COVER SHEET

MODERN COLONIALISM IN ANTARCTICA:
THE COLDEST BATTLEFIELD OF THE COLD WAR

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"Don't trust those Russkies! They know there's more to the Antarctic than science and weather forecasting. Close the Panama and Suez canals with an H-bomb and each and every ton of shipping in the Southern Hemisphere has to pass around Cape Horn and the Cape of Good Hope - in easy reach from the Antarctic. Base a few atomic submarines on the edge of the ice pack, lay a few rocket pads somewhere in the interior, and whambo! You sink the lot! I know it isn't good manners to speak about dirty subjects in front of you dedicated explorers, but no one can afford to ignore the strategic side of Antarctica any longer."[1]

Antarctica remained almost entirely unpopulated until mid-last century. Earlier explorers arrived, struggled to erect temporary shelters, planted flags of national possession, and then returned home. In 1954, ten men wintered at Mawson, the continent's first permanent settlement.[2] By 1961, thirty-five national bases fringed the continent. This intensive colonisation was driven by geopolitical pressures, particularly the Cold War. As this article demonstrates, in Antarctica geopolitics and the built environment are key components of one another: the stations are not simply products of geopolitics, they are geopolitics themselves, spelled out on the continent in the form of buildings, tracks, and bodies.

The decade 1954-64 is critical to the study of Antarctic settlement history because the Antarctic Treaty of 1961 'froze' territorial claims to the continent. The original stratum of Antarctic geopolitics laid down over this period juxtaposes competing claims of imperialism, multilateralism, and the idealism of international scientific cooperation. This paper examines three key research stations constructed during this decade: McMurdo (USA), Mirnyy (USSR), and Mawson (Australia). It focuses on the stations' siting and design, attending to the ways in which Cold War geopolitical and cultural contexts underpinned and shaped their divergent spatialities.

THE CONTEXT OF POST-WAR COLONISATION

The 1950s is undeniably the most active, unsettled period in the cultural history of Antarctican spatiality: during this decade, Antarctic physical space became permanently colonised, while at the same time a variety of competing Antarctic geopolitical spaces competed for primacy. Antarctic spatiality itself was a primary question during this period: it was not simply a matter of dividing the continent into sovereign units and deciding which state should get which portion, but rather a matter of deciding whether or not Antarctican space should or could be partitioned into state-governed sovereign possessions at all. Based on acts of imperial exploration, five nations—Australia, Britain, France, New Zealand, and Norway--laid claim to portions of the continent; Chile and Argentina relied on Papal Bulls to claim the Peninsula as Latin American space.[3] But other nations, notably the USA and the USSR, refused to recognise these claims, preferring to view Antarctica as entirely non-sovereign space. Despite the international territorial law of effective occupation, which stipulates that imperially-claimed land cannot be a complete possession until it is colonised,[4] before 1950s Antarctica remained unoccupied space.

[1] David Burke, *Monday at McMurdo* (novel). Wellington: Reed, 1967, p. 136.
[2] 'Wintered' is an Antarctic term meaning staying on the continent over the nine-month winter season. Mawson was the first permanent settlement on the continent; several peninsular and island settlements date from the 1940s.
[3] Shirley Scott, 'The Geopolitical Organization of Antarctica', *Australian Journal of Law and Society*, Vol 11, 1995, p. 118.
[4] Gillian Triggs, *International Law and Australian Sovereignty in Antarctica*, Sydney: Legal Books, 1986, pp. 4-6.

But by the 1950s, geopolitical and legal pressures on the continent were mounting in tandem with Cold War tensions; for the first time, Antarctica had become a contested space.

IGY

While international interest in Antarctica's military and economic potential grew during the 1950s, scientific pursuits ultimately did most to shape human occupation and political administration of the continent. The International Geophysical Year (July 1957 - December 1958) was the largest international scientific exercise ever undertaken.[5] IGY efforts focussed on the polar regions (and outer space).[6] Over 40 new permanent Antarctican research stations were established by twelve nations.[7] The continent's summer population approached 5000.[8] The USA and USSR built major logistics centres with airfields - McMurdo and Mirnyy - to supply field camps and numerous coastal and inland stations.[9] Great scientific interest in IGY's results prompted both permanent scientific settlements and treaty protection of the continent.[10]

