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Damage and Dispossession: Indigenous People and Nuclear Weapons on Bikini Atoll and the Pitjantjatjara Lands, 1946 to 1988

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The nuclear bombs that were dropped on the civilians of Hiroshima and Nagasaki signalled the end of World War II – and the end of old ways of seeing the world. Joseph Masco has written:

Los Alamos scientists created much more than simply a new technology with the invention of a military atomic device in 1945: they engendered new forms of consciousness July 16, 1945, can only be narrated as a moment of historical rupture and transformation...¹

But some things did not change, one of which was relations between major powers and Indigenous people. The newly invented bombs needed testing – and showing off – so all nations involved in the alliances of WW2 and ‘blocs’ of the emerging Cold War needed space. But it had to be space that was not in use by the current, dominant economy – land or waters that were designated as ‘waste’. They could only be waters in the most remote oceanic zones or arid deserts with no agriculture or industrial development. The sites chosen for testing were, of course, never empty. They were places with few people or where residents had little political power – or both. In the 28-year period between the bombs over Japan and the Partial Test Ban in 1963, each of the sites chosen for ‘tests’ by the weapons-testing countries were the homes of Indigenous, often colonised, and always powerless peoples.²

The United States chose either the desert country of Native Americans or mid-Pacific sites, the homes of Micronesian or Polynesian peoples. The United Kingdom chose first its former colony Australia, and then the still-colonised mid-Pacific Kiritimati (Christmas) Island. The Soviet Union chose deserts and then Novaya Zemlya Island off the northern sub-Arctic coast,

¹ J. Masco, *Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton and Oxford: Princeton University Press, 2006), 1.

² See Appendix, drawn from Nic Maclellan, *Grappling with the Bomb: Britain’s Pacific H-Bomb Tests* (Canberra: ANU Press, 2017); R.H Clarke and J. Valentin, ‘The History of ICRP and the Evolution of its Policies,’ *Annals of the International Commission for Radiation Protection* 109 (2009): 75–110; E. Frohberg et al., ‘The Assessment of Radiation Exposures in Native American Communities from Nuclear Weapons Testing in Nevada,’ *Risk Analysis* 20, no. 1 (2000): 101–111.

home of Nenets-speaking indigenous reindeer herders. The French tests from 1960 affected mobile peoples in colonised Algeria, then the Islanders of colonised French Polynesia. The Chinese tested bombs on Uighur lands while the Indian tests in the Thar Desert of western Rajasthan in 1974 affected mobile herders and impoverished sedentary pastoralists.

There is clearly much to be learnt from the experiences of all these Indigenous and disempowered peoples around the world as they faced nuclear testing. Yet the effects of the nuclear testing itself has so dominated the consciousness of the world, just as Masco indicated, that attention has been diverted from the broader context of each of these groups. Because their country had been defined as 'wasteland', these groups had previously faced little direct imposition of colonial control. Not only did they have to cope with the testing programs, but also the intense impacts of encroaching colonisation.

This chapter will address this broader context by briefly reviewing a number of case studies: two on the Bikini Atoll people of the Marshall Islands and two on the Pitjantjatjara in Australia. Drawing on these cases, the paper will raise some of the issues that are not usually identified in discussions of the impacts of nuclear testing on Indigenous people. It will close with the meeting between the Bikinians and the Pitjantjatjara in 1988.

It is important to recognise, however, before turning to these case studies, just how little the military and scientific establishments of any of the testing countries actually knew about the short- or long-term impacts of nuclear weapons. In 1945 it was believed that for most radioactive materials, the severity of the injury was related to the amount of radioactive material to which the person was exposed. This kind of effect is called 'non-stochastic' or non-random, which means that there is a predictable relationship between the level of exposure and the severity of injury, and that a threshold exposure could be defined below which no damage could be caused. For other radioactive materials, any exposure at all can have severe damaging effects (known as 'stochastic', or random). These effects are therefore *not* dose-related, which means that *no* exposure could be considered safe, so that *no* threshold could be set. Despite the years that had elapsed since Marie Curie had discovered radiation, and the injuries it was known to have caused, authorities believed at first that the main effect of nuclear weapons were non-stochastic effects related to the dose of radiation, so that a threshold could be set for maximum allowable exposure.

The first threshold standards were set in 1949 in a meeting between the U.S., the U.K. and Canada, then announced by the International Commission of Radiation Protection (ICRP) in 1951. This threshold was then revised downwards in 1954, 1957 and 1958. As the survivors of the bombs over Japan began to bear children, the damage to foetuses had become evident,³ and as the survivors aged, the longer-term effects of the radiation to which they had been exposed became clear. Illnesses such as leukemia and other cancers were ‘stochastic’ or random damage to human bodies, which could be caused by even very low doses of radiation. Threshold levels continued to be lowered until, in 1990, the ICRP recommended that no exposure at all should be allowed unless there was confirmed benefit to the individual. By 2007 there was, for the first time, recognition of the impact of any radiation exposure, not only on humans but also on non-human species.⁴

As this summary suggests, observing the illness patterns among Japanese survivors of the bombs as they aged was the most important source for the revisions of the exposure threshold. The actual mechanisms by which such damage occurred to living species was only revealed by studying the injuries to the lands and environments – and the Indigenous people themselves – who had to face the tests.⁵

Yet there were few precautionary strategies in place for the nuclear testing that occurred during the 1940s and ’50s, driven as it was by military, political, and economic insecurities. Certainly, the public relations approach in all the testing nations was to assert total confidence in the scientific knowledge of the time and to denigrate, and if possible suppress, any contradictory voices. An International Medical Commission visited Japan in May 1955, gathering results of recent research and surveying data on radiation damage and contamination after 1945 and on the presence of radiation across the Pacific after the March Bravo test. Reporting in *The Lancet*, Dr S. Sevitt, a member of the team, reiterated the Commission’s preliminary report when he ended his accompanying letter:

³ Only in 1954 did early results of genetic testing on foetuses by Japanese doctors begin to circulate among Western doctors. See the International Medical Commission preliminary report of their visit to Japan in 1955: International Medical Commission, ‘Effects of Atomic and Hydrogen Bomb Explosions,’ *The Lancet* 269, no. 6882 (1995): 187, 199–201.

⁴ William C. Inkret et al., ‘A Brief History of Radiation Protection Standards,’ *Los Alamos Science* 23 (1995): 116–123; Clarke and Valentin, ‘The History of IRCP’, 104.

⁵ Martin, Laura J., ‘Proving Grounds: Ecological Fieldwork in the Pacific and the Materialization of Ecosystems,’ *Environmental History* 23, no. 3 (2018): 567–592.

Doctors have to defend the public health [...] It is the duty of doctors all over the world to call for the prohibition of explosions which are a menace both to mankind today and to future generations.⁶

After discussions with U.S. President Eisenhower, British Prime Minister Winston Churchill dismissed the Commission's evidence of severe health effects, both after the 1945 blasts and after the Bravo H-Bomb explosion, of which he said: 'some Japanese fishermen were slightly affected by the radioactivity generated by the second Bravo blast'.⁷

The Bikinians

By 1946, the Indigenous people of Bikini Atoll of the Marshall Islands had been colonised first by Spain and later Germany, then occupied by the Japanese (1942–1945) before being 'liberated' by the U.S. The conflict between the Japanese and American troops was worst on Kwajalein but affected all the other islands, although little is known about the impact on the Islanders. The U.S. assumed control of the islands for the remainder of the war, and the Marshalls eventually become a UN 'Strategic Trust Territory' administered by the U.S., a political position that was equivalent to colonisation.

