Desert(ed) geographies: cartographies of nuclear testing

JOE LOCKARD

THE PAPER ANALYSES cartographies of nuclearism and colonial–native relations in terms of the exclusions in nuclear testing maps. It considers maps from French and British nuclear tests at Mururoa in the South Pacific and Maralinga in Australia. The paper argues that these maps rely on older Euro-American cartographic and narrative traditions of imagining empty and deserted territories in order to advance political arguments for the displacement and deterritorialisation of native peoples who occupy nuclear testing areas. Such official government nuclear cartography reproduces a colonial narrative of native abandonment. The explicit spatial expansionism of nuclear testing maps emphasises that control of place is the crux of the struggle for an anti-nuclear narrative strategy.

Joe Lockard is a lecturer in English. He may be contacted via: English Department, 322 Wheeler Hall, University of California, Berkeley, CA 94720, United States of America. Email: lockard@socrates.berkeley.edu

SINCE THE FIRST ATOMIC EXPLOSION at the Trinity site in New Mexico in 1945, isolated districts of the American southwest, Australia, China, Kazakhstan, and small South Pacific islands have shared a common fate of designation as suitable sites for test explosions. The geography of nuclear testing coincides with deserted geographies, or those areas considered by official opinion as the far peripheries of human habitation and economic possibility. These lands have been designated by metropolitan policymakers as suitable sacrificial sites. Deserted geographies are contemporary continuations of the Renaissance tradition of imagining a cartographic *terra incognita*, and are more accurately understood as creations of Euro-American imaginations rather than as descriptions of real terrain. For nuclear tests, as Peter Bacon Hales writes, planners from the first 'sought the vast, hostile zones, places already inhospitable, already lit by a harsh and unrelenting light, already written out of the mythology of redemption. No amount of cultivation would turn these deserts into gardens' (1997 p 302).

KEY WORDS

Nuclear testing

Cartography

Colonialism

South Pacific

Australia

Aboriginal people

Colonisation of emptiness and the original inhabitants of putative 'empty' spaces profoundly shapes narratives of nuclearism.[1] Since nuclearism's first territorial conquest has been that of space, through displacement of native peoples and the creation of irradiated no-go zones, the consequent discourse has been pre-eminently one of spatial stories. The commonalities and differences between nuclear testing narratives centre around their inherent conceptual spaces and represented spatial histories.

In this paper, I analyse the joint topographies of nuclear testing and colonial–native relations, focusing especially on cartographic principles of exclusion involved in the creation of nuclear domains. This will elucidate what Harley terms 'the political unconscious of the map' where 'colonial power has been reinforced and made legitimate through cartography' (1992 p 530). I discuss nuclear maps from the South Pacific and Australia, considering nuclear cartography as a form of narrative practice. Through close examination of this instance of nuclearist discourse, I shall attempt to sketch leading features of nuclear spatiality that extend through diverse discourses.

Theorising 'spatial stories', Michel de Certeau distinguishes between space (*espace*) and place (*lieu*): a *place* is a stable 'configuration of position', whereas 'a *space* exists when one takes into consideration vectors of direction, velocities, and time variables'

RESEARCH

(1984 p 117). In this definition, 'space is a practiced place'.[2] Building on de Certeau's distinction between space and place, narrative is both a record of praxis and the transformative mediator between place and space. De Certeau argues that a story has 'distributive power and informative force' (1984 p 123) that enables it to establish space, and 'reciprocally, where stories are disappearing (or else are reduced to museographical objects), there is a loss of space: deprived of narrations ... the group or the individual regresses toward the disquieting, fatalistic experience of a formless, indistinct, and nocturnal totality' (1984 p 123).

That loss of distinct space to an invisible fear, driven by the demands of state technology and research, together with a memorialised absence of humans, have been primary characteristics of nuclear stories. Nuclearist narrative has resonated with a subtle fear of apocalypse throughout the body of late twentieth-century discourse, omnipresent and potentially omnicidal. In the form of nuclear testing narratives, nuclearism assumes an imperial expansiveness. It quite literally transforms quiet 'marginal' places, where both marginality and place have been defined by external cosmopolitan criteria that emphasise absent functions rather than present life, into a malignant, invisibly contaminated, nuclearised space. Marginal spaces attract special attention as laboratory places, as available wasteland for exhibitions of social power. In the moments before a nuclear test, 'all geography emanates' from ground zero (Hales 1997 p 301) and a mythic silence settles over the landscape that impresses itself in observer reports. This is the silent moment into which a new story is born.

Preliminary apocalypses (tests that sign nuclearism's potential) have scarred and transformed desert(ed) places into harbingers of expansionist nuclearised spaces. The severely delimited and government enforced boundaries of test sites bear little relation to the meanings and fears that overspill and surround them. Narrative, inasmuch as it precedes and authorises spatial practice, has become an active accomplice of nuclearism's shadow. The stories that have been eclipsed or disappeared are those of voiceless narrators, displaced people who remain powerless to alter substantially the dominant narrative paradigms.

Nuclear testing begins with a zone of exclusion and its apologetic narratives start at the same point. The (1973) White Paper issued by the French foreign ministry, defending nuclear tests in 'French Polynesia'[3] against international protests, used the following language to defend its atmospheric testing programme:

> Because of their geographic location, the Mururoa and Fangataufa sites compare favorably, as far as safety is concerned, with the most isolated foreign sites: there is practically nobody within a radius of 120 miles (200 km) and barely 4,200 inhabitants within a radius of 620 miles (1,000 km) whereas for the same 620-mile area around the Maralinga site in Australia the population was 700,000; 4 million around the Soviet site of Kazakhstan and 7 million around the American site in Nevada (France 1973 p 5).

Arguing this case graphically, an annex to the White Paper (1973) supplies a series of maps to buttress the test. An initial map locates Mururoa's situation within the Pacific and arrows indicate kilometre distance in relation to other major land masses: New Zealand, Australia, Chile and Mexico, in order of increasing distance. Following maps overlay geographic outlines of the South Pacific, Australia, Kazakhstan and the United States with concentric circles of distance, originating from their respective test sites, and detail population within the circles.

The argumentative projects of the first map (Figure 1) and its successors are integrally linked by a cartographic 'bridging' manoeuvre in which arrows traverse

