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Review

the soil, tenants who maintain their property in good condition are to recognize the authority of the paramount chief may regard the land as their own.

The first thermonuclear explosion—Trinity—in July, 1945, demonstrated the feasibility of the atomic weapon. Two devices were fired at Operations Crossroads on Bikini Atoll in July, 1946, for information concerning the effects of atomic bursts on ships. The first full-scale thermonuclear device was exploded in the Pacific Proving Grounds on November 1, 1952. Subsequent tests took place as shown in Table I.

TABLE I. U.S. THERMONUCLEAR TESTING FROM 1948 THROUGH 1956.

Code	Time	Place	Test
Sandstone	Spring 1948	Eniwetok	Atomic
Ranger	Winter 1950-51	Nevada	Atomic
Greenhouse	Spring 1951	Eniwetok	Atomic
Buster-Jangle	Fall 1951	Nevada	Atomic
Tumbler-Snapper	Spring 1952	Nevada	Atomic
Ivy	Fall 1952	Eniwetok	Hydrogen
Upshot-Knothole	Spring 1953	Nevada	Atomic
Castle	Spring 1954	Pacific	Hydrogen
Teapot & Wigwam	Spring 1955	Nevada and off U.S. coast	Atomic
Redwing	Summer 1956	Pacific	Hydrogen

In contrast to the tests of high-yield thermonuclear devices at the Pacific Proving Grounds, only relatively small nuclear test explosions were conducted at the Nevada test site. There, as well as in the Pacific, all tests were planned for times when forecast weather conditions minimized the possibility of fallout hazards. High-air bursts at the Nevada test site have produced no significant fallout; the damage has been successfully confined to the controlled area of the test site. Previous to the 1951 "Castle" mishap, biological damage from the testing of atomic weapons was negligible. The Atomic Energy Commission reported that four persons suffered hand burns on May 14, 1948, because of a failure to handle radiated materials with adequate protection.²

One of the major problems in the Marshall Islands stems from the

displacement of islanders as a result of the establishment of the Pacific Islands Proving Grounds. The first of the tests was conducted on July 1, 1946, before the territory had been placed under the administration of the United States. The population of Bikini Atoll, numbering 16,000, was evacuated in several stages, first to Rongerik, later to Kili. The physical and climatic conditions on Kili differed from those on Bikini and the islanders had difficulties in adjusting to their new home. Bikini Atoll, which had been abandoned by the Japanese, afforded its people the opportunity of returning to their homes. The abundance of fish and good anchorage facilities for the fleet were not to be expected. Bikini has a larger land area than Kili and has heavier rainfall and richer soil. Further, the islanders were forced to learn new methods of cultivation and to grow in their former habitat. They informed the United States Visiting Mission of their dissatisfaction with the conditions and their desire to return to their homeland, or to be resettled on an island suitable to their needs.³

The United States High Commissioner, DeWight F. Bailey, visited Bikini on March 10 that conditions on Bikini were such that, if the islanders returned there for many years, it would be impossible to find another atoll had been available. As a result, arrangements had been made for the displaced islanders to be resettled on Jaluit Atoll. Buildings had been constructed there to accommodate some of the families from Kili on a temporary basis. It was possible for them to fish in the lagoon and grow food crops on the island. Since the use of Jaluit might be necessary for the land lost on Bikini, the displacement of the islanders was a matter of urgent importance.

The 1956 Visiting Mission toured Jaluit Atoll and Kili Island, some forty miles away. Since there was no landing strip nor mooring facilities, the plane could not land without landing. Most of its 198 acres are planted with coconuts which surround a lagoon located in the center of the island. The reef anchorage, the unfavorable trade winds, and the lack of fresh water combined to isolate the island during the visit. Landing operations are possible only by helicopter. The unfavorable surf conditions in the lagoon, which at best are infinitely poorer than

² U.S. Visiting Mission, *op. cit.*, 77-79.
³ *Ibid.*, 80-81.

² U.S. Dept. of Navy, *Report of the Trust Territory of Pacific Islands for 1948* (OPNAV-122-100E, Washington, 1949), 411.

the loading of copra and making the greater part of the island accessible to the islanders.⁶

To aid in the islanders' development, the community initiated a program of self-help. The Bikini group with the resources of Kili and applied their own labor to assist them. Taro plants were planted and a natural extension station was established. A tangible means of transportation was developed. The development of the island itself and the surrounding areas accessible to the Bikini islanders.