Immediately after the Japanese surrender in August 1945, the U.S. began looking for a site for further testing of nuclear weapons, both to demonstrate its new weapon to world media as well as to test the impact of nuclear weapons on naval vessels. Bikini Atoll in the Marshall Islands was chosen not only because it was under U.S. control, but because it was far from major shipping lines. It was believed, too, that oceanwater would dissipate any harmful products.⁸ Equally important was that the population was small, easily transported, and it was believed they could be convinced to leave. However, although the Bikinians had converted to Christianity, they continued to value traditional spiritual knowledge.⁹ Central to this

⁶ International Medical Commission, 'Effects,' 201.

⁷ 'Hydrogen Bomb News Prompted Churchill's Washington Excursion,' *Canberra Times*, 14 July 1954, 1.

⁸ Martin, 'Proving Grounds,' 572.

⁹ Jack Niedenthal, *For the Good of Mankind: A History of the People of Bikini and their Islands* (Majuro, Marshall Islands: Bravo Publishers, 2013), 16–22. Jack Niedenthal was a Peace Corps volunteer who married a Bikinian, speaks fluent Marshallese and lived for many years with the Bikini community on various islands. His book records numerous oral history accounts by Bikini community members, including a discussion about the widespread affiliation with Christianity and the continuing influence of traditional spirituality. Niedenthal is currently Secretary of Health & Human Services for

knowledge was their attachment to their atoll home, which supported them through lagoon fishing and the growing of coconuts and other crops. As Jukwa Jakeo, a Bikinian elder, explained it to the American Jack Niedenthal in 1987, using the language of monetary exchange introduced previously by missionaries so that Niedenthal could understand:

I want now to speak about land and the reason we Marshallese treasure it so highly. The land we sit on now as we talk is like gold. ... If you were an owner of land you would be held up as a very important figure in our society. Without land you would be viewed as a person of no consequence.¹⁰

Jakeo was, of course, pointing out that the land was of far deeper significance than any monetary value:

Islanders' traditional religious systems taught that the entire atoll environment was protected by the spirits of the ancestors and enchanted by spirits of the natural world.¹¹

The Military Governor of the Marshall Islands asked the Bikinians in February 1946, using church networks and in language associated with the Bible, if they would move temporarily to another island 'for the good of mankind and to end all world wars'. The community considered the request carefully. Their troubled discussions resulted in an agreement of sorts to a temporary move, with their leader, King Juda, responding, according to his son, with: 'We will go believing that everything is in the hands of God'.¹² Jonathon Weisgall, the lawyer for the Bikinians in their all their subsequent cases against the U.S. government, was far more sceptical of this account of events. He argued that Juda had simply kept repeating 'everything is in the hands of God' until the Governor gave up and stopped asking.¹³

the Marshall Islands Government (appointed 2019) and President of the Majuro Cooperative School (2003 to present).

¹⁰ Niedenthal, *For the Good of Mankind*, 86–87.

¹¹ Many others have made this point explicitly, see for example, M.X. Mitchell, 'Offshoring American Environmental Law: Land, Culture, and Marshall Islanders' Struggles for Self-Determination During the 1970s,' *Environmental History* 22, no. 2 (2017): 212.

¹² Niedenthal, *For the Good of Mankind*, 1, 45. Rubon Juda recollecting his father, King Juda, in an interview with Niedenthal, December 1989.

¹³ Jonathon Weisgall, *Operation Crossroads: The Atomic Tests at Bikini Atoll* (Annapolis: Naval Institute Press, 1994), 113, 162; Stewart Firth, 'Review of *Operation Crossroads: The Atomic Tests at Bikini Atoll*, by Jonathan M. Weisgall,' *The Contemporary Pacific* (Fall 1995): 380–381.

There appears to have been no review of the Bikinians' health status before they departed. Neither the people who recalled their departure,¹⁴ nor the extensive photographic record of that departure, indicated any baseline recording of Bikinians' health. Consequently, any effects from the tests are difficult to assess.

The Bikinians were taken off their atoll in March 1946, shipped to Rongerik, an uninhabited island much smaller than their home, and left there with six weeks' supplies. They found that the plants on Rongerik did not fruit well and the fish in the lagoon were scarce. They were unable to secure enough food from traditional sources and their appeals to the U.S. to replenish their supplies produced only intermittent deliveries of airdropped food. In 1947, the whole area of Micronesia was designated a UN 'Strategic Trust Territory' to be administered by the U.S. which promised to 'protect the inhabitants'. It was the only such Trust Territory the UN created.

While the Bikinians were struggling with hunger on Rongerik, the U.S. Navy supervised the testing of two fission bombs off Bikini, each about the size of the bomb that had been exploded over Nagasaki. As these were intended to be demonstrations, there were many press reporters and politicians invited to witness the tests. To show how powerful the blast was, and to test its effect on naval vessels, 95 captured and U.S. navy ships had been assembled in order to be scuttled by the blasts. The first test, Able, was unimpressive, with the bomb exploding far above and away from the shipping, having little effect.

The effects of the second bomb, Baker, were totally unexpected. Detonated underwater, the explosion threw masses of irradiated seawater and solids, both from the ocean floor and ship debris, into the atmosphere and across the lagoon, over the remaining ships and far more widely, over the surrounding ocean and islands.¹⁵ Unprotected sailors on ships in the vicinity were photographed 'cleaning up' the radiation with scrubbing brushes, lye and soap!¹⁶ On 11

¹⁴ Niedenthal, *For the Good of Mankind*.

¹⁵ Martin, 'Proving Grounds', 571; Kessai Note, 'Memories of Bikini Advocate and Marshall Is President (2000–2008),' interview by Ian Johnstone, *Radio New Zealand*, 5 August 2011, audio, 37:13, <https://www.radionz.co.nz/international/programmes/new-flags-flying/audio/2495114/hon-kessai-note>.

¹⁶ See photograph: 'Sailors wash down the highly contaminated deck of the captured German battleship USS Prinz Eugene (IX 300) after the Able test.' (NARA, Still Pictures Unit, Record Group 80-G, box 2228, folder 627483–627519), in 'Bikini A-Bomb Tests,' Briefing Book #555, ed. William

August 1947, *Life* summarised the official report on the Baker test by stating that ‘If all the ships at Bikini had been fully manned, the Baker Day bomb would have killed 35,000 crewmen. If such a bomb were dropped below New York’s Battery in a stiff south wind, 2 million people would die.’¹⁷

David Bradley, a young surgeon, had been one of the scientific U.S. Atomic Energy Commission (AEC) team who were sent into the test area immediately. They found massive irradiation that sent their counters off the scale. He returned to San Francisco late in 1946, to find that public interest in Bikini had vanished. He realised then that ‘the poisonous results of the tests were de-emphasised by the government and their implications largely ignored by the press’.¹⁸ His widely publicised 1948 book *No Place to Hide* was intended to address that disinterest. Yet the book received mixed reviews, and although it fuelled the anti-nuclear movement and was reissued in 1984, what public attention it did draw was to the test procedures, not to the displaced Bikinians.¹⁹

This was not to be the end of the story of radioactivity in Bikini Atoll. In July 1947, one year after the Baker explosion, a team of American Fisheries Society biologists were contracted by the U.S. government to re-survey Bikini Atoll to assess the level of residual radioactivity. They found little, until they used their Geiger counters on the hydroids, a life stage of the hydrozoans, a class of small aquatic predators related to jellyfish, which had attached themselves to underwater survey equipment. The radioactivity of the hydroids was about a thousand times that of the surrounding lagoon water, suggesting that the hydroids were concentrating what radioactive particles remained in circulation. There were more studies in later years, with more sophisticated equipment, and it became possible to identify that radioactivity was concentrating in the creatures’ digestive systems. In 1972, when Bikinians attempted to return to their atoll, there were to be terrible demonstrations of this process.²⁰

Burr with Stav Geffner. National Security Archive, 22 July 2016. <https://nsarchive.gwu.edu/briefing-book/environmental-diplomacy-nuclear-vault/2016-07-22/bikini-bomb-tests-july-1946>.

