Australian Histories Podcast: Episode 68. Atomic Australia

*Note: citations included in this transcript are used more as memory prompts for me in writing the episode than for strict academic purposes.

The beginning of the atomic age has marked a rather scary escalation in our ability to self-destruct, but once the atomic technology genie was out of the bottle, it was clear that nothing would ever be the same, and no clock could be turned back to return us to a pre-nuclear age.

Of course as soon as the Americans had mastered the a-bomb, so other countries also felt the need to keep up and arm with these new weapons. Australia was not in apposition to do so itself, but it took a very supportive & enthusiastic roll, in helping the British get there. So today we're going to look at the dawn of the atomic age in Australia.

Most people will have heard of Oppenheimer, knowing he was pivotal in the success of the Manhattan Project; the American project which produced and successfully tested the world's first atomic bomb, on July 16th, 1945, at the Trinity test site in New Mexico. That bomb, nicknamed "The Gadget," marked the beginning of the nuclear age. What fewer people probably know, is that the British had begun their own atomic bomb building project, codenamed "Tube Alloys", six weeks prior to the commencement of the Manhattan Project. So it's the Brits who can claim, for those few weeks at least, to be the west's nuclear trailblazers.

When the Physics department at Birmingham University in the UK, headed by Australia's Mark Oliphant by the way, demonstrated that a uranium powered atom bomb was theoretically possible, in a paper written by Jewish refugees Otto Frisch & Rudolf Peierls in 1940, it led to Churchill establishing a British atomic bomb development program, on August 30th, 1941. (Grace, Paul. 2023, pp. 2–3)

Initially the Americans offered to work with the British in a joint project, but when that offer was not enthusiastically accepted by Britain, with no time to waste, each country began their own programs independently and the American Manhattan Project was instigated too. It was a poor decision on Churchill's part perhaps, because while they may have had their own British brainiacs on hand to work out the science, in the middle of a war, and war zone, Britain was not able to throw the money and manpower at such a mission, and they soon stalled while the Americans raced ahead.

Churchill soon afterwards tried to revive the offer of a partnership, but the Manhattan Project was by then up and running independently. British scientists, physicists and engineers were later seconded, and graciously allowed to contribute their expertise to the Manhattan Project, but it was no longer as an equal, joint venture, and they remained ever the bridesmaids. (Grace, Paul. 2023, pp. 2–3). Indeed, while the United States was the primary driving force, the Manhattan Project benefitted from contributions from many scientists who had fled fascist regimes in Europe, and from the substantial contributions of scientists and engineers from the United Kingdom and Canada for example, so it was an international effort really.

Following that successful test of "The Gadget", only months later, 2 more atomic bombs were dropped on Hiroshima, and Nagasaki, leading to Japan's surrender, and bringing an end to World War II.

However, with the post war recovery focus and the changing geopolitical landscape, the United States and the Soviet Union emerged as the two world superpowers, and the ideological differences between them, led to the onset of the 'Cold War'. And so the nuclear arms race really kicked off.

The US was the sole possessor of atomic weapons for a brief period after the war, giving them the strategic advantage. And keen to maintain that advantage, they became increasingly concerned about the security of nuclear information and technology, for civilian and military uses.

They developed a policy of nuclear non-proliferation, advocating for the prevention of the spread of nuclear weapons to other countries, and they enacted The McMahon Act, also known as the *Atomic Energy Act of 1946*, to control and regulate the dissemination of nuclear information. This act restricted the sharing of atomic energy information with other countries, including previously close allies like the UK.

While collaboration on certain aspects continued, the level of sharing was significantly reduced, compared to the wartime cooperation during the Manhattan Project. Certainly the fear of potential leaks and espionage was another reason for their more restrictive approach to sharing sensitive information. And this fear was not without foundation.

One notable case that contributed to these concerns was the detection of Klaus Fuchs, a Germanborn physicist and a member of the British delegation to the Manhattan Project, who was later outed as a spy. Working on the British atomic bomb project before the war, and later as part the Manhattan Project team, he had begun passing classified information to the Soviet Union in 1943. At that time, with Germany still in the war, the Soviet Union was an ally of the United States and the United Kingdom, but tensions were already rising, and it was clear the Soviets might become a problem.

Fuchs continued to pass on classified information, including details about the design of the American atomic bomb, and he was not uncovered and arrested by the British until 1949. And we learned later of course, that the British intelligence agencies leaked like a sieve, being riddled with spies working for the Soviets, so the anxiety of the Americans had been well placed. Collaboration had ceased in August 1946, after the Atomic Energy Act was passed. (Grace, Paul. 2023, p. 8). (Grace, Paul. 2023, p. 14) The British were afterwards on their own if they wished to continue nuclear development. And they did.

They had the expertise, but very limited money and resources to put to the project in post war Britain. But with the Soviets also now in the race to arm, they felt it was imperative to build and test their own weapons within 10 years, to act as a deterrent to Soviet aggression.

First they needed nuclear power plants that could manufacture the plutonium required, which they began building immediately, but without the desired American blueprints, they would need to devise, build and test the complicated atomic weapons from scratch, to ensure they would work as desired. And it was the bomb *testing* phase that drew them to Australia in the early 1950s.

The first of the tests, known as Operation Hurricane, took place in October of 1952 on the Montebello Islands off the northwest coast of Australia. Subsequent tests, including those at Emu Field and Maralinga on the Australian mainland, continued over the following years. But for today's episode we will focus mainly on the first of these tests, undertaken at the Montebello Islands.

There are now a number of resources available after all these years, but I will be getting a good deal of today's material form the research that **Paul Grace** did in his book **Operation Hurricane: The story of Britain's first atomic test in Australia and the legacy that remains**. I was not able to get access to the official **"A history of British atomic tests in Australia" by J L Symonds**, created on behalf of the then Department of Resources and Energy in 1985, but I note that Grace has used it in his writing. As always, full details of references used will be on the episode webpage at Australian Histories Podcast .com.au

The Americans had undertaken their atomic testing in their own country, and in other places such as the Pacific. (Grace, Paul. 2023, p. 15) They had dropped them from purpose built towers and planes, detonated them in deserts, underwater and underground, but one horrific scenario that bothered the British, needed more thorough testing. Their fear was that a merchant ship controlled by the Soviets might smuggle an atomic weapon right into one of the many international British ports. They wanted to assess the

effects of an atomic explosion in a port or harbour, produced by the firing of a device mounted below the waterline, in the hold of a ship. (McLELLAND [no date], p. 103)

They needed to know how such an explosion might affect the surrounding environments, while testing the efficacy of their newly built weapons. But they needed to find an appropriate site. Obviously islands surrounding Britain were ruled out, the area being geographically limited and pretty highly populated.