McMURDO

U.S. occupation of Antarctica began in 1939-41. The Antarctic Service Expedition, led by Admiral Richard E. Byrd, established two bases in the continent's unclaimed sector.[11] These were abandoned during World War II.[12] In 1946-47 Byrd headed Navy Antarctic Development Project 'Operation High Jump'. This exercise, still the largest ever undertaken in Antarctica, involved 4700 men.[13] It mapped and photographed a quarter of Antarctica and sixty percent of its coastline.[14] Its purpose included "training personnel and testing material, consolidating and extending U.S. sovereignty over Antarctic areas, investigating possible base sites and extending scientific knowledge in general",[15] but also "prepar[ing] the U.S. military to fight the Soviet Union in polar conditions".[16] Specified instructions included "develop[ing] techniques for establishing and maintaining air bases on the ice, with particular attention to... later applicability ...[in] Greenland".[17]

Americans also identified the strategic military importance of Antarctica itself, aiming "to deny a Soviet presence".[18] Contemporary Soviets observed: "American military circles are seeking to

[5] Keith Suter, *Antarctica: Private Property or Public Heritage?* Leichhardt NSW: Pluto Press, 1991, pp. 17-19. See also Hugh Dryden, 'The international Geophyscial Year: Man's Most Ambitous Study of His Environment', *National Geographic Magazine,* Vol. 109 No. 2 (February 1956).
[6] Stephen Martin, *A History of Antarctica.* Sydney: State Library of New South Wales Press, 1996, p. 207.
[7] Barney Brewster, *Antarctica: Wilderness at Risk,* Melbourne: Sun Books, 1982, p. 27.
[8] Stephen Martin, *A History of Antarctica.* Sydney: State Library of New South Wales Press, 1996, p. 213.
[9] Tim Smither, 'Antarctica Exploration', http://www.caroclarke.com/smither/antexplore.htm
[10] Ormond Solandt, 'A Trip to the Antarctic' *Canadian Geographic Journal,* Vol. 76 No. 5 (1968), pp 176-77.
[11] Barney Brewster, *Antarctica: Wilderness at Risk,* Melbourne: Sun Books, 1982, p. 24.
[12] Tim Smither, 'Antarctica Exploration', http://www.caroclarke.com/smither/antexplore.htm; 'US Navy Operation Deepfreeze', http://www/southpole.com/p0000149.htm; John May, *The Greenpeace Book of Antarctica: a new view of the seventh continent.* Frenchs Forest NSW: Child & Associates, 1988, p. 127.
[13] Melville Grosvenor, 'Admiral of the Ends of the Earth', *National Geographic Magazine,* Vol. 112 No. 1 (July 1957), p. 45; 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm.
[14] 'Antarctic Development Squadron (VXE) 6 'Ice Pirates', http://www.globalsecurity.org/military/agency/navy/vxe-6.htm; 'History of Antarctic Development Squadron Six', http://www.vaq34.com/vxe6/vxe6hist.htm; http://www.antarctica.org/UK/Envirn/pag/antar_history/pag/drames3.htm.
[15] 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm.
[16] Jack Williams, 'Navy ends long Antarctic duty', 17 April 2000, http://www.usatoday.com/weather/resources/coldscience/anavy.htm; see also Klaus Dodds, *Geopolitcs in Antarctica*. Chichester: Wiley, 1997, p. 35; 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm.
[17] 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm.
[18] (Pyne 343). citing the US Defence Department. ; Peter Beck, *The International Politics of Antarctica*. London: Croom Helm, 1986, pp. 50-51; Klaus Dodds, *Geopolitcs in Antarctica*. Chichester: Wiley, 1997, pp. 35-36

subject the [polar] regions to their control and to create there permanent bases for their armed forces".[19] These first bases were essentially military field camps, not designed for longevity. The tent city 'Little America' was rebuilt four times, repeatedly being buried in snow or breaking off the Ross Ice Shelf and drifting out to sea.[20]

McMurdo's siting in New Zealand's Ross Dependency clearly articulates its geopolitical function. While the US's large-scale presence on the continent demonstrated the US intention to dominate Antarctican spatial administration and organisation, the placement of McMurdo in the Ross Dependency reinforced the US rejection of all territorial claims in Antarctica.