¹⁷ Stafford L. Warren, ‘Conclusions: Tests Proved Irresistible Spread of Radioactivity,’ *Life*, 11 August 1947, 86, 88; David Bradley, *No Place to Hide* (Boston: Little, Brown and Company, 1948), xii.

¹⁸ Bradley, *No Place to Hide*, 174–178; Alexander Hammond, ‘Review of David Bradley, *No Place to Hide*,’ *Bulletin of the Atomic Scientists*, 39, no. 9 (1983): 37–39.

¹⁹ Hammond, ‘Review,’ 39.

²⁰ See discussion and references later in this chapter.

Later work was done on Enewetak Atoll, near Bikini, where other U.S. tests were conducted: the U.S. AEC invited scientists to visit, saying it was ‘a perfect aquatic laboratory’.²¹

But in 1947, the Bikinians were still starving on Rongerik. Their pleas for assistance were being ignored. After a series of reports from visiting American doctors expressing concern about their health and eventually a blistering media critique by former Secretary of the Interior Harold Ickes in his syndicated column, ‘Man to Man’,²² it still took months before the U.S. finally rescued the Bikinian population in March 1948. They found themselves dumped into tents on Kwajalein Atoll, next to the airstrip at the U.S. Air Force base. In June 1948, the Bikinians made the collective decision to choose Kili Island as a home and were sent there almost immediately.

Kilon Bauno explained this difficult choice to Jack Niedenthal in 1988:

We lived a strange life on Kwajalein. From day to day we were frightened by all the airplanes that continuously landed very close to our homes. We were also frustrated by the small amount of space in which we were permitted to move around. We had to depend on the U.S. military for everything. We were always asking them to help us in one way or another. We were afraid of this alien environment and almost from the day we got there, we began thinking about another place to live.

We talked about moving to many places like Wotho, Lae and Ujae Atolls. But we encountered the same types of problems with all of these islands. One major factor was that these islands already had people living on them and therefore we thought that we would have social conflicts with the inhabitants because they recognized the *iroij* [leader] of those atolls. We Bikinians did not. We were afraid that they wouldn’t let us live by our own rules and so we began asking the Americans to find somewhere else for us. Then, Dr Mason asked us about Kili Island. We debated among ourselves

²¹ Martin, ‘Proving Grounds,’ 572–578.

²² Harold Ickes, ‘Man to Man’ column, *Honolulu Star*, 29 September 1947, quoted by Jack Niedenthal in ‘A History of the People of Bikini following Nuclear Weapons Testing,’ *Health Physics* 3, no. 1 (1997): 30. Ickes had been U.S. Secretary of the Interior from 1933 until 1946, and wrote these as a syndicated column series, published by various newspapers and later in the *New Republic*. Typescripts of all the columns are held in the Syracuse University Archival Collection.

about where we should go. Finally it came to a vote. We chose Kili by a large majority over Wotho and Ujae as the site of our third temporary home.

They sent some Navy men along with some of us Bikinians to help set up our community there. I remember that time well because we were so tired of all this moving around, building new communities and then having to adjust to new places-- always adjusting, adjusting, adjusting. Now, once again, we had to start thinking of how to move all of our people to this next island.²³

Bauno's account is particularly important as it gives an insight into the psychological stress experienced by the Bikinians:

It was terrible. We were so weary and exhausted, not only by the labour we were going through to get these places ready, but also by these thoughts in our minds: What was happening to Bikini? How long would we be in this new place?

Sometimes we wouldn't eat for an entire day because of the combination of hard work and all the worry that we were experiencing. We were always asking ourselves, 'What are we doing here? What are we going to eat when we get our people to this new place? How will our lives be there?' Questions like this were a great burden for our leaders at that time.²⁴

This decision, however, was only to lead to further problems. Kili Island was small with no inner lagoon, so the Bikinians' traditional fishing methods could not be used. The Bikinians had to fish on the open ocean, which was rough around the island, reducing their catch. Not enough coconuts or other crops could be grown either to support the Bikinians or for the copra trade. When the occasional shipment of U.S. aid supplies did come, the Navy vessels were often unable to dock and unload because of the rough seas. The Bikinians were short of food again, and the long years at Kili after 1948 were years of hunger and frustration.

²³ 'Life While Living in Tents on Kwajalein Atoll,' as described by Kilon Bauno to Jack Niedenthal in 1988 and 1990 (all in Marshallese). Kilon Bauno, who died in 1992, was the *iroij* [leader] of the Bikinians, and, earlier in his life, a councilman. This was his first hand account of life on Kwajalein and the decisions that had to be made by the islanders, which included their transition to Kili Island. As cited in Niedenthal, *For the Good of Mankind*, 53–55.

²⁴ Niedenthal, *For the Good of Mankind*, 54–55.

The Pitjantjatjara: Wallatina

The Bikinians had faced terrifying warfare between America and Japan as well as the longer impact of European presence and Christian conversion. The pressures on the Pitjantjatjara in Australia in the decades before testing began were different but just as debilitating; a period of intensifying colonisation. These western desert people were traditionally mobile, travelling seasonally across wide areas of the Great Western Desert, navigating with the aid of *Tjukurpa* (or Law), the rich bodies of traditional knowledge encoding environmental information and water sources, along with complex oral narratives of creation and law. Relationships between people were mapped onto the landscape and fulfilled at ceremonial gatherings; a strong sense of identify with particular landscapes intensified as men and women grew to maturity.²⁵ At all levels, people and their country were entangled.

These ceremonial cycles continued into the mid-twentieth century, but missionaries were establishing strongholds in the east and west at an increasing pace, and mining companies were penetrating the arid lands, looking for uranium and other metals. At the same time, the presence of pastoral activity at the eastern edges of their country was drawing or forcing many Pitjantjatjara people to the cattle and sheep properties, rapidly interfering with their established social life and land management. But the most devastating catastrophes were the measles epidemics of 1948 and 1957.²⁶

These viral epidemics struck a non-immune population. Prior to WW2, there had been no dense settler populations in inland Australia. Common viral illnesses like measles had not therefore reached the Aboriginal people in the Central Desert. Measles and similar viruses first entered the Aboriginal populations in these areas only once Alice Springs developed to have a substantial European population, including children.

²⁵ There is a substantial literature on the relationships between Western Desert peoples and their land, their *country*. See for example Fred R. Myers, *Pintupi Country, Pintupi Self* (Los Angeles: University of California Press, 1991).