They approached the Americans for use of one of their sites, but they got no response. 'Refusal may offend' apparently, so the US simply stalled and *hummed* and *haared* and said nothing, and time was ticking on for the British. They examined atolls in the pacific, and sites around Commonwealth Canada and Australia, but after much consideration, the Montebello Islands off our North West coast seemed to meet most of their criteria.

In September 1950, the British Prime Minister, Clement Attlee, sent a classified letter to the Australian Prime Minister, Robert Menzies, advising that they were looking for a suitable site for testing their atomic weapon, currently in production, and that the Americans had so far not replied to a request to use their sites. The British had identified a suitable alternative site; the Montebello Islands, a low-lying, barren, uninhabited group of islands about 120 km off the north-western coast of Australia. (McLELLAND [no date], p. 103)

By agreement, the Australians would be asked to substantially support the operation, but being such super, top secret, British business, such support would not to extend to any area requiring knowledge or function of the weapons. The Australian Government willingly accepted the British view that, by the terms of its agreement with the US, the UK was prevented from providing information on, or allowing Australian participation in, technical aspects of the tests. (McLELLAND [no date], p. 7) We could do the laky work, but not benefit from any of the crucial nuclear information gained.

Numerous RAAF, RAN & Army units might happily provide Australian equipment & men for duty to support the British, providing transport, construction, engineering, logistical and any other support requested. (McLELLAND [no date], p. 106) All personal involved would be bound by the secrets act and the whole project should remain hush hush as far as possible.

Would Menzies be open to hosting such a test, and would he consent to a survey, code-named Epicure, being carried out there post haste, to confirm it's suitability? All arrangements would need to remain top secret old boy. (Grace, Paul. 2023, p. 22)

Menzies immediately agreed to the requested reconnaissance, and a photographic survey of the Montebellos was undertaken for the British, by the Royal Australian Air Force, in October of 1950. (McLELLAND [no date], p. 103)

The Montebello Islands consist of a group of more than 170 limestone islands located 20 km north of Barrow Island, and 120km north, north-west of Dampier, on the mainland Pilbara coast of North Western Australia. During the last Ice Age, when water levels were much lower, they would have formed the outermost landmass of a once-extensive peninsula, up to around 30,000 years ago, becoming gradually cut off from the mainland as the Ice Age receded, first forming a larger offshore island connected with Barrow, and separated from the mainland by the then 8km or so wide Mary Anne Passage, before further global warming and rising sea levels around 13,000 years ago completely submerged the area, leaving the Montebellos isolated, a long way off shore. (Veth, Peter 1993)

The archaeological record indicates that aboriginal occupation was sparse and probably episodic, but showed that fauna was abundant between around 30 000 to 10 000 years ago. The hard rock stone artefacts discovered appear to have been brought in some distance from the now mainland areas. Aboriginal use over the most recent 10,000 years seems unlikely, given the vast distance water travel

required, as we see them today, so far off shore. (Veth, Peter 1993) (Wallis, Veth, Aplin, Manne, Pulsford, White, Chappell 2007)

The earliest known European contact with the islands occurred in 1622. Now recorded as Australia's first shipwreck site, the English ship "Tryall" (Trial) was wrecked on uncharted submerged rocks about 32 kilometres (20 mi) northwest of the outer edge of the Montebello Islands. On her maiden voyage, she was carrying silver, for trade in the East Indies. One wreck survivor recorded "being 128 soules left to God's mercye, whereof 36 [were] saved". The captain and a few others had left almost immediately in the Captains skiff, (with a suspicion that they may have taken some of the silver). The other 36 'soules' mentioned made their way in the longboat to one of the larger islands, where they spent 7 days before they set out for Java. (Wikipedia: Tryall 2021)

An attractive salvage target owing to the prospect of silver on board, the Tryall wreck was located in 1969, and there is a rather sorry story related to that, including illegal salvage and the use of explosives damaging the wreck, which you can look up if you're interested. And some recovered artefacts are now held in the WA Maritime Museum. (Ida Lee (Mrs. Marriott) 1934) (Veth, Peter 1993) (Veevers, John J., Britannica [no date]) (Wikipedia: Tryall 2021) (Green, Jeremy N. 1977)

The Montebello Islands were given their current name by the French navigator Nicolas Baudin in 1801, in honour of the war hero French duke of Montebello, and they have been used in various capacities from the late 19th century, including pearling, turtle farming and aquaculture, up until the Nuclear Tests mid 20th century. (Veth, Peter 1993) The Beagle, with Charles Darwin aboard also explored the Montebellos & you know, shot stuff there in 1840. (Grace, Paul. 2023, p. 36)

It was the pearlers who fished the waters and camped on the islands that are said to have been responsible for the introduction of the cats and the black rats, who then contributed to the extinction of numerous bird colonies and the Islands' golden bandicoot and spectacled hare wallabies. (Montebello Islands Fishing [no date]) (Government of Western Australia Parks and Wildlife Service [no date]) (Veevers, John J., Britannica [no date])

By the 1950s Australia was of course no longer a colony of Britain, but an independent country. So one might think there would have been a level of concern about our safety, the ethics of the atomic testing program, and any number of other environmental concerns to be carefully considered, before making a decision on whether we should make our land and service personal available for atomic testing. But no. Robert Menzies was an absolute Anglophile, and could not wait to give his almost entirely unreserved agreement for the British, to do pretty much whatever they pleased. Even with the very limited information that had been provided by the British, Menzies appeared thrilled with the whole suggestion, even though we would not directly share in, or benefit from, any of the nuclear science and data gathered. Menzies assured the British that anything required would "of course be made available".

Grace reminds us, that given the political climate, things may not have been any different had any other Prime Minister been in power. After all, Chifley had established the Woomera Rocket Range in 1946 as an Anglo-Australian joint project, and had initiated our own atomic program, which led to the commissioning of the Lucas Heights Reactor in New South Wales. (Grace, Paul. 2023, p. 24) Such developments may have been inevitable given the times.

When Attlee had decided that his country should 'go it alone' developing their nuclear weapons, his decision was made with the utmost secrecy, and was not revealed to his Cabinet. And when Attlee approached Menzies about hosting the tests in Australia, the latter likewise agreed to the operation without referring the matter to his Australian Cabinet. (Robert Menzies Institute: University of Melbourne [no date]) Menzies appears only to have met with his acting Minister of Defence and the Defence Secretary, (Grace, Paul. 2023, p. 23), so it's not clear how much further information, consultation or consideration he needed.

As Grace put it "if Britain was in the cold war against the Soviets, so was Australia. As loyal subjects, Australians were duty bound to pitch in". (Grace, Paul. 2023, p. 24)

Grace noted, from the Navy's point of view, the Montebellos were perfect. ... one opinion from the time stating "They were isolated, uninhabited and rarely visited. The nearest mainland town was Onslow, a small port 85 miles south which – crucially - was upwind of the proposed test site. The surrounding area was sparsely populated, so if anything went wrong only a handful of natives and colonials would be affected." (Grace, Paul. 2023, p. 17) Such an attitude was carried throughout the whole program, and to my mind, doesn't indicate the expected level of care and consideration one's Government should have shown, on our behalf. Shocking.