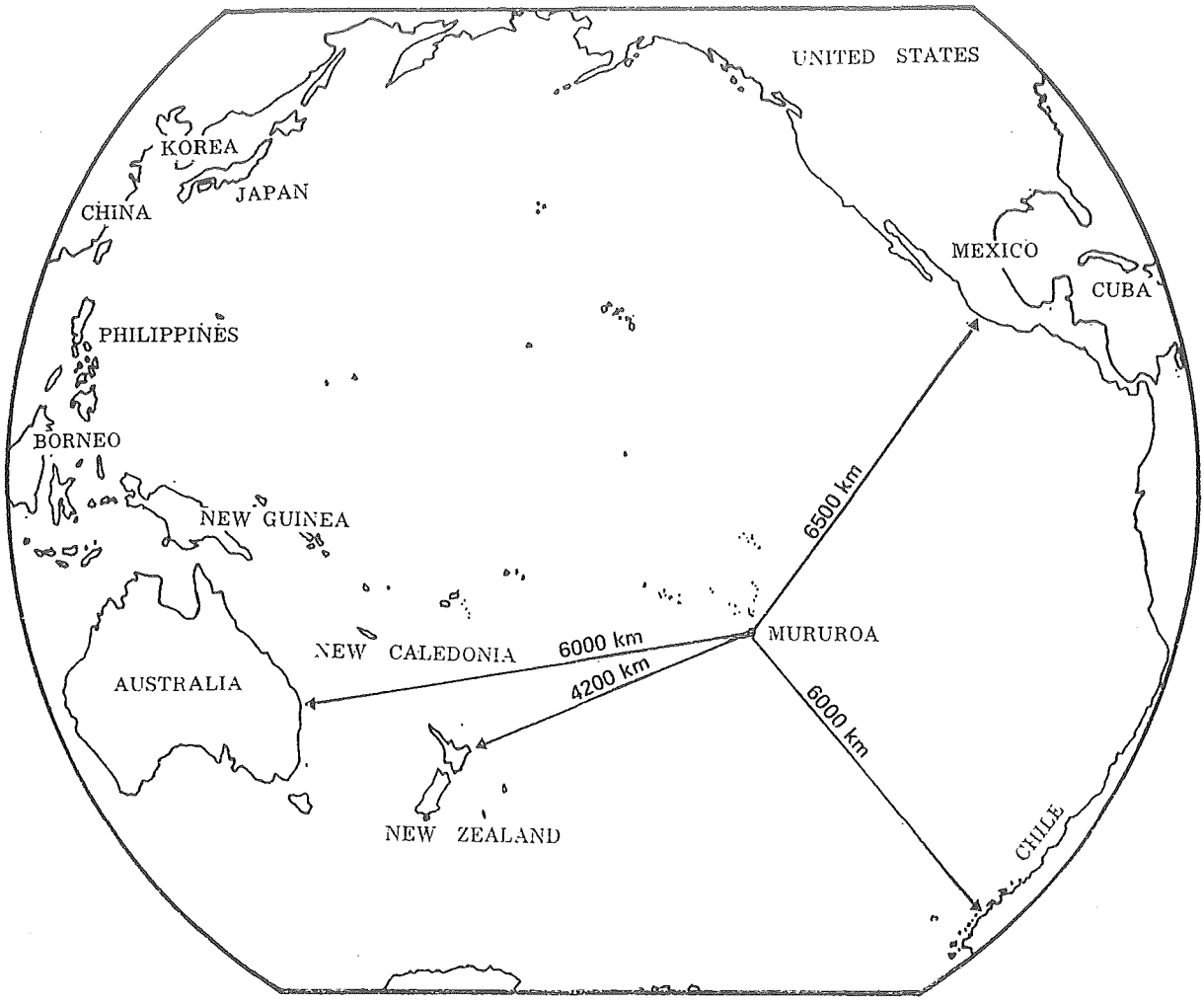


Figure 1: Map of geographical location of Mururoa.

'empty' space and designate major land masses as the direction of concern. The mid-ocean test site is rendered a geographic isolate, removed from its immediate Pacific environment and thereby deemed a safe location. As a map, it operates through a colonial and imagined fiction of emptiness. Small islands and small populations ('small' is used here advisedly, for it incorporates unidirectional cultural perspective) lie beneath the bridging traverse of the kilometre arrows. As narrative, this government map, while adhering to an objective geography, engages in deceptive practices. It erases both a region and its constituent identities, for nearby Pacific islands remain unlabelled and in an ahistoric condition; it erases unitary environmental relations between ocean and land to construct a version of oceanic 'desertification'; it erases power relations between land masses and their governments; and, through an omniscient third-person scientific narration, it seeks to erase the policy purposes of cartographic agency itself. These flawed geographic arguments continued to characterise official French policy over 20 years later, during the 1995–6 resumption of Mururoa tests. Citing such surface distance figures, General Paul Vericel, military commander of the testing programme, stated, 'We are in the largest desert on earth' (Greenlees 1995 p 19).

Ironically, the map's government sponsors undercut their own intentions by emphasising the globality of nuclear testing and its long-range atmospheric consequences: although they attempt to represent place within place, the map merges and integrates places within a nuclearised space.[4] Global radioactivity dispersion data underscore that distance means diminished effect, not absence of effect. Produced in the Quai d'Orsay, the selection of a Pacific Rim perspective reveals an incontestably diplomatic *compositio loci* (creation of place), one where narrative voice remains metropolitan and colonial despite the near-centring of an otherwise 'peripheral' Mururoa on the map. At the head of a map series, this map seeks to initiate a cartographic narrative of nuclear testing as 'nobody's business but our own'. In their spatial storytelling, then, French foreign ministry officials endeavoured to ensure spatial enclosure and a closed narrative but were betrayed by their own geography. They sought to depict an isolated place and instead drew an expanding outline of nuclearised space. Official cartography, prepared as a defence of French nuclear testing policy, failed to recognise that 'in the geography of the imagination, Australians and New Zealanders view the South Pacific islands as close' (Findlay 1995 p 374). The Pacific Ocean surface, rather than constituting the barrier that these maps envisage, has been conceived throughout the region as a source of community. Anti-nuclearist discourse in the Pacific and elsewhere relies on mental mapmaking that expresses interconnective structures of distance, much in common with the traditional navigational cartographies of Oceania (Finney 1998).

Subsequent maps (Figure 2a, b, c) work to integrate an aggregate social and human geography into the official French argument. The mapped territory of the Mururoa area is specified, via parenthetical '(Fr)' notations, as both France and French. The notation functions ambiguously: as a proper noun it specifies territorial identity; as an adjective it asserts such identity. On the map's flank, Pitcairn and Deno islands are designated as '(GB)': that is, to buttress entitlement through title specification, the parallel colonial history of another European power – Great Britain – is mentioned. The mere fact that title specifications are necessary alerts us to processes of consolidated territorial incorporation (and an absence of '(Fr)' beside Tahiti, a French *territoire d'outre-mer*, heightens this political question). As Campbell (1989) notes with regard to French Pacific politics, 'the root of the problem has been that France has not considered its Pacific possessions to be colonies: rather, they are overseas territories, and so ... independence has not been negotiable' (1998 p 205). An unstated premise, recognisable only as an abbreviated hint in the map's symbolic apparatus, is that the territory is not only French but, further, subject to exercise of French national will. The inner concentric circle is thus French, while the outer circle is a French–British condominium. Parenthetical place-name appendages become statements of title, and consequently, a colonial exclusion of native claims. The graphic argument expressed, which centres on a space/population ratio, entirely ignores more basic questions of nuclearism, the consequences of testing, and colonial destruction of the land itself.[5] The issue of Polynesian self-determination entirely disappears, for, as Tahitian representative John Teariki addressed President de Gaulle in 1966 when he arrived for the first nuclear test, '[French policy consisted] right from the very beginning of a long series of attacks against our liberties, threats and acts of force aimed at reinforcing the colonial system and the military occupation of our islands' (quoted in Dibblin 1988 p 203). The map's symbolic apparatus asserts, in the face of challenge, an imperial right of disposition.

As this cartographic narrative continues over subsequent pages and equivalent circumferences surround Australian-British, Soviet and American test sites, its