²⁶ For detailed discussions of these epidemics and Aboriginal memories, see H. Goodall, 'The Whole Truth and Nothing But ... Reflections of a Field Worker on the Intersections of Western Law, Aboriginal History and Community Memory,' *Journal of Australian Studies: Power, Knowledge and Aborigines* (special issue) 16, no. 35 (1992): 104–119; and H. Goodall, 'Colonialism and Catastrophe: Contested Remembrance of Measles and Bombs in a Pitjantjatjara Community,' in *Memory and History in Twentieth Century Australia*, ed. Paula Hamilton and Kate Darian-Smith (Melbourne: Oxford University Press, 1994), 55–76.

The 1948 measles epidemic, in particular, took a terrible toll. This viral illness appears to have occurred in all the small scattered settlements of Aboriginal people across the area, including pastoral properties, but it was worst in the larger and more dense settlements like the Presbyterian Mission at Ernabella, as people had been attracted by the missionary activities but there was no hygiene infrastructure. There is extensive missionary documentation of this epidemic, as well as the documentation of Dr Charles Duguid, a medical doctor and co-founder of the mission, who rushed up from Adelaide.²⁷ There was no other outside assistance for the sick, who suffered severe dysentery and respiratory infections as they were weakened by the measles virus. There being such intersecting outcomes for measles infection is a common pattern to this day in developing countries, although most Australians are unaware that experiences in developing countries are so different from their own.

The accounts of Aboriginal people are even more chilling. Perhaps a third of the population of the Mission died within a two-week period; no family was untouched. As the researchers for the Royal Commission into British Nuclear Testing in Australia discovered, the horrifying memories of the measles epidemic were burned into the minds of the Aboriginal people in the region. For some people, these were closed episodes of pain and grief in the past. For others, the memories were like continually troubling open wounds that refused to heal, because they felt there had been no satisfactory explanation for the epidemic's particularly severe impact on their communities until they later learned more about the developments for weapons testing, already underway from 1947.²⁸

Such epidemics racking Pitjantjatjara communities must have compromised their health, yet no reliable baseline health statistics were gathered before the detonations began. In fact, there appears to have been little information gathered at all prior to detonations beginning. The U.K. had been looking for opportunities to test their own weapon systems in order to restore

²⁷ Charles Duguid, *Doctor and the Aborigines* (Adelaide: Rigby, 1972), 156–157; Melba Turner (sister-in-charge, Ernabella), 'First-hand Account of the 1948 Measles Epidemic,' Appendix 2, in *The People in Between: The Pitjantjatjara People of Ernabella*, ed. Winifred Hilliard (London: Hodder and Stoughton, 1968), 230–236.

²⁸ Goodall, 'Colonialism and Catastrophe,' 55–76. As a researcher for the Aboriginal submission to this Royal Commission, and then living in Ernabella, I was involved in extensive oral history and archival historical research and analysis about the period from 1940 to 1975. My article 'Colonialism and Catastrophe' is an extended investigation of the way the 1948 measles episode has been remembered and interpreted among Pitjantjatjara communities.

their standing in the alliance with the U.S. They began in Australia: they built a Rocket Range for the firing of non-nuclear weapons at Woomera, South Australia in 1947, then began testing fission bombs in October 1952, with one explosion on the Monte Bello islands, just off the coast of Western Australia. There is simply no data on either the numbers of people who might have been in the path of the Monte Bello explosions, nor on their health status.

Next the British tested two bombs at Emu Junction, north of Woomera, in October 1953, then two more in haste on the Monte Bellos, in May and June 1956, to gather information for the concurrent British thermonuclear testing on Kiritimati Island in the mid-Pacific.

Unlike the Monte Bello tests, there was somewhat more planning for the next tests, code-named Totem 1 and Totem 2, to be held north of Woomera at Emu Junction in October 1953. A Patrol Officer was directed specifically to protect Aboriginal people: Walter MacDougall, who had been the manager of the sheep flock kept on Ernabella Mission, but had left in 1947 to work at the Woomera Rocket Range. Aboriginal people therefore knew of his association with the testing and he presumably knew some Pitjantjatjara and related languages.

Despite being designated a 'Patrol Officer', MacDougall was given no vehicle, so he had to travel by train. A few weeks before the Totem tests, MacDougall had attempted to enumerate the population around the Emu Junction test site, travelling to Wallatina pastoral property and other camp sites, but he reported that there simply had not been enough time to do a complete job. There were no surveys on Aboriginal health despite knowledge of the widespread experiences of measles and other viral epidemics across the region in the recent past. It can be assumed that these had compromised the health of Aboriginal people at all the settlement areas, not just Ernabella.²⁹

There was, however, substantial documentation created about the conditions of firing the Totem bombs. The meteorologists for the tests were alarmed by the weather conditions, advising in a report known as Report A32 that the wind would be blowing in the same direction through every height, which would act against dispersal of the explosion's radioactive plume and instead concentrate it into a narrow band. If wind direction was over

²⁹ Goodall, 'Colonialism and Catastrophe.'

one of the inhabited areas, such as Wallatina, there would be an unacceptably high radioactive contamination of such populated areas.³⁰

The meteorological advice was ignored. The test had already been delayed 8 days because of poor weather, including rain, and it seems the British military and scientific personnel feared that delay would make the U.K. appear indecisive. Totem 1 was fired in precisely the conditions warned against by the British meteorologists. Its yield was twice that expected and so the warnings issued by the meteorologists were doubly relevant. The persistence of concentrated radioactivity in the detonation plume was demonstrated by the effects on two of the tracking aircraft, which flew through the plume 10 hours after detonation, 400 miles from Emu. On their return to base they were unexpectedly found to be ‘heavily contaminated’.³¹

Yet with all the evidence that the Wallatina or surrounding populations may have been contaminated, no attempt was made to contact them or monitor their future health. There was not even a follow-up population survey: Native Patrol Officer Walter MacDougall did not pass through the area until September of the following year and then only on his way to Ernabella on other business. His failure to notice any problems there was the only British evidence that Totem 1 had not caused health problems. It is difficult to discount the argument that this neglect occurred because the majority of the population at risk was Aboriginal, more vulnerable to radiation because of their prior health and lifestyle but with little access to political power, despite their continued role in the ongoing pastoral operations of the area.³²

The Yanykuntjatjara people at Wallatina did not forget. They spent many years trying to tell authorities what had happened to them. Yami Lester was one – a community leader by the 1970s, working at the Institute for Aboriginal Development (IAD) in Alice Springs, he spoke to many people in the emerging Aboriginal-controlled health service and legal service there.

³⁰ Meteorological Report, A32, the meteorologists’ report to the Weapons Range Controlling Authority detailing their concerns prior to the firing of Totem 1. The document was discovered by Counsel Assisting the Royal Commission into British Nuclear Tests in Australia [hereafter RCBNTA], and discussed extensively in their Report. *British Nuclear Tests in Australia*, vol. 1, 20 November 1985, 216.

³¹ RCBNTA, Report, vol. 1, 20 November 1985, 216.

³² Some years later, once the technology of the pastoral industry changed, with motorbikes and helicopters replacing Aboriginal stockmen on horseback, policies shifted to ‘assimilation’ and patrol officers ‘encouraged’ or forced Aboriginal people to move into larger settlements like Ernabella or towns like Alice Springs.