By January 1951 the British were convinced that the Montebello Islands should be the preferred site for their first atomic test, but for climatic reasons, in particular because of the prevailing winds, the tests could only be conducted in the month of October. Attlee informed Menzies in March 1951 and sought his formal agreement for an atomic weapon test to be carried out in October of 1952. Menzies had to delay his formal agreement as elections were to be held in May of 1951, but with the Menzies Government returned, further surveys began in July and August 1951 using HMAS Warrego. McLelland noted in his 1985 Royal Commission findings "The decision was taken without the benefit of any scientific knowledge of the hazards that would be involved." (McLELLAND [no date], p. 7) The operation was code-named Hurricane. (McLELLAND [no date], p. 103)

Australian military personal involved on the reconnaissance would have been aware that the areas were being surveyed for suitability as military testing sites – they were encouraged to believe it might become an extension of the Woomera testing range - but not that such testing would be of nuclear devices, at least not in the early days. The public knew nothing about it until the media scoops later in 1952.

The Woomera Rocket Range, now formally known as the 'RAAF Woomera Range Complex', is now a military and civilian test range, though in the early days it was solely under military operation as a Defence research and long range weapons testing site. Initially an Anglo-Australian joint venture, it was conceived as a testing area for weapons designed to counter the V1 & V2 rockets that were launched into Britain during WW2. Instigated under Chifley in 1946, as mentioned earlier, the joint project operated on into the 1970s. The complex participated in the US Mercury and Gemini space programs, and continued being used for testing of drone aircraft and rocketry up until recent times.

It remains the largest testing area in the world, with the Woomera Prohibited Area covering a land area of 122,188 km (47,177 sq miles) across the Western- central parts of the South Australian State. Covering almost a quarter of SAs landmass, it roughly equates to the size of North Korea, according to Wiki. (Wikipedia: Woomera Range Complex 2023) More recently some areas within the no-go zone have been opened up for mining. If you recall we spoke briefly about some outback stations who found themselves situated within the gazetted Woomera Prohibited Area after it's establishment, in the **Episode 28 - The Dingo Fence**. Some had very funny stories to tell about witnessing rocket tests.

Once the onsite surveys were complete, preparations for Operation Hurricane began in earnest. Britain hoped that Australia "would be willing to help with the logistic support …. [and that] we can settle later, details of finance and machinery." (Grace, Paul. 2023, p. 43) However Menzies was so excited to be picked for the team, that he volunteered to cover the Australian costs, as our contribution to the project. A project remember, that we would not be getting the data from. "His compliance stunned even the Brits" (Grace, Paul. 2023, p. 44)

Menzies was reminded by Attlee that "The effect of exploding an atomic weapon in the Montebello Islands will be to contaminate with radioactivity the north east group, and this contamination may spread to other islands. The area is not likely to be entirely free from contamination for about three years and we would hope for continuing Australian help in investigating the decay of contamination. During this time the area will be unsafe for human occupation, or even visits by pearl fishermen who, we understand, at present go there from time to time, and suitable measures will need to be taken to keep them away." (Grace, Paul. 2023, p. 43)

So there was *some* acknowledgement of the nuclear contamination expected, though understated I would think, suggesting all will be well in three short years. But it didn't seem to worry Menzies anyway. Grace wonders where the 3 year time frame came from, though I guess all things nuclear where new to many, at that time. Still you would think those from the physics department would understand nuclear decay, as indeed they did... and it does appear to simply have been a number pulled out of the air... Being charitable, I think Grace wonders if Attlee, perhaps unintentionally, misquoted the real advice? It'll be no surprise to you to discover that areas in the Montebellos are still very 'radioactively hot' and that more than 70 years later, people are advised not disturb any soil, or remove any items, or stay in the area for more than hour, before risking unacceptable levels of exposure.

Anyway, Phase 1 of the Operation would see Royal Engineers sent to coordinate the personal, equipment & materials gathered to build the infrastructure required on the Islands & lagoons. There would be further hydrological surveys and detailed meteorological recordings, particularly through August to October. Moorings and marker boys were laid, and roads and landings were constructed on several larger islands, along with the construction of bunkers and equipment rooms, communications and stores etc.

The plan was to detonate the bomb within the hull of a moored ship, and multiple sites were considered for the measuring devices that would be required all around. Various sites on the islands surrounding the proposed 'ground zero' site were again surveyed and geological samples were taken, and consideration was given to best options for photographic capture of the explosion, along with placement of other recording and measurement devices. Angles, heights and distances were all recorded, with the biggest installations planned for the islands of Hermite, Trimouille, Alpha and North West. Transit channels were marked out for the various draft depth vessels expected to come and go.

Drinking water for the vast number of personal now in the archipelago was always a challenge, and had to be addressed by desalinating the surrounding seawater – not an ideal solution for those men having to drink it apparently. Weather conditions were often difficult, causing delays when the wind was up, and even for those working on land it was often very exposed and windy, and hot. The heat & humidity was of particular discomfort to the British personal, unfamiliar with Australian conditions. But with shark infested waters swimming was not an option for relief, though they did create some engineered safe spaces over time, by installing steel scaffolding and heavy wire mesh 'shark nets' across the mouth of two shallow tidal bays. (Grace, Paul. 2023, p. 91).

Some materials were shipped up from Fremantle, but most cargo was shipped out from Onslow, where the jetty had to accommodate the local 10 metre tide range, (Grace, Paul. 2023, p. 52) often adding more difficulty to the loading & unloading process.

Following Attlee's election loss to Churchill in October, Churchill was delighted to discover the state of the secret program, and committed to it continuing, so it was full steam ahead on the Montebellos. They were to work through the steamy wet season, though avoiding the cyclones would be desirable.

By January of 1952 Menzies was finally turning his mind to the dangers involved and requested advice from the British on the "possible after-effects of this project on the Australian mainland and it's inhabitants." He noted that only their experts could calculate the risks given their months of meteorological and other surveys of conditions around the islands, and an authoritative statement would be required from the British, that would assure the Australian public the effects would be "innocuous". (Grace, Paul. 2023, p. 62)

Assurances were given to Menzies that "the explosion would take place only when conditions are such that there will be no danger from radioactivity to the health of animals or people on the mainland of

Australia", but no hard data was shared with the Australian Government to allow them to make their own assessments. Despite the risk of a larger than expected explosion occurring, or an unexpected change in wind direction or speed for example, the program proceeded on what Grace called "a gentleman's agreement" and on the assumption the word of our British friends was good enough, old bean. (Grace, Paul. 2023, p. 63)

In February 1952 our Monarch died, and Queen Elizabeth the second came to the throne. Big news, and it was around this time that the British and Australian governments made brief statements quietly announcing the intention of testing by detonation, a British built atomic bomb in Australia. The assurances provided by the British were passed on to the public, (Grace, Paul. 2023, p. 84) though for now the site was not announced. (Grace, Paul. 2023, p. 63) Grace suggested reactions were more along the patriotic pride scale, than any kind of alarm, though speculation began immediately about where the test might take place. (Grace, Paul. 2023, p. 84) Most money would again, have been on the likelihood of the Woomera Rocket Range being used, and again, both Governments were happy not to correct that impression.