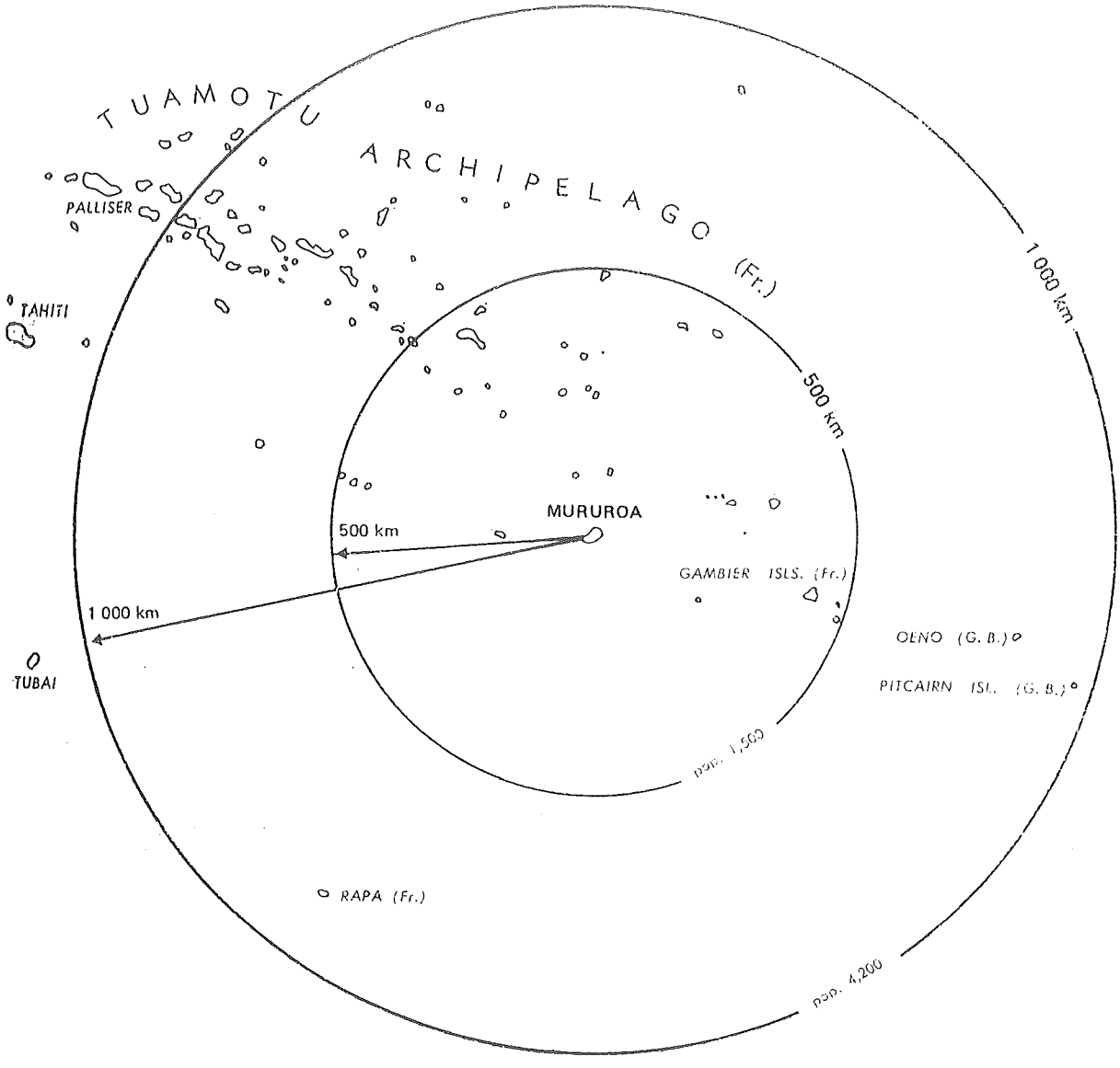


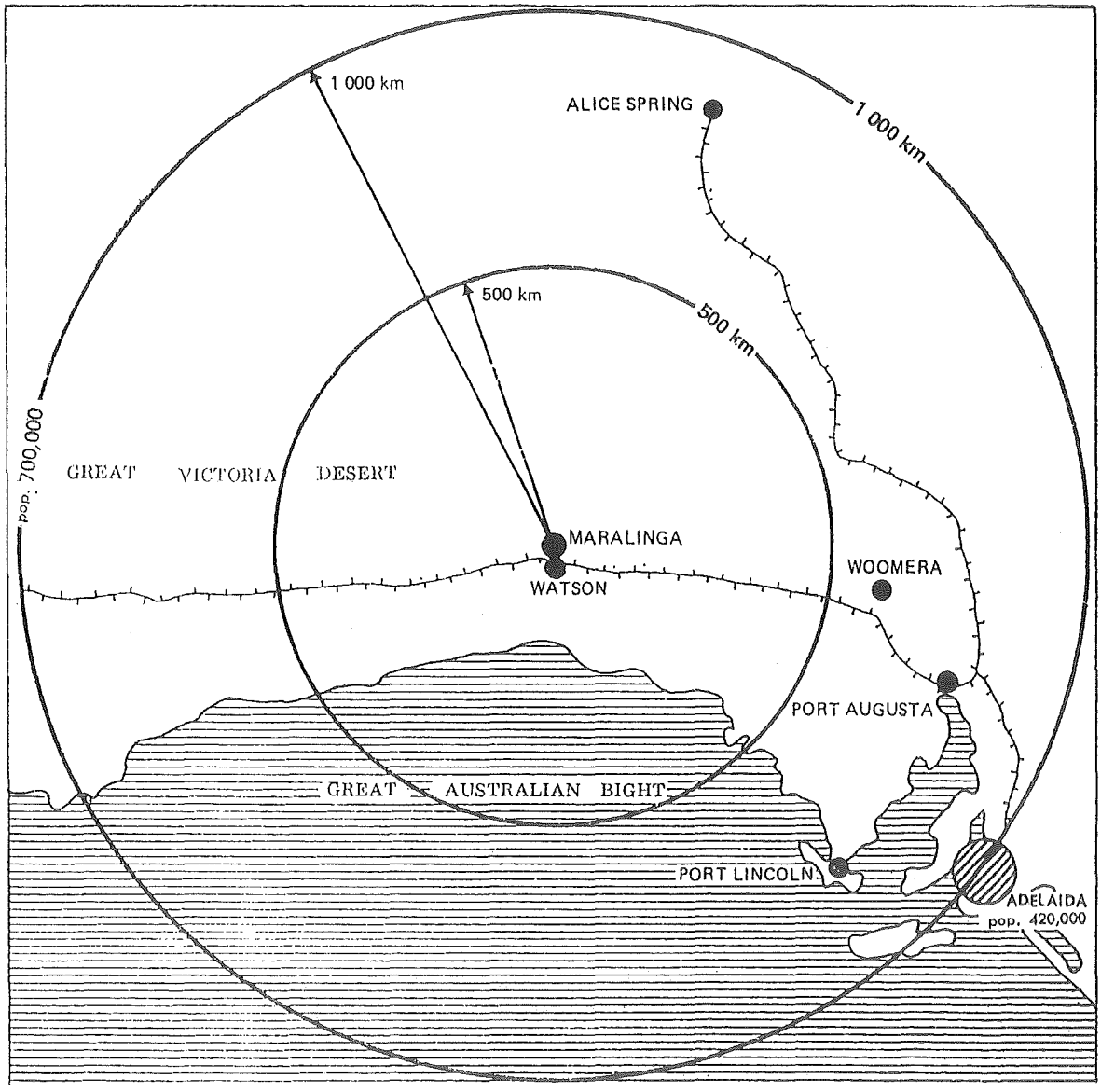
Figure 2a: Population density in the Mururoa site.

existence as self-serving government narrative may be turned to another purpose. The map series underscores a central feature of nuclearist geography and narrative. Nuclearised place is exclusive; nuclearised space is inclusive. The Mururoa, Maralinga and Nevada test sites – each of whose establishment affected native peoples profoundly – are exclusive, fenced and guarded places; the spaces they govern through their presence and use are open, wide and inclusive. Employing place and space as simultaneous geographic and narrative typologies or as a dialectic would be an error, for they are fluid human valences rather than absolute categories. Territorialised narrative erupts constantly from the political dynamic emanating from these shifting socio-spatial power relations. Such political chaffing between place and space attains expression in a full range of societal acts that generate narrative repetition and interpretation: colonial demands to vacate sites, displacement and deterritorialisation,

anti-colonial response affirming place and resisting a marginalised spatiality, and historical reconsiderations of past spatial competition. This competitive dynamic has had considerable and familiar expression throughout human history, but the advent of nuclearism in the mid-twentieth century raised the chiliastic stakes. When territorial place loses to state technologists, the final destructive aesthetic reads like the one contained in Edward Teller's reportage (Teller 1962 p 51):

> Few scientific experiments have been conducted under conditions as exotic or in a place as beautiful as the Pacific setting for the first thermonuclear explosion. Rising early that May morning, we walked through the tropical heat of Eniwetok's placid lagoon. Again, we put on dark glasses. Again, we felt the heat of the blast on our faces.

Figure 2b: Population density in the Maralinga site.