The investigations they triggered eventually led to the Royal Commission into British Nuclear Testing in Australia and many who had been Wallatina residents testified.³³ Yami later wrote about the events:

I was thinking it might be a dust storm, but it was quiet just rolling and moving quietly This thing came over us – like a black smoke or a mist. The older people said they'd never seen anything like it before. Soon afterwards there was sickness in the camp. One of my uncles was pretty bad: he had sort of blisters all over his body and he never got better. There was no clinic at Wallatina. So they took him off to try to get help for him. But he died there, while they were waiting.³⁴

Yami Lester's mother, Pingkai, testified that she remembered the low dark *puyu* to have deposited a moist, black substance on the leaves and ground, bringing a strong smoky smell that made her vomit. Like Yami, she recalled some people becoming sick and nauseated over the coming days while others developed sore eyes. Rumours of injury at Wallatina did reach MacDougall and his fellow Patrol Officer, Robert Macauley, in later years, but were never followed up.³⁵ The Royal Commission took evidence at Wallatina and many of the people who had experienced the *puyu* there gave evidence, as well as Aboriginal and non-Aboriginal witnesses from the Wellbourn Hill pastoral property and Mintabie opal field who also remembered the low mist.

Ray Acaster was one of the meteorologists who was on duty at Emu Junction during the Totem tests. He was a co-author of Report A32, which had advised so strongly against firing under the meteorological conditions that day. He has since written about the events, and identified elements in Yanykuntjatjara memories that expand on the original Report A32. Acaster believed that, together, the memories and the Report fully explain what happened that day.³⁶ Report A32 had not identified any source of moisture in the fallout plume and had

³³ RCBNTA, Minutes of Evidence: Wallatina; Geoffrey Eames and Andrew Collett, 'Royal Commission into British Nuclear Tests in Australia: Final Submission by Counsel on Behalf of Aboriginal Organisations and Individuals', AIAS R85/56, Adelaide, 1985; Eames and Collett, 'Aboriginal Collation', statements of evidence presented to the Royal Commission, 14 volumes, 1985.

³⁴ Yami Lester, *Yami: The Autobiography of Yami Lester* (Alice Springs: IAD Press, 1993). Quoted in Ray Acaster, 'Sherlock Holmes and the Grim Reaper of Wallatina: Aboriginal Oral History Solves a Scientific Mystery,' *Oral History Association of Australia Journal* 24 (2002): 18, 21.

³⁵ RCBNTA, Minutes of Evidence: Patrol Officer Long, vol 1: 174–194.

³⁶ Acaster, 'Sherlock Holmes.'

strongly emphasised the factor of uniform wind shear through all heights, which it argued would concentrate the radioactive fallout into a narrow cloud. Acaster pointed out in 2002, however, that all the Wallatina survivors recalled the *puyu* being broad and said that it deposited moist or sticky material on skin or on the ground that needed cleaning off. Acaster realised that the crucial factor was the persistence of high moisture content in the atmosphere, reminding readers that the test had been postponed because of rain. Furthermore, he argued that the fallout course through sandhills would have contributed some sideways dispersal to the cloud, ensuring that it was wider than the original Report A32 had predicted. Acaster has argued that the conditions at the time, confirmed by the memories of Aboriginal survivors, would indeed have created a moist, sticky, and highly radioactive cloud that moved low and wide in the directions suggested in A32. This meant it would have enveloped not only Wallatina but Mintabie and Welbourn Hill, and it was Aboriginal and non-Aboriginal people from these places that gave evidence to the Royal Commission that they remembered seeing the dark low cloud rolling silently towards them.

The southern Pitjantjatjara

The southern Pitjantjatjara are the focus of this fourth brief review. The British began planning in 1954 to develop a permanent test ground to the west of Woomera, in an area they named Maralinga, supposedly meaning ‘field of thunder’ although the actual language from which the word was taken has never been confirmed. These were extremely arid lands, but the southern Pitjantjatjara were known to travel regularly from the more well-watered areas of the Musgrave Ranges in the north (where Ernabella was situated to the east), down across the desert lands on which Maralinga is situated, towards Ooldea (a community presided over by the missionary Daisy Bates), and the Great Australian Bight. There were ceremonial sites in this arid area that were of significance and needed to be visited.

Tests were conducted at Maralinga in 1956 (four bombs code-named Buffalo) and 1957 (three bombs called Antler). After the Buffalo tests, but before Antler, a small family group, the Milpuddies, had followed a traditional route from the north directly into the Maralinga test area and had camped in a Buffalo bomb crater. Range staff had no idea of their presence until the Milpuddies walked into a radiation monitoring area set up near the bomb sites. Edie Milpuddie, her husband, and two small children were met with panic by Range staff. They were hurriedly tested and found to be contaminated, although adequate records of those

measurements were not kept. The family was then showered, their dogs were shot before their eyes, and they were hustled off to Yalata, a Lutheran mission set up in 1951.

Although other members of the family appeared to have suffered few immediate health effects, Edie Milpuddie's experience was different. She was pregnant at the time of her radiation exposure, a fact of which Weapons Research Establishment (WRE) was unaware because they did not attempt to gain effective or appropriate interpretation. Immediately after her arrival at Yalata, Edie went into labour, with her child stillborn. Edie and the Yalata women who assisted her in this labour are usually deeply reluctant to discuss 'woman's business' in public, but they spoke out at the Royal Commission in 1985 because they attribute the stillbirth to 'the poison' to which Edie had been exposed.

The sole concern of Australian and U.K. authorities was to cover up the Milpuddie's experience, as it was feared that such publicity would jeopardise the test programme given increasingly critical public attitudes in 1957. The staff who had witnessed the incident were threatened with 30 years jail under the Official Secrets Act should they ever reveal what had happened, and the family themselves were ignored once they had been dumped at Yalata. The priority was quite simply the tests rather than the safeguarding of Aboriginal health. There was no attempt at follow-up health monitoring.³⁷

The effects on Aboriginal people were not limited to their physical health. All the Western Desert owners of the lands that were designated 'prohibited' around the new Maralinga site suffered significant cultural disruption as access was denied to them for traditional ceremonies and travel. The northern Pitjantjatjara recall that the Patrol Officer MacDougall attempted to compensate for his lack of surveillance staff by threatening the Pitjantjatjara away from their lands, terrifying them with mixed images drawn from what he knew of WW2 bombs, traditional culture and a limited understanding of radiation, suggesting evil spirits, death, and horrible disease if they should venture south. The psychological impact of these threats is impossible to estimate, but the social effect of isolating the northern Pitjantjatjara from those in the south, by breaking their established desert travel routes, has been real and persistent.³⁸

³⁷ RCBNTA, Report, vol. 1, 319–322.

³⁸ See P. Toyne and D. Vachon, *Growing Up the Country: The Pitjantjatjara Struggle for Their Land* (Melbourne: McPhee Gribble, 1984), 33–51.

The southern peoples also suffered both in health terms and culturally. After Ooldea Mission closed in 1952, Aboriginal people had remained living there as they always had, but the selection of nearby Maralinga as the test site in 1954 ensured their removal to Yalata. Many attempted to return to their own country to the north and east but were turned back by Patrol Officer MacDougall and forced to return to Yalata. Not satisfied that the desert Anangu would remain on the coast, MacDougall coerced a number of senior men to return to the area north of Ooldea and Maralinga, to locate and remove all sacred ceremonial objects. MacDougall called this a ‘clean up’, which he believed would remove any motivation for Aboriginal people to return. He was wrong: ceremonial demands and the poor, unhappy conditions at Yalata led many Aboriginal people to trek northwards and MacDougall found he was frequently called on to turn back groups of Pitjantjatjara trying to regain their own country.³⁹

In a further bizarre strategy, MacDougall influenced the adoption of a moving rationing system at Yalata, which he hoped would keep the Pitjantjatjara residents occupied. Food and water were supplied only at a sequence of depots placed around the reserve land. So the Pitjantjatjara were put on an endless treadmill, shuffled from one tank to the next around the boundary fences of their jail, in a parody of traditional life.⁴⁰ The cost of this cultural assault can be measured by the history of conflict, dissatisfaction, alcoholism, and petrol-sniffing at Yalata, as well as by the persistent Anangu demands, continued to the present, to be allowed to return to their country.