The recently formed ASIO (the Australian Security Intelligence Organisation) was in charge of civilian security, particularly around Onslow and Fremantle, where many vessels destined for the Montebellos loaded up and departed, a big fear being imagined trouble from the Communist leaning Waterside Workers on the docks.

Apart from a few troublesome reporters they had very little to worry about in the end. It was an unintended indiscretion by a sailor, whinging about being sent to "some bloody place called the Montebellos" that gave a journalist for the West Australian newspaper the final puzzle piece, about where the tests would "likely" be occurring. When the story broke on April 22nd 1952, they certainly appeared to have gathered all the really quite unmissable clues, including the movement of Royal Navy & Royal Australian Navy personal, vessels and equipment, the appearance of vast numbers of engineers and technicians from both services, and fact that the Government was preparing to Gazette a substantial exclusion zone around the Montebellos and nearby areas "for the testing of war material". (Grace, Paul. 2023, p. 83)

So the cats were pretty much out of the bag then. With some intrepid journalists making their way out to the islands just the day before the Prohibited area legislation made it illegal to do so, on pain of up to 7 years imprisonment,(Grace, Paul. 2023, p. 99) and witnessing the massive infrastructure constructions going on there, and publishing their scoops, both governments were then forced to confirm the test would be carried out on the Montebello Islands. They also announced that no press would be allowed to witness the explosions. No details about the operation were given, and most people assumed that a bomber flying out of Woomera would drop the atomic device over the Montebellos, or that they would be fired there in a rocket.

The authorities were happy to leave people to speculate, though Grace recorded one correspondent to the Daily News had got close to the actual plan, writing "It seems a clear indication that the atomic tests are going to have plenty to do with the water. Otherwise why would the expedition ships bring out so many landing barges? Maybe we can expect underwater atomic tests similar to those conducted by the Americans at Eniwetok atoll." (Grace, Paul. 2023, p. 100) Oooo... close....

In the meantime, large numbers of servicemen had been shipped out to the Montebellos and construction was proceeding at a stunning clip. Grace recorded that in 6 weeks they had bulldozed and graded 6.5 miles of tracks and landings across the four main islands, transforming the area into a giant construction zone & laying 300 tons of pierced steel planking for access. (Grace, Paul. 2023, p. 89) In the following months 9 more miles of road were added and "80 concrete instrumentation platforms, !5 Anderson shelters (that's Bomb shelters constructed from corrugated iron and reinforced with sandbags), nine jetties, five concrete bunkers, four scaffolding towers and a permanent command centre [was constructed] on Hermite", and 150 miles of undersea cabling was laid, to link all the remote instrumentation

sites. (Grace, Paul. 2023, p. 90) There were certainly working at a frantic pace and making excellent progress.

In Australia, when the speculation began of Woomera being the chosen site began, there was some apprehension voiced by the Secretary of the Council for Aboriginal Rights, concerning the safety of the populations of Aboriginal peoples still living somewhat nomadic traditional lifestyles in that area. "The danger to human life from an explosion or contact with contaminated material is obvious." But very few people acknowledged the concern, the authorities simply responding unconvincingly, that no harm would be done. While on this occasion, for the tests on the Montebellos the risk was expected to be very low, the Secretary's safety concerns were in fact played out in all its horror, after the mainland tests which would occur in the future.

Other people also expressed their concern about the loss of wildlife around the blast zone and nearby islands. One member of the Royal Zoological Society stated "It will be very regrettable if those notable birds and animals are blasted out of existence." Churchill's derisive response to such concerns, expressed in his own parliament, was to say that "Every effort will be made to inconvenience them as little as possible." (Grace, Paul. 2023, p. 102) None of that was to matter. The device had to be tested, to make the British safe.

In June the *Campania*, carrying many of the scientific contingent required, departed England for the Montebellos, meeting the *Plym* on route, which was carrying the as yet unarmed nuclear weapon and had already departed. The radioactive core was to be flown out separately. Both sailed the long way round the Cape of Good Hope, avoiding the politically tense Suez Canal region, arriving at the archipelago in early August. Phase two of the operation had begun.

With the British atomic project team now onsite, they began setting up their devices, testing the equipment and fitting out their command centre at "H1", on a hilltop at the Southern end of Hermite Island, about 6 miles from the chosen Ground Zero site in the lagoon. H1 would be the only building to remain occupied on the island during the explosion. Grace records it housing "darkrooms, offices, laboratories full of apparatuses, and the all-important control room, where the maser control desk was located." (Grace, Paul. 2023, p. 134) The detonation would require a complicated 24 hour countdown initiating the firing sequence, and one Leuan Maddock, the Assistant director of the Telemetry and Communications Department, would be responsible for activating final detonation. (Grace, Paul. 2023, p. 134)

Overlooking the target site were any number of recording devices, including high speed cameras developed specifically for this purpose, able to take 100,000 frames per second, and used for the first time at the Montebellos. I'll bet there were some nervous camera creators, with fingers crossed that they worked as expected! Wouldn't want to miss the momentous explosion after all those years preparing!

Of course there were the more conventional high speed cameras dotted around too, taking 8000 frames per second, and any number of other recording devices. Grace noted they specifically required pictures of "the development of the fireball, the water column, the mushroom cloud and other blast effects" to give them appropriate data to analyse afterwards. (Grace, Paul. 2023, p. 135)

The *Plym*, the sacrificial ship which would hold the weapon just below the waterline, had been securely moored in 12 metres of water, in the middle of Bunsen channel, and was wired up for detonation

when the time came. It was also bristling with recording equipment of course, which would record & send data from on-board, right up until 1 millionth of a second before the ship was sent to oblivion.

As October approached, personal were gradually being removed from the islands, though a small skeleton crew would remain in safely distant observation bunkers, to detonate and monitor the explosion. Many others were still required right up until the last day, and would be removed to the RAN ships being moored at a "safe" distance for the blast. I have put a map marking where the various vessels were moored on the day on the website if you're interested. And so the countdown to D-day began.

The Radioactivity Measurement Division had laid their monitoring devices all over the islands, along with other materials which were to be left in the various measurement sites, to be exposed to the blast and be inspected and measured for damage and radiation levels afterwards. Things like plane components, scale models of parts of shipping vessels and a good deal of food stuffs, seedlings and seeds, all to be measured for radiation post explosion, with some to used afterwards for testing decontamination procedures. (Grace, Paul. 2023, p. 137) Local birds and fish would be caught around the islands afterwards too, to help measure the radiological impact of the bomb.