In 1955-56, leading up to IGY, the US Navy's 'Operation Deep Freeze I' established an airfield and logistics facility at McMurdo Sound, the southernmost accessible port. McMurdo primarily serviced researchers at numerous field camps and three other new continental bases.[21] The only research facilities were one small biology laboratory and a Navy-run 'aerology' (meteorology) centre.[22] McMurdo's layout resembled most military camps: tidy rows of quonset huts, separate barracks and clubs for enlisted men and officers.[23] "Streets were named after political figures [and] admirals", including former Navy Secretary James Forrestal, a man "[obsessed] with the soviet menace".[24] Such namings reinforced the settlement's colonial spatiality.

At one end of 'Main Street'[25] was a parade ground with flagpole. The other end aligned with Observation Hill. This view was soon interposed by the conspicuous Chapel of the Snows, erected by volunteer labour "on a knoll overlooking the camp".[26] Later embellishments included stained-glass windows and an octagonal steeple.[27] Thus even the Navy's pragmatic, provisional occupation of this uninhabited landscape adopted two typical characteristics of colonial settlement: grounding it in familiar social institutions,[28] and consciously orienting the settlement form within the wider landscape to naturalise human presence. The chapel's siting links god, landscape, and human intervention, sanctifying American colonisation.

Most early McMurdo architecture was unexceptional. America's "seven cities of Antarctica" were built to last IGY's 18 months.[29] "[McMurdo] station had no beauty in itself... the only

[19] 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm, citing the editorial of the Soviet naval journal, *Red Fleet.*
[20] John May, *The Greenpeace Book of Antarctica*, p. 128.
[21] 'US Navy Operation Deepfreeze', http://www/southpole.com/p0000149.htm.
[22] 'The 'unofficial' VXE-6 webpage for the (late-RIP) US Navy Squadron Antarctic Development Squadron Six', 1999, http://www.vaq34.com; Ormond Solandt, 'A Trip to the Antarctic' *Canadian Geographic Journal*, Vol. 76 No. 5 (1968), p. 181, Naval Aviation Chronology 1954-59, http://history.navy.mil/branches/avchr8.htm.
[23] 'The 'unofficial' VXE-6 webpage for the (late-RIP) US Navy Squadron Antarctic Development Squadron Six', 1999, http://www.vaq34.com; Ethan Dicks, 'The Seventh Continent', 2002, http://www.penguincentral.com/penguincentral.html; James Edgar Waldron, 'Flight of the Puckered Penguins: The experiences of Commander James Edgar Waldron, U. S. Naval Reserve, in the Antarctic during the years 1956-1957', 1996, http://www.anta.canterbury.ac.nz/resources/general/flight/; Roff Smith, *Life on The Ice*, Sydney: Allen & Unwin, 2002, p. 62.
[24] Stephen Martin, *A History of Antarctica*. Sydney: State Library of New South Wales Press, 1996, p. 209; 'The United States Navy Antarctic Developments Project 1946-1947', http://www.south-pole.com/p0000150.htm.
[25] James Edgar Waldron, 'Flight of the Puckered Penguins: The experiences of Commander James Edgar Waldron, U. S. Naval Reserve, in the Antarctic during the years 1956-1957', 1996, http://www.anta.canterbury.ac.nz/resources/general/flight/
[26] Admiral George J. Dufek, commander of Operation Deepfreeze I, in National Science Foundation, 'Historic Sites in and around McMurdo Station', 1995, http://quest.arc.nasa.gov/antarctica/background/NSF/histsite.html
[27] John McPherson, *Footprints from a Frozen Continent*, Wellington: Hicks Smith, 1975, p. 107.
[28] King, *Colonial Urban Development.*
[29] David Tyree, 'New Era in the Loneliest Continent', *National Geographic*, February 1963, p. 270; Ormond Solandt, 'A Trip to the Antarctic' *Canadian Geographic Journal*, Vol. 76 No. 5 (1968), pp 176-77.

adjective that can describe it is 'drab'".[30] Soviet scientists visiting in 1958-59 were unimpressed by the spartan conditions.[31]

