atomic Bombs in Hiroshima and Nagasaki: *Hiroshima and Nagasaki*. Iwanami Shoten, Tokyo, 1979; Basic Books, Inc., New York, 1981, pp 75, 78 (translation).

† Source: Feld, BT: Mechanics of fallout. In *The Final Epidemic*, R. Adams and S. Cullen, eds., Educational Foundation for Nuclear Science, Inc., Chicago, 1981, pp 111-114.