Rehearsals were conducted in September, indicating everything was in readiness, and when the meteorological conditions were deemed to be satisfactory on October 2nd, the countdown process was started with the detonation to occur the following day. (Djokovic, Peter 2016) Weather was a particularly tricky thing for the team to parse. Grace reminds us the British had assured the Australians that no fallout would reach the mainland, but the atomic cloud would likely climb to 25,000 feet, and at that height the wind could be trending in entirely different directions, across different altitudes. The Meteorologists might not be able to predict with any certainty just which direction might be on the cards on any given day or time. And their timing of conditions had to match with high tide in the archipelago, on a day with calm seas for the test to be viable, so there was much to consider. (Grace, Paul. 2023, p. 175) But October 3rd looked good as far as all things could be known....

Grace reports the weapon being installed and armed over a 2 hour period in the early hours of dday, noting "When it was done the device looked like something out of War of the Worlds: a gleaming aluminium ball constructed from geometric shapes, 5 feet in diameter, suspended about 2 feet above the deck, with 128 cables springing from equidistant points around the surface and snaking around the deck of the weapon room". (Grace, Paul. 2023, p. 188)

With all personal removed from the *Plym* and only the skeleton teams left on Hermine to detonate and monitor the weapon and equipment, all the ships were withdrawn to a safe distance. After a final meteorological check, the final go order was confirmed at 08:45 on October 3rd. By 09:15, as the final countdown began The distant ships were battened down, watches were all synchronised, and the men on the remote islands and who remained on the ships, authorised to watch the explosion, were all lined up with their backs to the explosion site, as a protective measure to help avoid eye damage from the super-bright blast, but wearing no other protective gear.

Grace recorded one Lieutenant saying "The atmosphere throughout the ship was electric and it was difficult to control the impulse to turn and cast nervous glances towards the island." (Grace, Paul. 2023, p. 190) The firing sequence had begun, but it was still a time consuming process and a few more minutes passed before the atomic weapon inside *Plym* was actually detonated, just before 09;30, leaving a crater on the seabed 6 metres (20 ft) deep and 300 metres (980 ft) across. (Wikipedia: Opertion Hurricane 2023)

I note that various sources can have different times recorded for the explosion and this may have to do with the varying timezones the different groups were operating on. For example the British Royal Navy Task Force operated on GMT +0930 or Item King time, while the local Australian RAAF worked in H time – GMT +0800 hours and so on. (Grace, Paul. 2023, p. 223) It was a ridiculous situation given the real risk of a

dangerous confusion arising, but there you are - working together but not really keen to work together it seems....

Grace noted the explosion would have created a fireball that was hotter than the core of the sun in those fractions of a second after detonation. The high speed cameras apparently captured the fireball bursting through the hull of the *Plym* at 23 millionths of second after the explosion, the ship disappearing entirely a few frames later! The fireball had expanded by .6 of a second to a width of 1/3 of a mile across, before contracting again, with the massive shock wave continuing to spread outwards across the water and islands. The resulting water column reached 1800 feet high within a second, and the expected mushroom cloud then began to form. A massive tsunami type wave emanated from the explosion site also. (Grace, Paul. 2023, p. 193)

Grace also notes the recollections of one man who, disturbingly, had been sheltering in a rather smaller boat, much closer to the explosion zone than the others by the sound of it, saying "the signal came over the radio to prepare for countdown and a black heavy canvas tarpaulin was pulled over the boat so we were now in darkness. We all then draped jungle green towels over our heads and I pressed my hands harder to my eyes, then realised I could see the bones in my hands. It seemed that this light was passing through the tarpaulin and towel for about 10 or 12 seconds, and there seemed to be two surges, and two detonations, with a continued rumbling and boiling sensation. My body seem[ed] first to be compressed and then billowing like a balloon. When the all-clear came, we removed our hands from over our eyes and towels from our heads, and sunlight appeared to be coming through holes in our tarpaulin. The tarpaulin was removed and I saw the cloud rising at speed." Grace notes this man had been a fit 30 year old at the time, but soon developed a chest infection and a rash on his back that never went away, and later developed cataracts, all of which he suspected of being related to this test. (Grace, Paul. 2023, p. 194)

Others recorded seeing, after their 10 second embargo before turning around, "an intense flash visible all around the horizon. We turned to look. The sight before our eyes was terrifying – a great greyish black cloud being hurled thousands of feet into the air and increasing in size with astonishing rapidity." (Grace, Paul. 2023, p. 195)

The scientists in the bunker on H1 emerged just 3 seconds after the blast and began operating the manual recording equipment, documenting the development of the rising cloud. They appear to have been hit after 30 seconds, by a blast wave, which shook the command centre and created a local dust storm across the island, obscuring much of the photographic equipment. Soon afterwards radioactive rain began falling from the mushroom cloud, over Trimouille and several other of the islands. Scrub fires were ignited across the archipelago and burned for some time, adding to the smoke & haze. The beach sands were blackened and sand dunes around levelled.

The two surges or explosions that were noted by many who witnessed the explosions seemed confusing, but the phenomena was explained by observers hearing the first direct sound wave, and then a moment later a reflection, or sort of echo, of the sound waves bouncing back from a layer of air 2 miles up. (Grace, Paul. 2023, p. 196)

The Commander of the *HMAS Hawkesbury* reported "In order that the ship's company would have the opportunity to witness Britain's first atomic explosion, lower deck was cleared at 09:25IK. Eight minutes later, there was a brilliant orange flash, followed by a boiling cloud of smoke, dust and water, shooting up into the sky with dramatic speed. The typical 'mushroom' was soon distorted by the high winds in the upper levels. The blast of the explosion was felt 2 minutes 16 seconds later." (Djokovic, Peter 2016)

Wiki records that a Royal Engineer observing the blast aboard *Zeebrugge*, later said of *Plym*, "all that was left of her were a few fist-sized pieces of metal that fell like rain, and the shape of the frigate scorched on the sea bed." And that a "gluey black substance" washed up on the shore of Trimouille Island, the liquefied *Plym* remnants too. (Operation Hurricane 2023)

The only Australian official observers were professor Ernest Titterton, a fairly recent arrival from the UK to become the Chair of Nuclear Physics at the ANU, and who had previously worked on the Manhattan Project; Professor Leslie Martin, Australia's Defence Scientific Advisor; and Mr Alan Butement, Chief Scientist for the then Department of Supply. (Grace, Paul. 2023, p. 168) It had been a hard job to negotiate even these three observers. Had Britain had it's way, the country hosting the test site, taking many of the risks, doing much of the physical preparation and bearing the costs, would have been entirely shut out of witnessing the outcome, such was their desire to hold all data close. Initially they had agreed to only one observer, but after continual begging and some support from the British Chief Superintendent of the HER, (the High Explosives Research body managing the tests) one William Penney, the two government scientists were also approved just weeks before d-day, but they were reminded this would give them no access to the weapon itself, nor to information about the design or efficiency data. (Grace, Paul. 2023, p. 172) Allies in war perhaps, but apparently not BFFs enough to consider sharing!