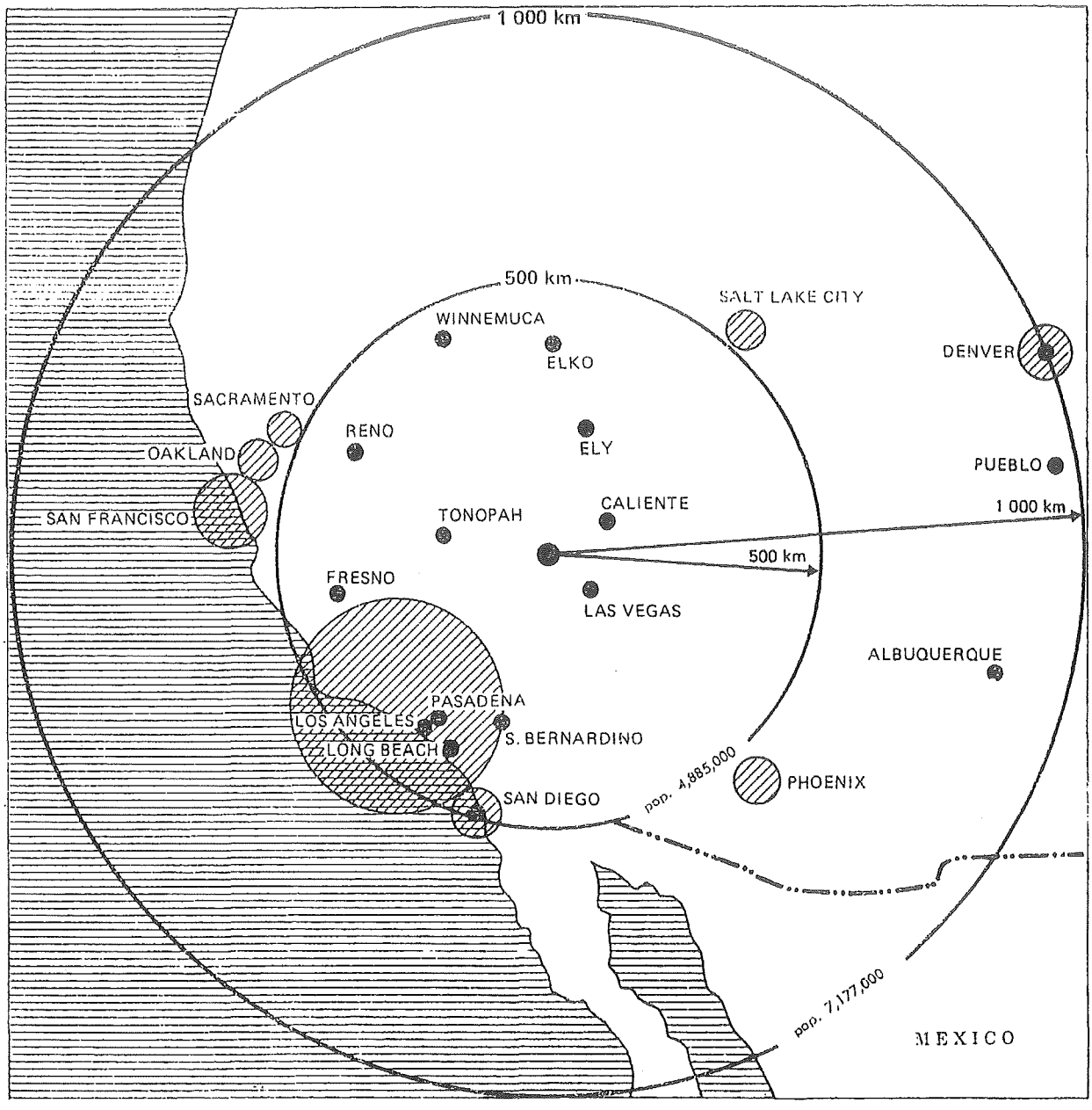


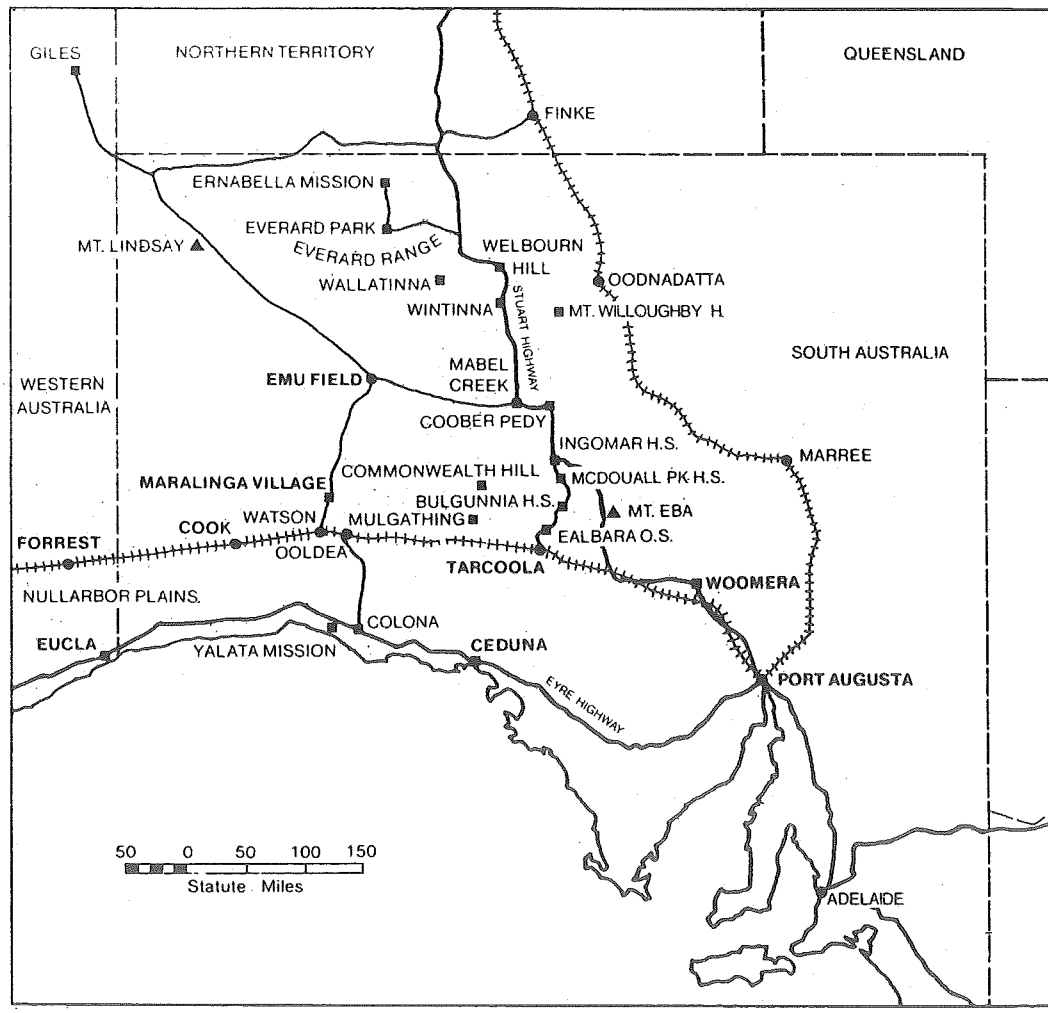
Figure 2c: Population density in the Nevada site.

In nuclear testing narratives, deterritorialisation includes the land itself and disestablishment threatens to become an all-encompassing event. The oral history of Bikini Island, site of the first United States nuclear tests in 1946, relates that its native population was descended from Larkelon, who arrived at the island five generations previous and threatened to make war. Frightened, the inhabitants took to their canoes and were never seen again (Kiste 1974 p 16). The arrival of the United States Navy and dispossession of Larkelon's descendants was in one sense a cyclical repetition of events. At a more fundamental level, however, a foundation-story has been replaced by a termination-story, for the island is no longer a habitable geography. Nuclearist mapmakers, whose work has been defined and limited by the policies

that shape their maps, can neither recognise nor incorporate the terminal events and future possibilities of these maps.

So that we may further explore comparative cartographies and narratives, I shall now turn to a set of Australian nuclear maps. They reveal a very different political definition of space, one of inland exploration and national self-recognition rather than classical features of French overseas colonialism.[6] When the Australian government arranged joint nuclear tests with Great Britain in the 1950s, it did so in the afterglow of an empire in an advanced state of disassembly. At the point atmospheric testing over Maralinga began in 1952, Gallup polls indicated a majority of Australians favoured the tests (58 percent approved, 29 percent opposed). By the time the tests concluded in 1958, the same poll showed that 37 percent remained in favor and 49 percent opposed the tests (Arnold 1997 p 221). Beyond a concern over radiological hazards, Australian opinion had entered an historic period of national definition, one which increasingly required territorial autonomy in appearance as well as in constitutional expression. By 1965, the political obstacles to developing Maralinga as an underground testing site, like the Nevada Test Site, were deemed

Figure 3: Map of South Australia showing location of Maralinga.



'formidable' (Arnold 1987 p 224). Thirty-plus years after the first tests, when a Labour-led government in 1984 established a Royal Commission into British nuclear testing in Australia, the political climate had shifted so dramatically as to render such collaborative tests unthinkable.

The Commission's work was notable in that 'The Aboriginal People' were the first party granted leave to appear and 48 of the 323 Australian witnesses who appeared were Aboriginal people. The Commission's report is an intriguing 'mixed' example of nuclearist and anti-nuclear discourse. Future analysis of nuclear discourse could profitably give prolonged attention to the report's literary qualities. It suffices here, however, to argue that popular hostility to the perceived infringement of Australian territorial sovereignty worked to amplify resoundingly Aboriginal protests within the report. White Australia, resentful of its (voluntary) colonial use as Britain's testing site, pointed to testing as a violation of native spatial rights. The report's concern with facilitating Aboriginal voices, while undoubtedly genuine, functioned within the enabling environment of an Australian national narrative protesting territorial violation. Voice – white and Aboriginal – was temporarily conjoined and mutual. This coalition of voices, though involving an appropriation by white Australia for its purposes of national self-definition, had the unintentional consequence of legitimating Aboriginal land rights claims beyond the test sites themselves.