Nuclear issued a press release on the subject made with the former residents of the island. The station for the use of their trust agreement amounted to a small settlement at Ujelang. Both groups were given homes and certain adjacent areas. The settlement was made at the Ujelang area. The United States was given the right to use the island.

The second displacement of the islanders took place shortly after the beginning of the Bikini Atomic Bombing in 1947, the selection of the island for the displacement. The islanders were given a small settlement at Ujelang. The islanders were given a trade store, a school, and a health center. The Ujelang problem of the Ujelang islanders was a considerable one. Their island, a considerable one, was frequently used for six months for the delivery of copra and to deliver goods to the Ponape Displacement. The reasons for the transfer, the displacement, and the reasons against it, basing their principles on culture and wisdom. The group was promptly given the island for the sole purpose of giving the islanders a home.

⁶ United Nations, Trusteeship Council, Report, New York, Dec. 1946.

⁷ U.S. Atomic Energy Commission, Report, New York, Dec. 1946.

⁸ U.S. Dept. of Navy, Report, New York, Dec. 1946.

⁹ U.N. Visiting Mission, *op. cit.*

TABLE II. FALLOUT INJECTIONS FROM MARCH, 1954, PACIFIC THERMONUCLEAR TEST

Group	Persons Involved	Estimated Penetrating Dose	Degree of Skin Contamination
Rongelap	64 Marshallese	175 roentgens	Extensive
Rongelap people on Ailingnae	18 Marshallese	69 roentgens	Less extensive
Rongerik	28 Americans	78 roentgens	Slight
Utirik	157 Marshallese	14 roentgens	None

Full co-operation and support from all the agencies enabled the team to operate at maximum efficiency and to render appropriate care to the injured with little delay. Plans were made to evaluate the medical and genetic status of the group at specified intervals to note the later effects of radiation. Data on the original investigations and surveys were published in a report entitled *Some Effects of Ionizing Radiation on Human Beings*.

Inside Bikini Atoll, at a point ten miles "downwind" from the explosion it was estimated that the radiation dosage was about 5,000 roentgens for the first 36-hour period after the fallout. The highest radiation measurement outside Bikini Atoll indicated a dosage of 2,300 roentgens for the same period. This was in the northwestern part of Rongelap Atoll, about 100 miles from the point of detonation.¹² The roentgen is the commonly accepted unit of measurement of radiation dosage. A dose of about 25 roentgens of radioactivity received by a person over a brief space of time will produce temporary changes in blood. A dose of some 100 roentgens received in a short interval may produce nausea and other symptoms of radiation sickness. About 450 roentgens delivered over a day or so may be fatal to approximately half of the persons so exposed.

One hundred eleven Marshallese, including members of the Holdover Committee of the Marshallese Congress, petitioned the Trusteeship Council in 1954 requesting that:

All the experiments with lethal weapons within this area be immediately ceased. If the experiments with said weapons should be judged absolutely necessary for the eventual well-being of all people of this world and can not be stopped or changed to other areas due to the unavailability of other

ations, the following suggestions were submitted: All possible precautions be taken to be taken before such weapons are exploded. All human beings and their valuable possessions be transported to safe distances first before such explosions occur. All the people living in the area be instructed in safety measures. Adequate funds be set aside to pay for the possessions of the people in case they have to be moved from their homes. Courses be taught to Marshallese medical practitioners and health aides which would be useful in the detecting and circumventing of preventable dangers.¹³

Dwight Heine, a representative of the Marshallese, informed the Trusteeship Council Standing Committee on Petitions that his people had not been warned of nuclear explosions and were not aware that the drinking water on the islands had been contaminated. The United States delegation upheld the right to conduct nuclear tests in the area on the ground that the "Trusteeship Agreement specifically designated the territory as a "strategic area" to ensure their country's role in the maintenance of peace and security and emphasized the fact that no person had lost his life, or been seriously injured, or had his home been destroyed as a result of the tests.