After 4 minutes the cloud reached the inversion layer flattened out around 10,000 feet, the mushroom shape being distorted and reshaped quite soon after the explosion by the conditions. The dust that did continue up though was, disturbingly, entering a wind direction layer which was carrying the debris towards the mainland! (Grace, Paul. 2023, p. 196) But that minor concern aside the test was immediately deemed a success (I guess because not all involved were blown to oblivion?) and the British Government was immediately informed.

6 minutes after the blast, the shockwave made it to Onslow 120 miles away, shaking buildings and windows, and startling it's residents. Not everyone was delighted by the prospect of nuclear blasts though. Author Robert Drewe recounts in his book "Montebello", his childhood memory living in Perth, when he phoned his mum to ask could he join his friends in going to the movies. His anxious mum, advised him theat an atomic bomb was exploded today, and it just worried the blazes out of her – she wanted him to come home immediately! (Drewe, Robert 2013) Though what she might have been able to do to protect him should some hellish chain reaction have been started by the bomb blast, was a mystery! But generally, the residents of Onslow at least, welcomed the tests success and celebrated as if it were NYE. (Grace, Paul. 2023, p. 206) Well, again, they'd survived hadn't they? Any private niggling anxieties could now be laid to rest.

Wiki states that "The British bomb design was similar to that of the American Fat Man, [the weapon dropped on Nagasaki during the war] but for reasons of safety and efficiency the British design incorporated a levitated pit, in which there was an air gap between the uranium tamper and the plutonium core. This gave the explosion time to build up momentum, similar in principle to a hammer hitting a nail, enabling less plutonium to be used." (Operation Hurricane 2023) So I take it to mean it was a pretty powerful item on the scale of things. It had a yield of approximately 25 kt . (Operation Hurricane 2023) (McLELLAND (vo1) [no date], p. 107)

The Australian newspapers published the a-bomb cloud pictures the following day, and much was celebrated of the still secretive but successful atomic weapon test on the Montebellos. The pride was even more pronounced in the British press, one writing "Today Britain is GREAT BRITAIN again. Britain's first atomic explosion did more to fill the Montebello sky with smoke. Overnight it restored Britain to the status of a major power". (Grace, Paul. 2023, pp. 208–9) Err well, ever thus for some Hawks I guess, but a bit optimistic to think that one such scientific achievement might drag Britain out of her post war malaise, and restore her to formal colonial glories perhaps? But the majority of data they would need to make the whole project a helpful was being gathered on the Montebellos, and already they would have been feeling safer from unbridled Soviet threats perhaps, so I good day I guess.

With the acceptance of a degree of risk by the Governments involved in the testing, some men were expected to re-enter the contaminated areas to gather the readings and data needed. Acceptable exposure levels were posited, but reliable and correct information was not entirely known, about the dangers of radiation, so risks for some were very high. In particular, there was no contemporary understanding of the

dangers of lonising radiation, causing cancers and genetic damage, which could then cause damage and illness in following generations. But even so, Grace quotes Admiral Torlesse saying "some men would have to take some risks for the greater good." (Grace, Paul. 2023, p. 215) And while that may be so, one would hope they could do so willingly, after knowing the potential risks and making their own decisions about their level of sacrifice. But most did not know, and were asked to take part assuming that the environment and exposures they were subjected were in the safe.

Very soon after the explosion, in undertaking one of the riskiest tests, a crew was helicoptered in to take water sample as close to the detonation site as possible. Surely that must have been red-hot right there? Others collected seawater samples at various more distant locations. Later crews, in protective gear, were sent back into the blast zone to recover the samples and equipment from the various surrounding islands for measuring and testing. Those first men on shore noted a "gluey black substance" all across the sand and surfaces. Again, this material would have been red-hot with radiation, as it turned out to be the liquefied remains of the disintegrated *Plym*.

The RAAF conducted various wind-finding sorties, to confirm the direction the fallout travelled in the air, taking air samples all through the expected cloud zone. I think it's fair to say the Australian's who were charged with collecting samples during the test and charged with ongoing monitoring after the British largely left, were probably doing their work with very little knowledge of the risks involved. Initially many were doing so with no safety equipment, coverings or working monitoring equipment, to even measure exposure, and that cannot be a wise thing? With the monitors they were issued not working, the air personal had no idea they had been passing right through the radioactive clouds, but the samples collected would confirm they had been doing just that when they returned to ground.

Appallingly, RAAF men on the ground, collecting the air sampling canisters from the planes, were once again working with no safety clothing or equipment. One member of the ground crew reported how he removed the canisters from the aircraft: "dressed only in shorts and a hat, I would stand on a ladder underneath the wing of the Lincoln Bomber, unbolt the canisters from the wings, and hand them down to another RAAF ground staff member ... I did not wear any safety clothing such as gloves, face mask, or what is referred to as a 'moon suit'... Once removed, the filter canisters were placed in a military vehicle which was commanded by British scientists, who were dressed in fully protective clothing..." This seems like pretty poor planning and behaviour by the British scientists, and reeks of what should be good for goose should be good for the gander doesn't it?! Doesn't reflect well on the British task force. As Grace put it, this lead to many Australian servicemen believing they were seen as expendable! Not good for moral or for one's health I imagine. (Grace, Paul. 2023, pp. 227–8)

The same lack of care also meant the planes themselves were now contaminated, and so no decontamination process was begun, and thus exposing the wider ground crews on site to contamination too. Altogether a very poor part of the exercise, and highly criticized in subsequent reports and commissions. These appalling deficits in hazard control were not addressed until after subsequent mainland tests, such as the Totem test, exposing more crews and RAAF personal again. Some would go on to suffer cancers that may well have been triggered by this exposure.

McLelland noted in his Royal Commission, 1985, that "Collection of air samples after the explosion was an RAAF responsibility, carried out on behalf of AERE (that's the United Kingdom's Atomic Energy Research Establishment). Often the crews did not wear film badges or dosimeters to monitor radiation dosage and no equipment was carried in the aircraft to indicate when the aircraft had located and was in the cloud. They had no way of knowing if they were flying near or straight through contaminated air. These omissions were the result of a statement, issued by the Hurricane Executive to the Australian authorities, that "the radioactive hazard to aircrews in flying through the radioactive cloud was negligible and that there was no fear of the aircraft becoming contaminated." But that information given was not complete and the potential for contamination was much higher than they implied in the statement. (McLELLAND (vo1) [no date], p. 107) Servicemen involved noted all the British scientists & technician had the appropriate safety

gear, including hazard suits and exposure measuring devises, while the Australians were wandering around in standard uniform, in some cases handling the instruments that were collected from the reconnaissance planes with their bare hands!