These double voices, mutual geographies and their joint narrative become visible in the map progression beginning with Figure 3 in the Commission's report (Australia 1985). It depicts the territory of South Australia, an apparently harmonious admixture of Aboriginal and British-origin toponymy. The map locates Maralinga and Emu Field indisputably nestled within a surrounding national space: Western Australia, Northern Territory and Queensland. Nuclearised places, the map informs us, are lodged as co-equal sites within a body politic. The following map (Figure 4) details the Maralinga Range, its military village, roads and outlying test sites (test name and dot). Unlike the preceding figure, no topographical or socio-political information appears: the map is stripped to the basics of the site purpose. The site is linked only to the rail town of Watson 25 miles (40 km) south and the Emu Field Test Site, used for earlier tests, some 120 miles (193 km) north. A startling topographic order appears in the next map (Figure 5) of the forward testing area, where inchoate cartographic space has been re-organised into an urban outback. A city street grid with one- and several mile-deep rectangular blocks extends from Second to Twenty-fifth Avenue, intersected by cross-streets! These were in reality dirt tracks intended for patrolling to the north of test shots, the direction towards which winds were supposed to carry fallout into the 'unpopulated' desert interior. This imaginative elaboration superimposed on the bush, besides its amusing urbanisation, carries the concept of a new and civilising order. Form has been imposed on the chaos of an unknown place being inducted into the higher space of nuclear purpose.

The final map (Figure 6) in this narrative sequence arranges together information and non-information on radiological safety under varying atmospheric conditions (concentric circles)[7] a white legal geography in delineated rural districts to the west; a northwestern civilian exclusion line (solid line); and a supposed Aboriginal social geography extending through the heart of the Maralinga test range. The figure's very title questions and contradicts the range of a Safety Committee's original estimate of Aboriginal inhabitation, and the Commission report vitiates this cartographic claim of limited habitat by citing numerous patrol contacts with Aboriginal people throughout the mapped area. The Safety Committee's map may

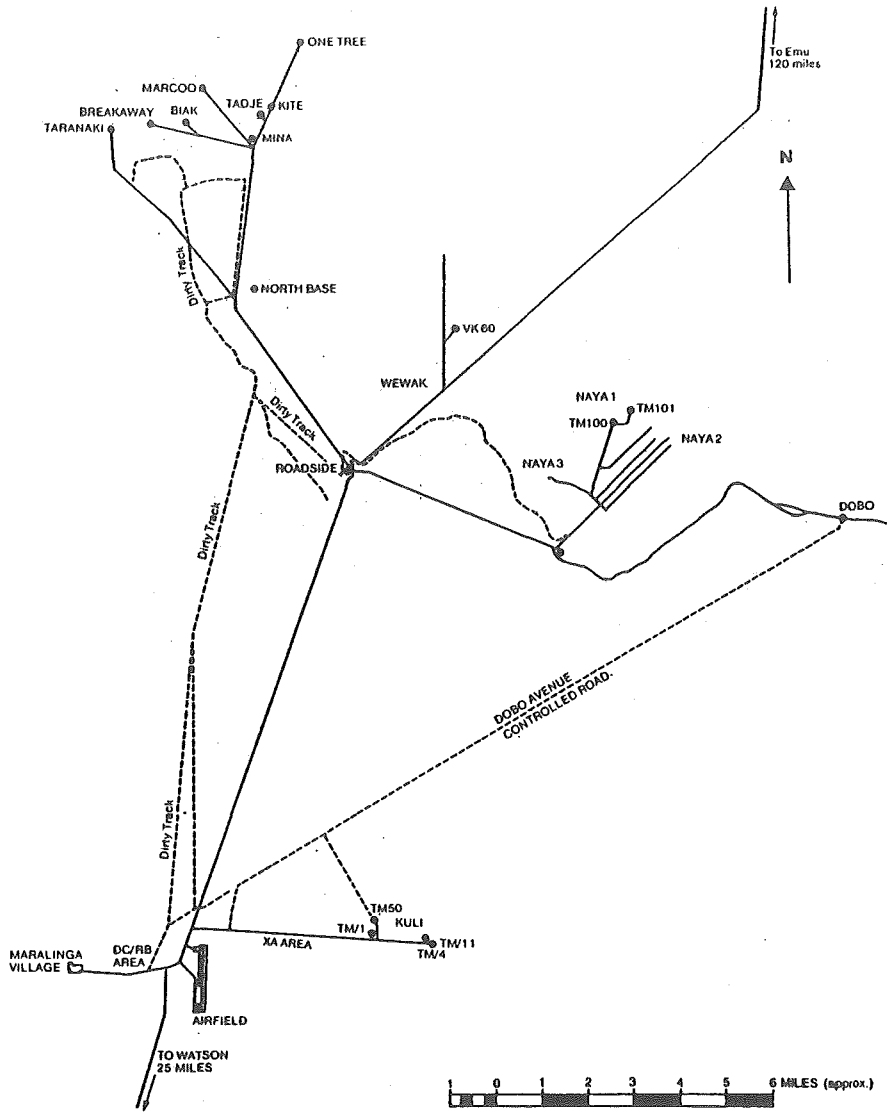


Figure 4: Map of Maralinga range.

be read as a narrative collage, a juxtaposition of technological voice over nativism's unrecorded and annulled articulation of place. Maralinga, from this inner point outward, became a spreading source of exilic signification. Substantial sections of the Commission report address the ineffectiveness of patrol arrangements in keeping Aboriginal people out of the vast stretches of test terrain, due to inadequate resources, 'hypocritical' attitudes (Australia 1985 p 380), and general cultural incomprehension. In reference to the 1959 Antler test series, the Commission concludes:

> Aboriginal people inhabited the Prohibited Zone during the tests and afterwards. When they were ordered to move off their lands, some of these people died. This incident is but one illustration of the lack of comprehension of Aboriginal culture and lifestyle. The need to know nothing of the distinctive characteristics of Aboriginality was a constant of the programme of British nuclear tests in Australia (Australia 1985 p 130).

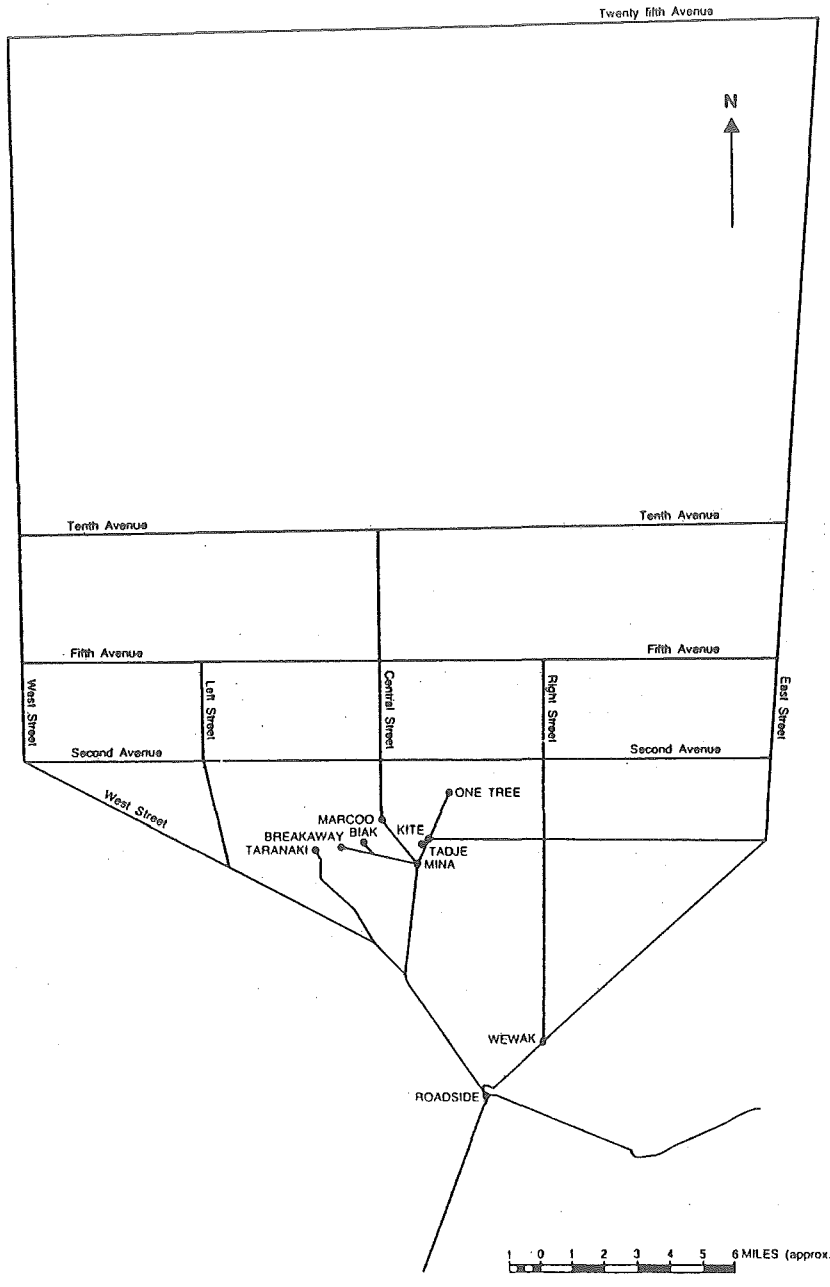


Figure 5: Map of forward area of Maralinga (to Twenty-fifth Avenue).