Even in his own terms, MacDougall could not do his job: he believed his patrols before the Totem tests at Emu Junction to have been barely adequate and he knew he had failed to survey fully the ‘prohibited zone’ before the Buffalo tests at Maralinga. An additional Patrol Officer, Robert Macauley, had been appointed for the Maralinga area, but even working together, the patrols succeeded only in a low intensity cover of an arc that went south, east, and north of the test sites. The area west of the ‘prohibited zone’ was not patrolled until the late 1950s, when MacDougall belatedly began to suspect what was confirmed in 1960: an extended family group of at least 15 Aboriginal people had been living continuously in the

³⁹ Eames and Collett, ‘RCBNTA: Final Submission.’

⁴⁰ Eames and Collett, ‘RCBNTA: Final Submission,’ 431–433.

northwest of the zone throughout the testing. MacDougall protested bitterly at the lack of resources WRE gave the officers: his protests were dismissed contemptuously, and he was labelled 'subversive'. He was threatened with dismissal by the Australian government in 1956 for 'placing the affairs of a handful of natives above those of the British Commonwealth of Nations'.⁴¹ Yet even MacDougall's view of the limited value of the patrols was optimistic: he continuously overestimated his own knowledge and so the ease with which Aboriginal people penetrated the prohibited zone from the north came as a total surprise to him.⁴²

The Pitjantjatjara continued to demand the return of their lands, which became reality when 76,420 square kilometres of land surrounding the Maralinga and Emu test sites were granted to them permanently in the Maralinga Tjarutja Land Rights Act [South Australia] of 1984. The Pitjantjatjara selected a central campsite at Oak Valley, near Lake Dey Day, northwest of Maralinga. Between 70 and 100 Aboriginal people began permanently living and foraging on these lands; the need to make the old Prohibited Zone safe once more for human occupation became all the more urgent. Yet the research around the Royal Commission demonstrated that the 'minor trials' in these areas were in fact often major explosions. Many led to the wide distribution of highly radioactive contaminants, such as plutonium and cesium-137, each with long half-lives, over vast distances, well outside the boundaries of the old 'Prohibited Zone'.⁴³

Bikinians and their ill-fated return

The Bikinian community had lived unhappily on Kili for some years, but kept on asking when they could return to their home. The U.S., however, continued testing nuclear weapons, using Enewetak Atoll as well as other Marshall Islands locations, and then began using Bikini Atoll to test its new fusion bombs with two tests in 1952. In 1954 a third H-bomb was detonated, codenamed Bravo.

⁴¹ Alan Butement, Chief Scientist, Australian Department of Supply, see Eames and Collett, 'RCBNTA: Final Submission,' 300; RCBNTA, Report, vol. 1, 309. Butement was British-born and educated and it is hard to believe he was not expressing the interests of the British government here as well as those of the conservative Australian government of Robert Menzies.

⁴² Eames and Collett, 'RCBNTA: Final Submission,' 25–38, 63–86; RCBNTA, Report, vol. 1, 299–319.

⁴³ RCBNTA, Report, vol. 2, 395–415, and Appendix G: Chronology, 8–11.

Bravo was far more powerful than its American makers had expected, blowing apart much of the atoll's coral reef (inadvertently greatly advancing reef science!). Not only was it far larger than expected, it was dirtier. It produced far more radioactive debris than predicted, which fell as white ash across many of the islands of the Marshalls group, as well sending a plume of less visible radioactive particles far across the ocean. In the process, it irradiated the crew of the Japanese fishing boat, the *Daigo Fukuryū Maru* – known as the *Lucky Dragon Number 5* – which limped home with its crew already ill and one dying. The survivors remained in hospital for months.⁴⁴

While there had been little attention paid in the past when it was Marshall Islanders facing irradiation, this injury to an international crew – even though they were humble fishermen – brought the major U.S. failure to predict the consequences of the explosion and ensure safety precautions to worldwide notice. While the Baker detonation at Bikini Atoll in 1946 and Totem 1 at Emu Junction in 1953 were each more destructive than expected, it was Bravo in March 1954 that woke the world to the risks of continuing nuclear testing.

Yet, in the Cold War climate, the Americans kept on testing at Bikini – although there was increasing global protest and mobilisation of opposition. The U.S.S.R. had exploded an H-bomb in a test in August 1953, a year before the U.S. began their H-bomb tests. The British decided that they too needed to have H-bomb capacity and began testing at Kiritimati (Christmas) Island in its colony of the Gilbert and Ellis Islands group in the central Pacific, later to become independent Kiribati. The first U.K. fusion test there, Grapple 1, was in May 1957 and drew on information from the 1956 Australian tests at Maralinga. Further Grapple tests occurred throughout the rest of 1957 and 1958.⁴⁵ Eventually, after a series of false starts, a Partial Test Ban Treaty was signed by the U.S., the U.S.S.R. and the U.K. in August 1963, which banned above-ground testing, although the British (and no doubt the others) continued 'minor trials'. These were based at Maralinga, and contributed major contaminants to the test sites for years afterwards.

⁴⁴ Oishi Matashichi, *The Day the Sun Rose in the West: Bikini, the Lucky Dragon and I* (Honolulu: University of Hawai'i Press, 2011), 26. For an account in the Japanese press, see front page of *Yomiuri Shimbun*, 16 March 1954, with headlines 'Japanese Fishermen Encounter Bikini Nuclear Test'. The Australian teacher Lucy Woodcock visited Japan and reported to the NSW Peace Council, published in *Tribune*, 10 August 1955, after interviewing the survivors of the *Lucky Dragon* in hospital where they were 'quarantined'. See also the animated film directed by Keith Reimink, *Day of the Western Sunrise* (2018, animation, 75 minutes).

⁴⁵ Maclellan, *Grappling with the Bomb*, 1–17.

In 1968, the Bikinians were told that they might be able to return to Bikini Atoll at some stage in the future once residual radiation had been assessed.⁴⁶ The surveys produced debatable results and, at the same time, the risks of radioactive exposure were increasingly recognised and allowable radiation limits continually revised downwards, as discussed earlier. Bikinians were deeply troubled by this indecision and were reluctant to return unless their safety could be assured. Their leaders travelled to Washington seeking reassurance but were not satisfied.⁴⁷ There were promises of an effective ‘clean-up’, re-building had proceeded and the planting of the coconut trees was finally completed, but then in late 1972, just as the Bikinians were told it was all safe, the AEC announced that the coconut crabs on Bikini Island were still radioactive and could be eaten only in limited numbers.