McLelland further reported "The cloud rose to about 1800 feet after one second and most of the cloud reached a maximum of 10 000 feet after about four minutes, where its ascent was substantially stopped by a temperature inversion. A small portion of the cloud continued to rise to 11 600 feet. Local fallout began at one minute after firing with most of it falling as contaminated rain as well as solid particles from the crater and parts of *HMS Plym*. Most of this close-in fallout fell to the north and west of Ground Zero." (McLELLAND (vo1) [no date], p. 115)

Despite one of the Australian observers stating he saw no fish or animals killed by the blast, many other witnesses recalled seeing vast numbers of dead fish floating around the atolls and anchorages around. Some were collected for testing, as were bird carcasses and other biological specimens. (Grace, Paul. 2023, p. 246)

But the scientists were surprised to note after extensive testing over the following days and weeks, that radiation fall-out was detected in Port Headland, in Townsville & Brisbane, and indeed much further afield, being detectable on islands in the Pacific!

The reports sent to Britain advised "Contamination over the greater part of Trimouille and northern half of the lagoon is extensive and severe." (Grace, Paul. 2023, p. 223) They found the fallout much more widespread than predicted, leading them to conclude that a shipborne explosion had distributed radioactive debris much more widely than an airbourne explosion may have done.

The spray from the resulting water column, and the liquefied remains of the ship, caused a great deal of highly radioactive contamination across the islands. This would have been horrifying news for the British. Grace notes, "from a civil defence point of view, the Hurricane blast was a nightmare", and any port so affected would be virtually unsalvageable. (Grace, Paul. 2023, p. 243) It was also clear that the use of such a device as an offensive weapon would not allow the follow up with troops given that the amount of radiation left would sicken your own men. Still, overall the test was deemed a great success. They had built and successfully detonated Britain's first atomic bomb, and it was now a contender in the Nuclear fight club.

The clean-up (such as it was) continued throughout October, with the authorities desperate to get it done before cyclone season approached. So it was a pretty rudimentary exercise, and some of the tales about how they handled and disposed of contaminated materials are hair-raising. Still substantially radioactive rubbish was left behind on Trimouille and other islands, including the grey metallic fallout from the explosion, coating the sands, along with other debris and associated equipment fragments. Some waste was loaded into drums and dropped into the sea, but it all seemed a little haphazard, as their deadline to leave approached. Most of the British had left the area by the end of October, but the *HMAS Hawkesbury* continued to patrol the area until 15 January 1953. (Operation Hurricane 2023)

When they returned again the following year to do further monitoring, testing, and to continue the clean up, many areas were still found to be 'hot' and a continuing hazard to life. Once again the men involved were exposed to hazards greater than were safe, without necessarily knowing it. And some equipment had been returned to service before being entirely decontaminated.

With the official reports given to the government, Churchill informed the House of Commons of the Operation's conclusion on October 23rd, and only then did they become aware that the weapon was tested by exploding it inside the hold of the *Plym*. "Thousands of tons of water and of mud and rock from the sea bottom were thrown many thousands of feet into the air and a high tidal wave was caused. The effects of the blast and radioactive contamination extended over a wide area. *HMS Plym* was vapourised except for some red hot fragments which were scattered over one of the islands and started fires in the dry vegetation" (Grace, Paul. 2023, p. 247)

Penney, the head of the British program, prepared several more communications in the following weeks, to add further detail and to explain some of the more bizarre observations, such as the apparent double explosion sounds discussed earlier, and like the British & Australian Prime Ministers had done, he reminded the public that it was all for a good cause. "The energy and enthusiasm which have gone into the making of the new weapon, stemmed from the sober hope that it would bring us nearer the day when war is universally seen to be unthinkable." (Grace, Paul. 2023, p. 248)

Still, the British we pretty pleased with themselves... for about four weeks, when they then discovered the Americans had just detonated the worlds first Hydrogen Bomb, with a yield 400 times that of the Operation Hurricane test weapon. Terrifying. Hydrogen bombs work by nuclear fusion, though a small fission atom bomb within was used to trigger the massive new weapon. Grace wrote "the news must have been deflating [making] the Hurricane device look like a .. cracker by comparison. Although the UK .. did not officially make the decision to develop the hydrogen bomb for some time, ... it was inevitable. Britain could not go back to the children's table now that it had just reclaimed it's rightful place with the grown ups. For poor old Penney it was back to the drawing board." (Grace, Paul. 2023, p. 248)

Grace records that the building of the bomb and the Operation Hurricane test, had cost the British somewhere between the vast figure of 100 to 200 million pounds. A bargain really, as it was fraction of the cost of the Manhattan project apparently. Australia accounted for it's financial contribution as being a very precise 201,662 pounds, which Grace records as included the writing off of the Army tents loaned to the Navy, which were then blown up on D-day. (Grace, Paul. 2023, p. 281).

In summing up we must account too for the environmental and health costs that had not been acknowledged in all the congratulatory hype . Massive damage was done to the Montebello Islands and the surrounding seas, with lingering radioactivity and contamination, closing them to visitors for decades. Radioactive particle contamination drifted across the mainland, despite assurances that would not happen, and the flora & fauna of the archipelago was devastated, and took many decades to recover.

Author Robert Drewe recounted the discovery of one serviceman undertaking a second tour of duty on the islands in 1953, assisting with the measurements and follow up surveys that were occurring over a two week period then. He claimed that on his day off, when sailing around one of the small islands in the area with a friend, they were forced to beach the boat to attend to a rudder problem. On approaching the beach they found 10 of thousands of dead turtles, the two 500 metre wide beaches there were totally covered, piled 3 to 4 deep on the sand, and of all sizes from near hatchlings to giant, aged turtles. He reported the smell there as 'very bad'. They took a large turtle carapace with them as a souvenir, towing it behind the boat to clean it. Apparently when they got it back to Fremantle it was found to be radioactive and it was thrown overboard into the sea. (Drewe, Robert 2013) Churchill should have been informed that there was substantial inconvenience experienced by those poor animals due to his tests.

Two more tests on the Montebellos would follow in 1956, exacerbating the long-term environmental consequences for the area. (Robert Menzies Institute: University of Melbourne [no date]) Known as Operation Mosaic, the British would this time, test their new hydrogen bombs, though they were pretty evasive in describing them as such, when once again asking for permissions from Menzies. But you may not be surprised to hear, while the first test detonated on May 16 yielded around 15 kilotons, and sent it's mushroom cloud 23,000 feet into the atmosphere, where it was once again carried over to the mainland, despite all the assurances, on June 19 the second test weapon yielded an estimate of between 56 and 98 kilotons, sending a massive contamination column 45,000 feet into the air. Once again the fallout was recorded right across the mainland, as far as Cloncurry in Qld.