The tragic effects of these conflicting geographies and Aboriginal expulsion were also recorded by the Commission, after patrol officers in a Land Rover[8] ordered an Aboriginal family to move out of the Prohibited Zone:

> As instructed, the family unit moved off the Range. And, as instructed, they walked along the road. To the white Patrol Officer this doubtless made sense. But for the Aborigines the road, unlike aboriginal routes, had no logic as a pathway between food and water. Without food and water, Darlene Stevens' mother, father and brother perished.[9]

The grid logic of a geometrical road system superimposed on a desert terrain, part of a techno-structure's geography, became a death trap for Aboriginal people. In the midst of their homeland, they died on alien territory. An absence of common spatial grammar, on a nuclear geography undergoing total redefinition, rendered Aboriginal people as subordinate, colonised and vulnerable subjects. The patrol officers' gesture incorporated a resonant repetition of 'originary founding acts' (de Certeau 1984 p 124) in which boundaries and exclusion established their partnership. Dreamtime and the authorisations of local, place-specific story and myth were forced down a linear road into an alien order of place and space. As Relph observes, there is 'a very clear distinction to be drawn between the existential space of a culture like that of the Aboriginal people and most technological and industrial cultures – the former is "sacred"and symbolic, while the latter are "geographical" and significant for functional and utilitarian purposes' (1976 p 15).[10]

The wide consequences of this nuclear displacement become visible in the isobar configurations (Figure 7) of an especially 'dirty' Buffalo series test in 1956. Nuclearism's place-appropriation has erupted across the Australian continent, a perspective that would seem to force map-readers towards a realisation that the projection of imagined national space has less importance than the reality of a nuclearised one. Yet here, unlike the official French map sequence which emphasises isolation as the containment of radioactivity, the Australian government commission focuses on an isolated nation-

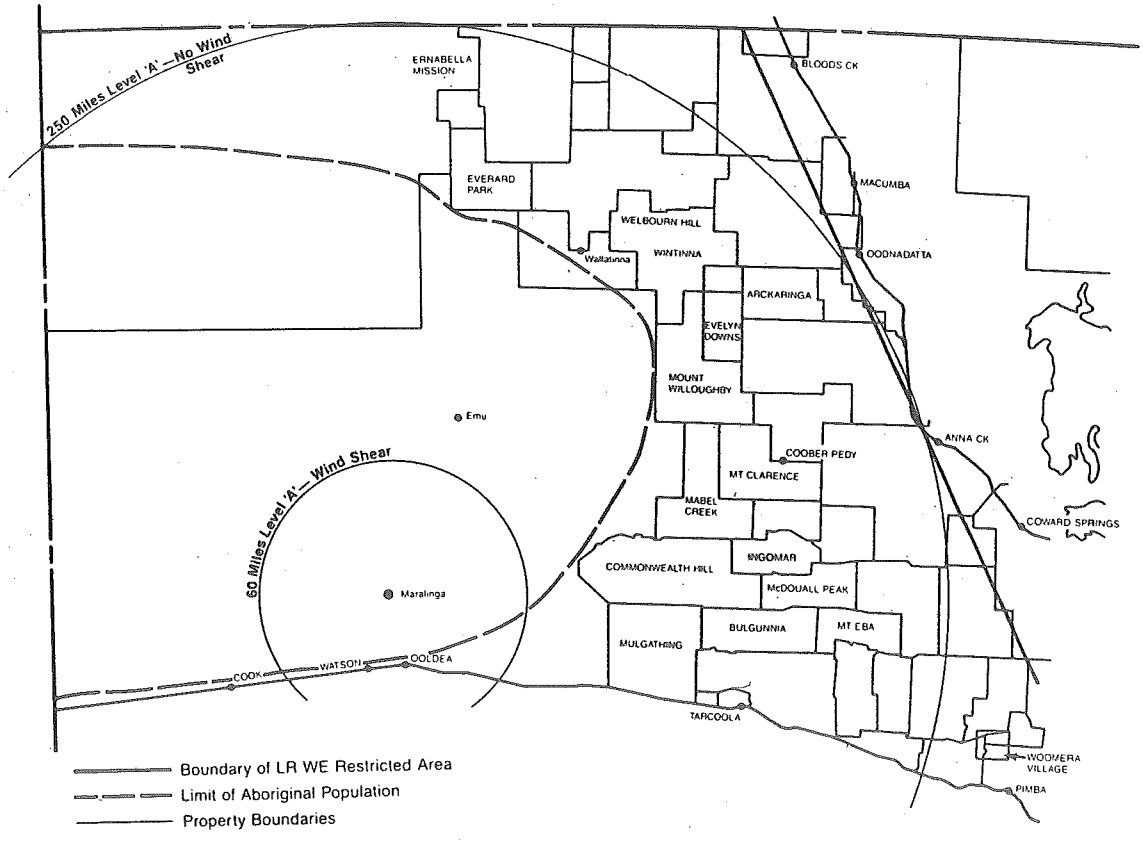


Figure 6: Map of western South Australia showing the area considered by the Safety Committee to be uninhabited. Circles show expected limit of 'Level A' fallout under different wind shear conditions.

state as the sole recipient of radioactive effects. Identical physical phenomena involved in French and British-Australian nuclear explosions have been inscribed with radically divergent national messages: self-justification in the former, and intense criticism in the latter. Paradoxically, given this contradiction, both map series were deeply involved in undertaking a defence of national spatial rights

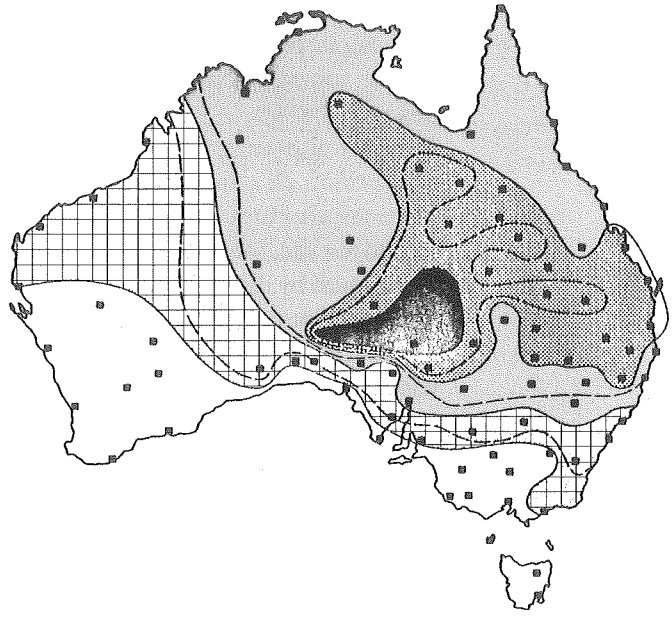


Figure 7: The distribution of fallout over Australia from the Buffalo 4 test. The contours show the total amount of radioactivity recorded by the sticky paper collectors. The squares show the locations of the fallout stations.

The task of locating the Australian test sites and laying out roads for them in the outback fell to Len Beadell, a bush surveyor, who later published an account of his work under the ambiguous title of *Blast the Bush*. Beadell was an 'old hand' in the bush, highly talented, resourceful, charismatic and one who alternated respect and blithe racism towards Aboriginal people. His account does not bear great intrinsic interest, being largely project shoptalk. One quality which singles it out for theoretical attention, however, lies in its tropes of white exploration, conquest and use of the useless. Nuclear testing in Australia, according to both Beadell and Sir William Penney, the project's first director, was founded on both an intimate white knowledge of the bush ('bushcraft') and a simultaneous exploration of its geography (Penney in Beadell 1967 p vii–xi). The contradiction of a knowledge claim to the land simultaneous with a quest into and investigation of the same land lies inherent in exploratory colonial practice. Siting work for the British-Australian nuclear tests proceeded from a general presumption that the bush was uninhabited and uninhabitable, an assumption refuted both by the decision to send search patrols for Aboriginal groups and by extensive water reportage from the Commission. At no point in his account does Beadell mention Aboriginal people in the test site areas. In the context of establishing the Maralinga site, prevalent opinion was expressed in the words of another project officer at the time:

> There was a mission at Ooldea ... but this has now been abandoned, and I am given to understand that this area is no longer used for Aborigines. There was a track from Ooldea up to the north through the area roughly where Emu now is, and further

> north, but I understand that this is not now used, except by one or two elderly blacks, and on rare occasions, and that there is no need whatever for Aboriginal people to use any part of this country around the proposed area (Australia 1985 p 300).