The 1961 ratification of the Antarctic Treaty quelled fears of military activity. While other nations wound down programs, re-named McMurdo Station grew substantially and its research function increased.[32] The National Science Foundation took over management.[33] After IGY's focus on atmosphere, geophysics and mapping, research expanded into biology, geology (specifically studying the nearby Dry Valleys) and cold-climate physiology. Laboratories were constructed for biology and earth sciences, and named after earlier researchers in these disciplines.[34] Specialised facilities built for studying cosmic rays,[35] UV radiation, the magnetosphere and ionosphere were located for isolation from vibration, metal and radios: numerous determinants of the station's planning are scientific.[36] These experiments' sensitive equipment and long time frames have ensured their persistence through redevelopment.[37]

Also isolated was McMurdo's nuclear power plant, 'Nukey Poo', installed halfway up Observation Hill in 1962 following a similar Army installation in Greenland.[38] McMurdo's reactor didn't violate the Antarctic Treaty's ban on nuclear weapons and radioactive waste disposal. However, after ten years of "shutdowns, fire damage and radiation leakages",[39] it was dismantled and shipped stateside, along with 11,000m³ of contaminated rock.[40] American scientists have repeatedly suggested nuclear waste storage in Antarctica, highlighting the distant superpower's "hemispheric chauvinism".[41]

McMurdo's site was studded with symbolic citations of Antarctic history. Nearby, Scott's historic Discovery Hut symbolises "the Heroic Age of Antarctic exploration" and "the earliest advances in the study of earth sciences, meteorology, flora and fauna in Antarctica".[42] Nearby are monuments to lives lost on Scott's two expeditions and during the airfield's construction.[43]

[30] James Edgar Waldron, 'Flight of the Puckered Penguins: The experiences of Commander James Edgar Waldron, U. S. Naval Reserve, in the Antarctic during the years 1956-1957', 1996, http://www.anta.canterbury.ac.nz/resources/general/flight/
[31] George J. Dufek, 'What we've accomplished in Antarctica', *National Geographic* Vol. 116 No. 4 (Oct. 1959), p. 541.
[32] John May, *The Greenpeace Book of Antarctica*, p. 128; 'The International Geophysical Year; Permanent Occupation of Antarctica' and 'Antarctic Population Dynamics', http://www.antarcticaonline.com/antarctica/history/history.htm; 'Historic Guide to Ross Island, Antarctica', http://ast.leeds.ac.uk/haverah/spaseman/old/roshistory.htm.
[33] Tyree, 'New Era in the Loneliest Continent', p. 282.
[34] George J. Dufek, 'What we've accomplished in Antarctica', *National Geographic* (Vol. 116 No. 4 Oct. 1959), p. 545; Gordon Fogg, *A History of Antarctic Science*, Cambridge: Cambridge University Press, 1992, pp.243, 255.
[35] Seth White, 'Cosmic Ray Observatory', http://www.sethwhite.org/cosmic%20ray%20observatory.htm.
[36] Antarctic Support Associates, 'Your Stay at McMurdo Station Antarctica', 1995, http://quest.arc.nasa.gov/antarctica/background/NSF/mc-stay.html
[37] Seth White, 'Cosmic Ray Observatory', http://www.sethwhite.org/cosmic%20ray%20observatory.htm.
[38] Owen Wilkes and Robert Mann, 'The Story of Nukey Poo', *The Bulletin* (Oct 1978), pp. 32-36; George J. Dufek, 'Nuclear Power for the Polar Regions', *National Geographic* (May 1962), pp. 712-30; Barney Brewster, *Antarctica: Wilderness at Risk*, Melbourne: Sun Books, 1982, p. 55.
[39] Barney Brewster, *Antarctica: Wilderness at Risk*, Melbourne: Sun Books, 1982, p. 56.
[40] Barney Brewster, *Antarctica: Wilderness at Risk*, Melbourne: Sun Books, 1982, p. 56-57; Owen Wilkes and Robert Mann, 'The Story of Nukey Poo', *The Bulletin* (Oct 1978), pp. 32-36; J. V. Filson, 'Nuclear power plant removal, Deep Freeze '75', *Antarctic Journal* July/August 1975, p. 195.
[41] Barney Brewster, *Antarctica: Wilderness at Risk*, Melbourne: Sun Books, 1982, p. 55-57.
[42] National Science Foundation, 'Antarctic Conservation Act of 1978 NSF 01-151: Antarctic Specially Protected Area No. 157 (Specially Protected Area No. 28, for Historic Site No. 18 Discovery Hut, Hut Point, Ross Island Lat. 77°50'50'S, Long. 166°38'E) Management Plan', 1978, http://www.nsf.gov/od/opp/antarct/aca/nsf01151/aca2_spa157.pdf
[43] National Science Foundation, 'Antarctic Conservation Act of 1978 NSF 01-151: Antarctic Specially Protected Area No. 157 (Specially Protected Area No. 28, for Historic Site No. 18 Discovery Hut, Hut Point, Ross Island Lat. 77°50'50'S, Long. 166°38'E) Management Plan', 1978, http://www.nsf.gov/od/opp/antarct/aca/nsf01151/aca2_spa157.pdf; Richard Byrd, 'All-out Assault on Antarctica', *National Geographic Magazine*, Vol. 110 No. 2 (August 1956), p. 159.