The conflicting information on the radiological contamination of Bikini caused the Bikini Council to vote not to return to Bikini at the time previously scheduled by American officials but the Council did not try to dissuade those individuals or families who wished to return.⁴⁸ Three extended families did go back, along with workers from other Marshalls islands to help with continued building. By mid-1975, there were 139 people living on Bikini, while a series of scientific investigations added further concerns. Higher levels of radioactivity than expected were beginning to be detected and it appeared that some water sources were dangerously high in radioactivity. Late in 1975, the AEC, on review of the scientists' data, decided that all the local foods grown on Bikini Island, i.e. pandanus, breadfruit and coconut crabs, were also too radioactive for human consumption. In October 1975, after these new, confusing, and terrifying reports, the Bikinians filed a lawsuit in U.S. federal court demanding that a complete scientific survey of Bikini and the northern Marshalls be conducted. The lawsuit stated that the U.S. had used highly sophisticated and technical radiation detection equipment at Enewetak Atoll but had refused to employ it at Bikini. The Bikinians won this case, although the U.S. Departments of State, the Interior and Defence bickered for three years about who would pay to have the survey conducted.

⁴⁶ Niedenthal, *For the Good of Mankind*, 7–12.

⁴⁷ Niedenthal, *For the Good of Mankind*, 82–85.

⁴⁸ Jack Niedenthal, ‘A Short History of the People of Bikini Atoll,’ accessed 18 August 2020, <https://www.bikiniatoll.com/history.html>.

While waiting for the radiological survey to be conducted, further discoveries of radiological dangers were made. In May 1977 the level of radioactive strontium-90 in the well water on Bikini Island was found to exceed the U.S. maximum allowed limits. A month later a Department of Energy study stated that ‘All living patterns involving Bikini Island exceed Federal [radiation] guidelines for thirty-year population doses.’⁴⁹ In April 1978 medical examinations performed by U.S. physicians revealed radiation levels in many of the 139 people on Bikini to be well above the U.S. maximum permissible level. The very next month U.S. Interior Department officials described the increase in radioactive cesium 137 in the examined Bikinians as ‘incredible’. It seems that, just like the tiny hydroids found by accident to be radioactive in 1947, the human Bikinians were bioaccumulating the atoll’s residual radioactivity only in specific organs of their bodies.⁵⁰

The Interior Department then announced plans to move all the people from Bikini ‘within 75 to 90 days’, and so in September of 1978, Trust Territory officials arrived on Bikini to once again evacuate the people who were living on the atoll. An ironic footnote to the situation is that the long-awaited northern Marshalls radiological survey, forced by the 1975 lawsuit brought by the Bikinians against the U.S. government, finally began only after the people were again relocated from Bikini.⁵¹

Conclusions

All of these stories have been told in more detail elsewhere, but taken together they suggest some of the overall themes that need to be considered. First, the Indigenous peoples in the isolated, arid ‘wastelands’ or remote oceanic areas that were chosen as test sites were likely to already have compromised health because of the disease effects of recent colonisation and the impacts of warfare. The effects of any exposure to testing-induced radiation was likely to be even worse than if they were suffered by a more robust population.

Second, the definition of places such as the Western Desert in Australia as ‘wasteland’ and the oceans around Bikini Atoll as ‘remote’ and ‘unused’ were definitions that ignored their cultural significance to the Indigenous land and ocean owners. The failure to recognise such

⁴⁹ Niedenthal, *For the Good of Mankind*, 10.

⁵⁰ Niedenthal, *For the Good of Mankind*, 10; Martin, ‘Proving Grounds,’ 582.

⁵¹ Niedenthal, *For the Good of Mankind*, 12, 87–88.

alternative cultural meanings not only led to irreparable damage of sites of significance and permanent destruction of lifestyles into the future, but also severely compromised any attempt to offer protection to people near the test site. In just one example, failure to recognise the importance of ceremony to the Pitjantjatjara, condemned to failure all attempts to obstruct their movements into the irradiated test zones.

Third, there was severe ignorance about the effects of radiation damage as well as about the outcome of any nuclear explosion. Taking the long view of these decades of nuclear testing, it is clear that far more was learnt thirty or forty years after the first bombs were exploded over Japan than had been known in 1945. The inability to predict accurately either blast power or radiation results of both fission and fusion explosions was demonstrated over and over again. ‘Unanticipated’ outcomes were far more common, either by overestimating predictions of bomb yields or, more catastrophically, by underestimating predictions of yields, than were accurate predictions. In each case, whether by displacement or by damage, it was invariably Indigenous and/or disempowered peoples who suffered the consequences.

Fourth, it was clear in the documentation of both the U.S. and U.K tests that there was only contempt and disinterest for the Indigenous peoples whose lands and waters were being damaged for the testing. The interests of the testing countries were in each case the overriding concern. British-born Australian Chief Scientist, Alan Butement threatened to sack Patrol Officer Walter MacDougall when he expressed concerns about the inadequacy of protection for Aboriginal people in 1956, saying MacDougall was ‘placing the affairs of a handful of natives above those of the British Commonwealth of Nations’.⁵²

Fifth, each of the groups of people who were moved off their lands were tenacious in their sustained desire and demands to be returned to their homes. In the case of the Bikinans and the Pitjantjatjara, the two peoples whose stories have been told here, each remained committed in their demands to be allowed to return to their homes or, at the very least, to insist on the remediation of the damage that had been done. This commitment to their country, and their sustained and often courageous advocacy for its repair, lasted decades and indeed continues to this day.

⁵² Alan Butement, Chief Scientist, Australian Department of Supply, see Eames and Collett, ‘RCBNTA: Final Submission,’ 300; RCBNTA, Report, vol. 1, 309.

Sixth, the nature of the damage they suffered in these tests has never adequately been recognised. This paper has already pointed out the situation of the people in each of the test areas discussed, who already had compromised health conditions before tests began, which made them even more vulnerable to the damage that blasts and radiation could do. The many campaigns to support the people displaced by the testing programs has however concentrated on somatic (physical) damage. As the epidemiologists who gave evidence before the Australian Royal Commission into British Nuclear Testing made clear, with no baseline data and very little data collected after any of the tests among the irradiated or displaced populations, it would be difficult to identify damage. In addition, these populations were all relatively small, and epidemiology – particularly in cases of radiation damage – needs ‘big data’. With small population figures, it is simply impossible to separate out the patterns of radiation damage from other forms of environmental damage.

Yet what each of these case study reviews indicate is the intense trauma and distress that each of these groups of people suffered. Whole communities of people were worried literally sick for decades about the risks to themselves, the risks to their homes, the risks to their futures. Kilon Buano’s account of how exhausted and deeply distressed the Bikinian leaders were in the face of so much uncertainty and the demands to make such terrible decisions is deeply moving – and gives just a hint of the burden that so many people carried for many years. Just as heart-rending were the memories of some Aboriginal people at Ernabella, recorded during the Royal Commission research, about their years of worrying over the causes of the measles plague and their conviction that only the poison of warfare associated with the bomb-tests could explain why it was only their people had died in such terrible numbers.⁵³ The burden of such sustained anxiety can only have added intolerably to the deep distress of displacement and the loss of a future.

None of this was seen by the many people all over the world who were horrified by the news of the Bravo test on 1 March 1954. This appalling detonation produced far more radioactive contaminants than had been expected.⁵⁴ All the newspaper reports covering the problems

⁵³ Goodall, ‘Colonialism and Catastrophe.’