As the Commission observed, 'it is difficult to see how [the official] could have made such a categorical and complacent assertion since no surveys had at this time been undertaken of Aboriginal people, their movements, sites and paths around Maralinga' (Australia 1985 p 300). What they surveyed was negative abandonment, not positive presence. Tropes of native abandonment emerge frequently throughout nuclear testing narratives, supplying the justification and rationales necessary for this spatial usage.

Beadell's account provides a convincing example of this manner of landscape perception. In a map he drew (Figure 8), Beadell records his overland trek and exploration of the outback to reconnoiter the site of what was to become Australia's second test site, Maralinga.[11] It is drawn as a field of isolation and desolation, bordered at the south by the Transcontinental Railway and stretching some 150 miles (241 km) into the emptiness of sand ridges and salt flats. The trek difficulties of Beadell's party have been noted along the route. The 'native wells', he reports, are dry and filled with sand (although, as noted in the Commission's report, Aboriginal families lived and logically found water in this dryness). No human sustenance appears possible from Beadell's descriptive topography. This topography has been sketched by thirst, emptiness and an occasional burial mound (1967 p 200). The terrain has been rendered as abandoned and the site only of pre-history, not present history. One of the first discoveries Beadell made along the trek trail was a site he chose to name 'Native Stonehenge'. Recording the moment of discovery, he writes:

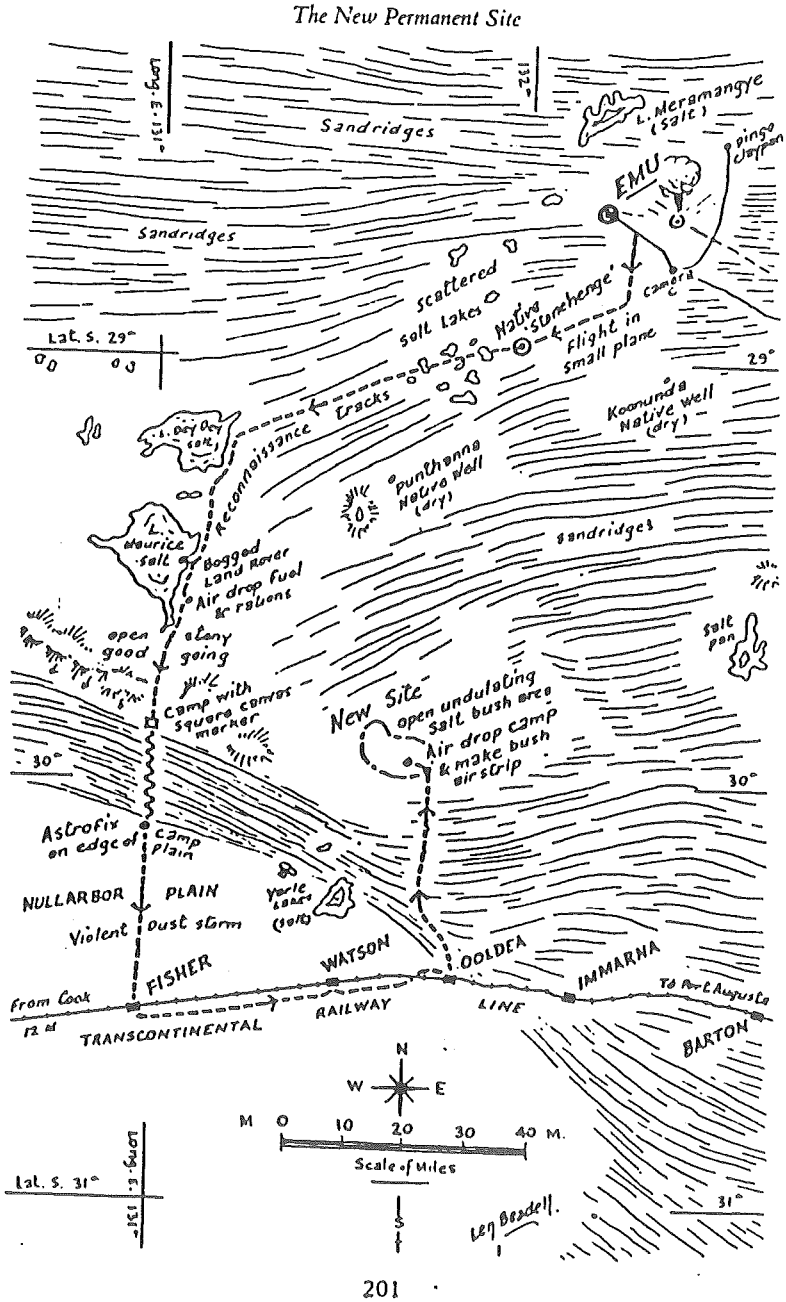
> The moment my vehicle topped the rise to level out again I saw it, spread out right across my path extending for at least sixty yards either side. It was almost like a picket fence with posts six feet apart made from slivers of shale. Tingling with excitement I switched off and leapt out of the cabin. Being in so isolated an area it was obviously built by those primitive, stone-age nomads in some distant dreamtime. And here we were, surely the first white men ever to be gazing in awe at the sight, scarcely daring to breathe in order to hold the atmosphere of it all and to prolong the memory of this dramatic moment to its limit (1967 p 173).

It is startling to witness how thoroughly the canons of Victorian explorer travel narrative from 'darkest' Africa and 'exotic' Asia continued to inform and operate in the account of nuclear scout published at the late date of 1967. The descriptive language of abandoned cultural sites of Latin America, Africa and Asia, as reported by numerous European travellers and written by H Rider Haggard, has been reinvented for this Australian occasion:

> I wondered what the scene would have looked like at night in those early days, with the ghastly sounds of the whispered chanting increasing in volume at times tapering slowly away, then surging back to life with the dancing of the black, naked participants, ochre painted and glistening with sweat in the glow of the fire. At the same time I couldn't help asking myself what these people, had they all been here, would have imagined if they had witnessed the glow from our atomic upheaval followed by earth tremors and shock waves (Beadell 1967 p 176).

Beadell inscribes a primitive absent native against a background of nuclear modernism, a gesture that works as spatial clearance. If the native can be imagined inhabiting a

temporal pre-history, then an ahistorical spatiality can be constructed. When nativeness has become a symbolic remnant, a 'Native Stonehenge', Aboriginal people have been made to disappear as thoroughly as the Druids and the spatial horizon is void. 'The New Permanent Site' of Beadell's map (Figure 8), where a global weaponry will be tested, has become the Aboriginal Stonehenge's cultural replacement. Its permanence will exceed that of any paleolithic site, for some of these test areas have been radioactively contaminated and will remain uninhabitable for an estimated 240,000 years (Nelson 1992). The replacement space is a New Permanence, a global archipelago of sites that prohibit human presence far beyond an imaginable future. Describing the efforts of a United States government panel to create a monumental



201

Figure 8: The New Permanent Site.

'Keep Out' marker for a New Mexico nuclear waste site, Alan Burdick observes '[G]iven the enormous timespan, what sort of architectural model should the markers panel follow? Of the original Seven Wonders of the World, only one – Khufu's pyramid in Egypt – still stands, a mere 4,500 years old; Stonehenge is a thousand years its junior. The marker ... must compete for uniqueness with all the monuments yet to rise and fall ... ' (Burdick 1992 p 63). New-born nuclearised space has overpowered its human origins and exceeds civilisation's temporal claims: history itself has been atomised, and a nuclear Dreamtime emerges.[12]

The spatial explicitness of nuclear maps elucidates the function of native displacement, a shifting into a shadowed and disempowered narrative space, as a feature of nuclearist discourse. An expurgation of native presence precedes narrative agencies arguing towards a replacement presence and naturalisation of self and Nation into the landscape. This suggests that control of place is the crux of the struggle for anti-nuclear narrative strategy.[13] Because nuclearist discourse – whatever its narrative form – depicts a necessary abandonment of the land, counter-nuclearist discourse must attempt to reinhabit the land through imaginative acts, which can and must include anti-nuclear mapping. To expand these ideas on the narrative of nuclear spatiality, we must give continued attention to how broader Euro-American narrative traditions have represented the 'desert(ed)' spaces available to nuclear testing.