The British though, did helpfully put up new signs around the Montebello Islands they deemed contaminated after the Mosaic tests. DANGER! Radioactive – KEEP OUT, and they fenced off the northern section of Trimouille Island. However, Grace contends there was no clean up of any kind undertaken after those tests. (Grace, Paul. 2023, p. 290)

After offering up sites for more than 12 tests over one offshore and two mainland testing sites, and after providing substantial resources, including personal and equipment to assist, the British weapons testing program in Australia drew to a close in 1963, and Australia gained nothing from the programs, not even any defence agreement that might see the UK come to our aid should we be threatened in any way. No weapons or any other kind of technical data was shared, and in the end, it seems even Anglophile Menzies was a little taken aback at how one sided the relationship had been. Indeed, we were left with injury to our people and to our environments, and we had to fight over decades to get the British to even *contribute* to fund any further decontamination and rehabilitation of the sites used, let along cover the costs that should have been entirely bourn by them.

Questions about the injury to servicemen and civilians resulting from the immediate and ongoing contamination produced by the tests, particularly at Maralinga, at last began gaining some attention in the 1970s. Various Veteran associations and lobby groups gained momentum, but though several reports were released in the 70s they pretty much failed to offer any helpful conclusions. In the mid 1980s Bob Hawke's government instituted a Royal Commission into the testing in Australia, and I've provided links to the Commission's findings in the reference lists.

While there were a number of disturbing issues raised about the tests on the Montebellos, the worst of the findings related to the later tests hosted on the mainland at Emu Field & Maralinga, which directly contaminated a number of indigenous people and station hands, resulting in injury, early death and ongoing health problems. Still the authorities refused to take responsibility, and getting the British government to pay for the neglected clean ups and decontamination, was like pulling teeth over many decades.

Grace summed up, that while The Royal Commissioners conclusions did criticise both Governments for their failures in planning and execution, they also suggested there was little evidence of dangerously high fall-out and therefore, after all this time, could not link this as a cause to the illnesses and deaths of veterans and aboriginal persons exposed, leaving those effected feeling massively disappointed. (Grace, Paul. 2023, p. 303)

Regarding the Montebello Islands, they specifically found that they were "not an appropriate place for atomic tests owing to the prevailing weather patterns and the limited opportunities for safe firing." (Grace, Paul. 2023, p. 303) The failure to provide air crews with appropriate instruction, protective equipment and radiation monitoring devices and decontamination facilities was 'negligent', and that those returning to the islands for the clean ups were exposed to unacceptable risk in the performance of their duties. Conduct in the later trials at the Montebellos also drew further opprobrium.

A study of atomic veterans published in 2006 found their over all death rate was only slightly higher that the general population, but that cause of death from various cancers was much higher – 18% higher. However they still they did not slate the causes to the radiation exposure, (Grace, Paul. 2023, p. 307) though many veterans believe they were sited closer to the exposure zones that the official records place them on the day of the explosion, and would likely have had higher exposure than the official record suggest. So it's all still very contentious. (Wikipedia: Opertion Hurricane 2023) (Gun, Richard. et al. [no date])

Interestingly, while the studies generally felt unable to confirm provable injury to persons involved or exposed in the area, McLelland ruled that "Their exposure to radiation as participants in the trial program has increased the risk of cancer among nuclear veterans'." (McLELLAND (vo1) [no date], p. 102), and recommend reversing the burden of proof required by those seeking compensation, placing it instead with the Commonwealth. Many had tried & mostly failed to get any compensation for injury or widows compensation for the early deaths of their husbands. As Grace commented, it's an irony that one particular planner's argument was not accepted when he maintained that Operation Hurricane was actually 'an operation of war'. Had they made that distinction, all atomic veterans would have been entitled to pensions, as if they had been bombed by an enemy, but apparently being poisoned by an ally did not offer any such compensation. (Grace, Paul. 2023, p. 306)

The Royal Commission recommended extensive decontamination and rehabilitation of all the sites, at the British cost, and also suggested compensating the traditional owners for loss of access to their traditional lands. The British refused to pay of course, finally agreeing to contribute \$45 million to the rehab estimated costs of \$100 million in the early 1990s after embarrassing articles had been published and their poor behaviour had become known world wide. The clean ups commenced in the late 1990s, but many are still unhappy with the outcomes, especially on the Maralinga site. (Grace, Paul. 2023, pp. 303–4) The land can still not be occupied for any length of time and indeed, even the Montebellos still have restrictions to guard the health of those visiting.

After the frightful scare of the Cuban Missile crisis of October 1962, there was international concern about just how close the world had come to a nuclear war, and pressure was exerted to control and reduce nuclear proliferation, starting with a partial Test Ban Treaty in 1963, the same year our tests came to an end.

The Montebellos remained a 'prohibited area' and occasional radiation surveys were undertaken over time. Some clean up was attempted in the mid 1960s, and the signs and fences were replaced at that time too. A token effort was again made in 1979. By the 1980s the radioactivity had decayed to the point where it was deemed no longer hazardous to the casual visitor in many places across the archipelago, as long as they do not disturb the environment or stay too long!

When a gas project was proposed on the nearby Barrow Island, which had since become a bit of an offshore ark for some native animals, it was decided to eradicate any remaining cats & rats from the Montebellos, and in 2009, birds and endangered marsupials and other animals, were transplanted there from Barrow. Funded by the Gas consortium, a 16 year Montebello Renewal Project meant that conservationists and biologists regularly monitored and managed the site over that period. (Drewe, Robert 2013)

Today, the Montebello Islands are a Conservation & Marine Park. Visitors though are advised NOT to spend more than an hour per day at the test sites, not to disturb the soils, or remove any souvenirs from the site due to residual radioactivity. A surprising amount of Operation Hurricane relics can still be seen across the area, from the remains of the bunkers, metal from plane wings or rocket launchers, and other pieces of military structures and test debris that were not cleaned up. (Veth, Peter 1993) (Veth, Peter 1993) Of course none of it should be touched or removed, as much will still be radioactive from the blast. A monument on Alpha Island marks the 1956 test site. (Operation Hurricane 2023) (Government of Western Australia Parks and Wildlife Service [no date])

Now this episode I want to recommend a podcast I have only found fairly recently. An absolute gem and I wonder how I could have missed it for so long. Called "The Rest is History", and created by two brilliant and highly amusing British historians and writers, Tom Holland and Dominic Sandbrook, their podcast will entertain and enlighten you by interrogating the past, and attempting to de-tangle the present. https://rss.acast.com/the-rest-is-history-podcast

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- Intro/Exit music modified from: 'Grand Canyon' by David Löhstana [CCFM Music]
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