The claims of the United States delegation were questioned by Indian representatives led by V. K. Krishna Menon, who contended that the Trusteeship Agreement gave the United States the right to establish military bases and to station troops in the area, not to use the territory as a proving ground for nuclear weapons. The reference to "strategic area" in the agreement only concerned the defense of the territory by the administering authority. Menon pointed out that the Council was faced with two grave issues of principles: The first questioned the right of the Administering Authority to use a territory placed under its trust for a testing ground; the second concerned the Administering Authority's duty to ensure the well-being of the people and to conserve the natural resources of the territory under administration. Activities in the Pacific islands were certainly not designed to ensure the welfare of the inhabitants, to conserve the territory's resources, or to protect the elements of Micronesian civilization.

The Indian delegation proposed that the International Court of Justice render an advisory opinion on the legality of such experiments, bearing in mind the provisions of the United Nations Charter and the Trusteeship Agreement. Pending the Court's opinion, the

¹² U.S. Trusteeship Council, Official Records, "Fourteenth Session, 87th Report of the Trusteeship Council on Petitions for June 2-July 16, 1954" (New York, 1954), 246.

¹³ U.S. Doc. T/PEF/10/28, dated May 6, 1948, T/1235, p. 82.

people but to all the peoples of the free world to maintain at a maximum its capacity to deter aggression and preserve peace. Thus it believes that further tests are absolutely necessary for the eventual well-being of all the people of this world.²⁹

An exhaustive examination was undertaken of alternative sites in this country and in other parts of the world. The conclusion was reached that there were no other technically suitable sites available to the United States where such complete safeguards against possible hazards could be taken.

After considering the two petitions, the Council reaffirmed the position taken in 1954 on the Pacific bomb tests. By a vote of 9 to 4, it urged the United States to take all necessary measures to guard against dangers in the conduct of experiments and to settle claims of the inhabitants of Bikini and Eniwetok relating to their temporary displacement in connection with the 1954 nuclear test.³⁰

The Council's proposal was opposed by the representatives of India, the U.S.S.R., Burma, Syria, and Haiti. Krishna Menon stated that his delegation had never intended to condemn any action or policy of the United States, when proposing that the matter of the mononuclear testing in trust territories be referred to the International Court of Justice. The experiments would be equally regrettable whatever country conducted them and wherever they were held; India felt strongly that the experiments should be stopped. Problems of precautions and of radioactive fallout have far greater implications than those immediately affecting the Marshall Islands.

Tsarapkin considered the use of a trust territory for atomic tests of weapons intolerable. Bikini and Eniwetok were uninhabitable at present and would remain so for a long period, if not forever. This meant that a part of a trust territory had actually been destroyed. U Mya Sein, representing Burma, questioned whether the Administering Authority should conduct nuclear tests within a trust territory without the free consent of the inhabitants. It was immaterial whether the aims of the tests were military or peaceful and what precautions were taken or compensations paid. A careful reconsideration of the problem might lead to a real test of the United Nations Charter. Rafik Asha of Syria and Max Dorsinville of Haiti expressed the hope that the Administering Authority would soon find it possible to settle the claims of all displaced persons in Micronesia and

cially solve the problems and laud claims of the Bikini inhabitants.³¹

The serious irradiation of a number of Japanese fishermen, coupled with the contamination of considerable quantities of fish, caused by the fallout of radioactive ash over a large area of the Pacific Ocean in March, 1954, had an enormous impact on world opinion. The New York *Times* reported that 23 fishermen were killed by atomic particles and 12,000 pounds of fish recovered from public sales were tested and declared dangerous by the Science Research Institute of Tokyo. The log of the vessel showed it to have been eighty miles from Bikini.³²

In England, the Bikini explosion of March, 1954, produced a minor crisis in the Churchill government. Labour party leaders and the *Times* urged the prime minister to seek an immediate meeting with the United States to discuss the outlawing of atomic weapons. Labourites signed a motion which called for the control of nuclear weapons by the United Nations, demanded an immediate ban on further experimentation with the H-Bomb, and proposed that the United States, Great Britain, the U.S.S.R., and the Chinese Peoples' Republic suggest methods for an over-all reduction in armament. Minister of Defense Emanuel Shinwell contended: "We are entitled to have all the information available to the United States arising out of recent tests; otherwise our partnership in defense with the United States is a sham."³³ Churchill cautioned the country that atomic experiments were a vital war deterrent; experiments were an essential part of the defense policy of a friendly power, without whose massive strength and generous help Europe would be in mortal peril.