NOTES

[1] 'Nuclearism' will be defined in this paper as those military and civilian systems employing the nuclear processing cycle and associated technologies (eg missile systems). By extension, the term includes the ideologies, advocacies, policies, practices and socio-environmental outcomes associated with such technologies. 'Counter-nuclearism' and 'anti-nuclearism', used interchangeably, refer to opposition against nuclearist policy and practice.

[2] De Certeau's definitions, employed throughout this paper, are generally consonant with those of social geographers such as Massey (1994 pp 249–269) and Tuan (1997).

[3] Quotation marks in this instance denote recognition of the oxymoronic quality of phrases such as 'French Polynesia' or 'American Samoa' and the colonial enterprise they seek to validate.

[4] The map may also be read as argumentative resistance to an increasing regional integration that regarded French nuclear testing as an alien intrusion, a solidification of regional public opposition that gathered over decades and reached extraordinary levels. For anti-nuclear opinion in Australia, see Nossal and Vivian (1997).

[5] Jacques Cousteau and others have argued that the several dozen underground nuclear tests at Mururoa may cause its coral geology to fracture and eventually collapse, leading to catastrophic radiation releases from nuclear test caverns (Alcalay 1991 p 95). The French government has repeatedly asserted that the coral atolls are stable and will not leak radioactivity (Patel, 1995). However, at Amchitka island in Alaska, test site for one 1971 explosion, and Novaya Zemlya, site of 132 nuclear tests in the former Soviet Union, hydrological contamination processes are already in evidence. For the US, see Ridgeway (1996), Wald (1996); for former USSR, see Clery (1993), Korsunsky (1992). Thus by charting surface distances (Figure 1) and population density (Figure 2), the sub-surface vectors of toxic contamination have been ignored. For further discussion, see Danielsson (1990).

[6] The spatial practices represented on these Australian maps can properly be deemed 'internal colonialism'. Destruction of interior Aboriginal homelands through nuclear testing stands on a continuum of settlement practices and previous Aboriginal deterritorialisation. The present concern, however, lies with narrative perspective in nuclear cartography rather than a full engagement with concepts of internal colonialism. Although the following examples derive from Australian maps, a discussion based on domestic colonialism would be equally useful in relation to the southwestern US and the former USSR (see Lupandin and Gayer (1989) for discussion of Aboriginal mortality in Chukotka from atmospheric nuclear tests).

[7] 'Level A 'in the map data refers to 'that [contamination] level which will not give rise to any observable effects on the body' (Australia 1985, p 280), this being judged by then-prevailing exposure standards. See Caulfield (1989) for a general history of these standards and, on pages 162–163, for

specific risk estimates and morbidity/mortality excesses. 'Wind shear' refers to the high-level atmospheric winds which test authorities relied upon to disperse harmful radioactive fallout. When strong wind shear was present, Level A was established outside the inner circle (60 miles {97 km} radius), and without wind shear Level A fallout would spread to the far circle (25 miles {40 km} radius). The Commission report (Australia 1985) examines several cases where tests were conducted under unfavourable atmospheric conditions.

[8] Patrol officers were prohibited by regulation from giving rides in their vehicles to Aboriginal people (Australia 1985 p 380).

[9] Three family members survived their 100 mile (120 km) desert trek. Eleven other Aboriginal people travelling in the area were missing and their status unknown (Australia 1985 p 368). The Commission's report carefully employs 'some' to quantify Aboriginal deaths, the true number remaining uncertain.

[10] See also Rapoport (1972) and Tuan (1977 p 132).

[11] Australian authorities designated the site's place-name as 'maralinga,' meaning 'thunder' in an Aboriginal language. An expropriative act was thus naturalised with a native-like toponym.

[12] For a philosophical examination of the ethics of nuclear waste disposal, see des Jardins (1997 pp 5–82).

[13] Successful examples of this strategy over the past decade include Peter Goin's photo essay volume *Nuclear Landscapes* (Baltimore: Johns Hopkins University Press 1991), Robert Stone's documentary video *Radio Bikini* (PBS, Alexandria, Va), and other visual representations of test sites. Judson Rosebush's *Trinity*, a hypermedia work, attempts to re-visualise the New Mexico test site in a new medium (New York: Judson Rosebush Company, 1993).

ACKNOWLEDGMENTS

I wish to thank Charles Altieri, Ross Chambers, David Lockard, Mike Mosher and Gerald Vizenor for their comments on previous drafts. The present draft has also benefitted from comments by three anonymous readers and the editors of this journal.

REFERENCES

Alcalay, G (1991) Nuclear Colonialism in the Pacific, in Foerestel, L (ed) *Women's Voices on the Pacific:* The International Pacific Policy Conference, Washington, DC: Maisonneuve Press.

Arnold, L (1987) *A Very Special Relationship; British Atomic Weapon Trials in Australia,* London: Her Majesty's Stationery Office.

Australia (1985) *The Report of the Royal Commission into British Nuclear Tests in Australia* 1, Canberra: Australian Government Publishing Service.

Beadell, L (1967) *Blast the Bush*, Adelaide: Rigby.

Burdick, A (1992) The Last Cold-War Monument, *Harper's Magazine* (August), pp 62–67.

Campbell, IC (1989) *A History of the Pacific Islands*, Berkeley and Los Angeles: University of California Press.

Caulfield, C (1989) *Multiple Exposures: Chronicles of the Radiation Age,* Chicago: University of Chicago.

Certeau, M de (1984) *The Practice of Everyday Life*, Berkeley and Los Angeles: University of California Press.

Clery, D (1993) Cracks Begin to Show in Russia's Nuclear Test Site, *New Scientist* (January) 16 p 8.

Danielsson, B (1990) 'Poisoned Pacific – The Legacy of French Nuclear Testing,' *Bulletin of the Atomic Scientists* 46, (March) 2 pp 22–26.

Dibblin, J (1988) *Day of Two Suns: US Nuclear Testing and the Pacific Islanders*, New York: New Amsterdam.

Findlay, T (1995) Explaining Australasian Angst: Australia, New Zealand and French Nuclear Testing, *Security Dialogue* 26(4) pp 373–381.

Finney, B (1998) Nautical Cartography and Traditional Navigation in Oceania, in *The History of Cartography: Cartography in the Traditional African, American, Arctic, Australian, and Pacific Societies* (2, 3), D Woodward and G Lewis (eds), Chicago: University of Chicago Press.

France, Ministere des Affaires Etrangeres (1973) *White Paper* [on Pacific nuclear tests], Paris.

Greenlees, Don (1995) The Gallic Logic Behind the Tests, *World Press Review* 42(11) p 19.

Hales, PB (1997) *Atomic Spaces: Living on the Manhattan Project*, Urbana, IL: University of Illinois Press.

Jardins, JR des (1997) *Environmental Ethics*, Belmont, CA: Wadsworth.

Harley, JB (1992) Reading the Maps of the Columbian Encounter, *Annals of the Association of American Geographers* 82(3) pp 522–542.

Kiste, RC (1974) *The Bikinians: A Study in Forced Migration*, Menlo Park, CA: Commings Publishing Co.

Korsunsky, Lev (1992) Novaya Zemlya Spreads Nuclear Contamination, *Current Digest of the Post-Soviet Press* 44 (December 23) 47 p 12.

Lupandin, V and Yevdokia G (1989) Chukotka's High Death Rates Blamed on Nuclear Testing, *Current Digest of the Post-Soviet Press*, 41 (December 6) 45 p 20.

Massey, D (1994) *Space, Place, and Gender*, Minneapolis: University of Minnesota Press.

Nelson, E (1992) Aborigines 'Hot' Homes, *San Francisco Chronicle*, February 23 p 6.

Nossal, KR and Carolynn V (1997) *A Brief Madness: Australia and the Resumption of French Nuclear Testing*, Canberra: Canberra Papers on Strategy and Defence 121, Strategic and Defence Studies Centre, Research School of Pacific and Asian Studies, The Australian National University.

Patel, T (1995) France Claims Mururoa Rocks are Blast-Proof, *New Scientist* September 30 p 7.

Rapoport, A (1972) Australian Aborigines and the Definition of Place, in *Environmental Design: Research and Practice*, Mitchell W J (ed), Proceedings of the 3rd EDRA Conference, 1 pp 3-3–1 to 3-3–14 Los Angeles.

Relph, E (1976) *Place and Placelessness*, London: Pion.

Ridgeway, J (1996) Glow Fish, *Village Voice* 41, 45 p 24.

Teller, E (1962) *The Legacy of Hiroshima*, Garden City, NY: Doubleday.

Tuan, Y (1977) *Space and Place: The Perspective of Experience*, Minneapolis: University of Minnesota Press.

Wald, M (1996) Radiation Leak Reported at Site of Nuclear Test, *New York Times*, October 30 p 15.