⁵⁴ International Medical Commission, ‘Effects,’ 187, 199–201. The Commission pointed out that although the widespread contamination of crop-bearing land in Japan and the fish across the Pacific (from the coast of Japan south to PNG and Australia, and from Taiwan in the west to Hawaii in the

with the Bravo detonation addressed the radiation dangers posed for world populations and the dangers of such a weapon for world peace. Yet the failure to predict the effects of the detonation was only really exposed because it caused an international incident by injuring crewmembers of another country's vessel – mobilising global concern and protest that Winston Churchill described as an 'intense sensation'.⁵⁵ It energised the Peace movements across the West and much of Asia, which continued to build strength and finally to exert real political power in many of the countries that had led the testing program.⁵⁶ And yet, very few of the Peace activists of the 1950s and '60s were aware of, or interested in, the Indigenous peoples like the Bikinians and the Pitjantjatjara. It was only after many years – and still more wearying journeys by the leaders of the Indigenous peoples themselves – that their stories began to be told.

The very isolation that made their lands and seas so attractive as nuclear test sites also made it harder for the people who carried the real burden of the tests to get their stories out into the world, but also to meet each other and to build a united front. As any of the narratives of these people's movements makes clear, spokespeople travelled endless miles across oceans or deserts – or both – to campaign for justice and to build support. Archie Barton was a spokesperson for the Maralinga Tjaraja community during the Royal Commission and, after the Land Rights Act had restored title, he became a tireless advocate for a serious clean-up of the continuing contamination of Aboriginal lands. It was in this role that he made the long journey to meet the Bikinians on Kili Island early in 1988. By this time, both communities had gained title of sorts over their homes, although Bikinians had been displaced a second time and the Pitjantjatjara, although now owning the title to Maralinga, had no effective access because, just like Bikini Atoll, the land was still contaminated. Barton invited the Bikinian leaders to come to Pitjantjatjara lands to meet the elders, who were the authorities on whose behalf the whole campaign had been waged.

east), the health impacts on the Marshall Islanders were far worse as they suffered 'the bloody diarrhoea, epilation and leucopenia of radiation disease'.

⁵⁵ 'Hydrogen Bomb News Prompted Churchill's Washington Excursion,' *Canberra Times*, 14 July 1954, 1. For an account in the Japanese press, see the front page of *Yomiuri Shimbun*, 16 March 1954, with headline 'Japanese Fishermen Encounter Bikini Nuclear Test'; also 'Death Ash', photograph and translation in Matashichi, *The Day the Sun Rose*, 26.

⁵⁶ Lucy Woodcock's reports to NSW Peace Council, *Tribune*, 21 December 1954; 10 August 1955, after interviewing the survivors of the *Lucky Dragon* in Japan.

The Bikinian leaders decided to take up the invitation and a group of them, led by elder Nathan Note, set out for the meeting, with Jack Niedenthal as assistant.⁵⁷ It took five days of air travel – via Adelaide and Ceduna – before the Bikinians arrived in Oak Valley (apparently thinking it was Maralinga itself) to meet the Pitjantjatjara community. With Niedenthal acting uncomfortably as interpreter, and with a degree of confusion on all sides, the elders of both communities told each other their people’s respective exodus stories and conferred about what strategies might be most helpful in applying pressure to achieve effective clean-ups. Niedenthal wrote:

I studied the small circle that was a mix of islanders and aborigines as we sat around trying to figure out just what was up with all this. I thought about how this grouping personified the tragedies that can result when larger nations, in their unquenchable struggle to become even more powerful, show callous disregard toward a smaller country and the ancient human life that resides within its borders.⁵⁸

Despite the challenges for the two groups, each of them has continued to travel and to campaign for justice. But the major change since 1988 has been the placement of satellites, which allows these small, remote, and embattled communities to have full use of the internet. Each of these communities now is networked into the various global Indigenous, anti-nuclear, and environmental movements, overcoming the deep disadvantage that they each faced when they had to travel for five days to reach each other. Yet for both groups, the problems of residual contamination continue to haunt their relationships with their homes and their futures.

⁵⁷ Niedenthal, *For the Good of Mankind*, 65–67.

⁵⁸ Niedenthal, *For the Good of Mankind*, 67.

Appendix

DATE	BOMBERS	LOCATION & TYPE	LAND (& SEA) OWNERS
30 June 1946	U.S.	Bikini Atoll, Marshall Islands. Fission.	Marshall Islanders affected by fallout. Bikinians displaced.
29 Aug 1949	U.S.S.R.	Semipalatinsk, Kazakhstan. Fission.	Mobile peoples on border between Kazakhstan and Russia.
27 Jan 1951	U.S.	Nevada Test Site, 65 miles north of Las Vegas.	Lands of Shoshone and Southern Paiute peoples. All those downwind of the test site, particularly in Utah, experienced radioactive fallout effects. Native peoples (Shoshone, Southern Paiute, and others) living on their lands received 'substantial exposure' due to diets, e.g. eating small game, see Frohberg et al, 'The assessment of radiation exposures'.
3 Oct 1952	U.K.	Monte Bello Islands, Australia. Fission.	Aboriginal people in mid-western Australia.
1 Nov 1952	U.S.	Bikini Atoll. First fusion explosion	Marshall Islanders. Bikinians remain displaced.
15–27 Oct 1953	U.K.	Emu Junction. Fission. Code named <i>Totem 1</i> and <i>Totem 2</i> . <i>Totem 1</i> fired against meteorological advice and far larger than expected.	<i>Pitjantjatjara-Yanykuntjatjara</i> people at Wallatina, and non-Aboriginal people at Mintabie and Welbourn Hill station saw fallout cloud and may have suffered effects.
1 Mar 1954	U.S.	Bikini Atoll, third ever fusion (H-bomb), code named <i>Bravo</i> . Far larger blast than expected. Wide surrounding region irradiated.	Marshall Islanders affected by fallout. The <i>Lucky Dragon</i> , a Japanese fishing boat, severely affected by fallout, one death, surviving crewmembers hospitalised for months.
July 1954	U.S.S.R.	Novaya Zemlya Island (a sub-Artic island off north coast of Russia). First Soviet fusion test.	<i>Nenets</i> (Samoyed peoples), indigenous mobile reindeer herders (similar lifestyle to <i>Sami</i> in Scandinavia).
16 May & 19 June 1956	U.K.	Monte Bello Islands.	Aboriginal people in WA.
27 Sept–22 Oct 1956	U.K.	Maralinga.	<i>Pitjantjatjara</i> and others, central and southern South Australia.
15 & 31 May & 19 June 1957	U.K.	Gilbert & Ellice Island – Malden Island. First U.K. fusion bombs. Code named <i>Grapple</i> .	Kiribati Islanders.
14 Sept–9 Oct 1957	U.K.	Maralinga. Fission, <i>Antler</i> series. Three bombs	<i>Pitjantjatjara</i> and others, central and southern South Australia, displaced.
8 Nov 1957	U.K.	Gilbert & Ellice Islands colony: Kiritimati	Kiribati Islanders.

		(Christmas) Island. <i>Grapple X</i> . Fusion.	
28 Apr, 22 Aug 1958	U.K.	Gilbert & Ellice Islands colony: Kiritimati (Christmas) Island. <i>Grapple Y</i> and <i>Grapple Z</i> . Fusion	Kiribati Islanders.
28 Apr–18 Aug 1958	U.S.	Enewetak Atoll, Marshall Islands and Johnston Atoll, north Pacific.	Marshall Islanders. Johnston Atoll between Marshalls and Hawaii.

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