Drew Middleton declared in the New York *Times*, on April 4, 1956: "It is difficult to escape the conclusion that the most serious casualties from the hydrogen weapons explosions in the Pacific have been suffered by those governments in Britain and Europe, which are the most friendly to the United States. In London, a citadel of the North Atlantic Alliance, the [Churchill] government was under heavy assault by a Labor Party so appalled that it forgot its internal feuds." Anne O'Hare McCormick, in the same newspaper three days later, wrote: "The emotional reactions to the stupendous blasts in the Pacific have spread far beyond the radius of their destructive power. They have whipped up shrill protests against continuing the tests in

²⁹ New York *Times*, March 17, 1954.

³⁰ *Ibid.*, March 28, 1954.

³¹ *Ibid.*, March 31, 1954.

³² Trusteeship Council, Official Records, *Resolution*, *op. cit.*

³³ Trusteeship Council Considers New Petition, from Marshall Islanders, *United Nations Review*, II (May, 1956), 61-63.

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²¹ Quoted by V.

²² Jules Lauren
April, 1955), 111.

²³ N. Arizona,
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If your government were to suspend research and preparation for tests as well as the tests themselves, and resume such preparation only upon knowledge that another nation had actually exploded another H-Bomb, we could find our present commanding lead in nuclear weapons erased or reversed. We must continue—until properly safeguarded international agreements can be reached—to develop our strength in the most advanced weapons—for the sake of all free nations, for the sake of peace itself. We must—and we shall—continue to strive ceaselessly to achieve—not the illusion, but the reality of world disarmament.

Lewis L. Strauss, Chairman of the Atomic Energy Commission, sent President Eisenhower a statement from 12 scientists supporting the policy of continued testing of hydrogen bombs.³¹ On the other hand, 62 scientists at Brookhaven National Laboratory at Upton, Long Island, issued a 350-word statement against further testing.³² Dr. H. Bentley Glass, professor of Biology at Johns Hopkins University, noted that an international agreement on the number of nuclear explosions allowed each nation appeared to be necessary for the safety of the human race. Dr. Ralph Lapp, nuclear scientist, also endorsed controlled disarmament enforced by a unified police corps.³³ In a letter to the *Saturday Review*, July 17, 1954, Albert Schweitzer openly appealed for the cessation of testing.

The basic facts concerning the dangers of atomic radiation are known and generally accepted by many scientists. There are, however, sharp divergences of opinion concerning the amount of radiation that will do permanent damage not only to individuals directly but to future generations. The Medical Council of London in 1953 considered that the then foreseeable hazards from external radiation due to fallout from the test explosions of nuclear weapons were negligible, but added that the world cannot ignore the possibility of more ill effects to the population if the rate of firing increases.³⁴ The International Congress of Human Geneticists which met in Copenhagen in the autumn of 1955 took the position that the "damage produced by radiation on the hereditary material [of man] is real and should be taken seriously into consideration in both the peaceful and military uses of nuclear energy as well as in all medical,

commercial and industrial practices in which x-rays or other ionizing radiations are emitted."³⁵

The March, 1954, hydrogen-bomb explosion in the Pacific led to a manifold unorganized world-wide protest. Subsequent reports on fallout, radioactivity, and biological hazards led to some extent only reinforced the initial reaction. The manifest absence of any firm foundation of knowledge seems apparent in statements issued by professional organizations. Clearly the inevitable and influence of increased radiation on health and the genetic endowment of man must be balanced against the needs for defense and national sources of power. A well-informed public opinion could doubt influence ultimate decisions on weapons testing, at power, and biological hazards in an atomic age.

The United States must constantly re-evaluate security needs in the light of its duties as a trust administrator, for despite the creation of the Pacific Trust area as "strategic," this country has agreed to participate in the over-all United Nations program to lead to mandates toward self-government and independence. Each step must be closely watched by friends and foes; mismanagement will only add to those to whom the words "colonialism" and "imperialism" have sinister connotations.

³¹ *New York Times*, Aug. 7, 1956.

³² *New York Times*, Oct. 16, 1956.

³³ *Ibid.*, Oct. 20, 1956.

³⁴ *The Hazards to Man of Nuclear and Allied Radiations: A Report to Medical Research Council*, CMO 9180 (London, 1956), pp. 69-81. Cf. *Nuclear Explosions, and Their Effects*, Delhi, Indian Ministry of Information and Broadcasting, June, 1956, p. 6.

³⁵ *The Hazards to Man of Nuclear and Allied Radiations*, *op. cit.*, 10-11.