The station is framed by a history which both marks the longevity of human occupation and reaffirms the inhabitants' frontier spirit.[44]

A bust of Admiral Byrd stands in the centre of McMurdo, gazing polewards,[45] embodying American heroism in a harsh landscape. Its framing by flagpoles of Antarctic Treaty nations lends geopolitical authority to American endeavours.[46] McMurdo's Science Centre was named for Albert Crary: geologist, America's scientific leader during IGY, and the first person to visit both Poles.[47] This dedication affirms America's globe-spanning interests and geology's key (economic) importance.

In McMurdo's dining facility, 'The Galley', base management noted "Civilians may dine in either the enlisted (E-Side) or officer (O-Side) section".[48] Over time the base started to loosen up somewhat, spatially and behaviourally. The few remnant small buildings became informal social and recreational venues.[49] Yet a framework of discipline remains: "McMurdo is very much a company town".[50] Living quarters are segregated by occupation and status. The settlement reproduces familiar class distinctions.[51] Staff occupy dormitories in one area;[52] aircrews have special rooms.[53] On the opposite side of McMurdo are two dormitories for short-term visitors (scientists) and, further removed, private apartments for NSF personnel, "MacTown's executive elite".[54] People maintain favourite tables and dining companions. Whilst "MacTown seems to be a classless society… when it actually comes to [running] an Antarctic base… governments prefer the Captain Scott model with its class structures and hidebound rigidities".[55]

MIRNYY

The Cold War prompted Soviet involvement in Antarctica. No Russians visited Antarctica between Bellinghausen's 1820 discovery and 1954.[56] Antarctic research stations were among numerous political, military and scientific activities with profound territorial implications pursued by the USSR throughout the 1950s. The Warsaw Pact (1955)[57] and Cuban Revolution (1959) expanded Soviet territorial alliances. The Soviets launched the first artificial satellite

[44] Smith, *Life on The Ice*, pp. 41-44.
[45] Ethan Dicks, 'The Seventh Continent', 2002, http://www.penguincentral.com/penguincentral.html. See also Matthew Lazzarra, 'Antarctic Journal', 2003, http://tellus.ssec.wisc.edu/outreach/antarctic/index.htm
[46] Ormond Solandt, 'A Trip to the Antarctic' *Canadian Geographic Journal*, Vol. 76 No. 5 (1968), p. 179.
47 Ed Payne, 'McMurdo Installation Trip (11/98)', 2002, http://www.wff.nasa.gov/~ats/pages/mgsinstallation.html.
[48] Antarctic Support Associates, 'Your Stay at McMurdo Station Antarctica', 1995, http://quest.arc.nasa.gov/antarctica/background/NSF/mc-stay.html
[49] Irma Hale, 'Antarctic Adventure: Irma's Field Notebook - McMurdo Station, part I', 1999, http://www.irmahale.com/1999e.html; Robert Holmes, 'The Ice: The Antarctic Adventures of Robert Holmes', 2002, http://www.theice.org/index.html; Ethan Dicks, 'The Seventh Continent', 2002, http://www.penguincentral.com/penguincentral.html; Antarctic Support Associates, 'Your Stay at McMurdo Station Antarctica', 1995, http://quest.arc.nasa.gov/antarctica/background/NSF/mc-stay.html; 'F. Scott Robert' (pseudonym) 'Welcome to The Program: A Guidebook for New Antarctic Workers', 2003, http://www.bigdeadplace.com/welcome.html.
[50] Smith, *Life on The Ice*, p. 47.
[51] Payne, 'McMurdo Installation Trip'; Barney Brewster, *Antarctica: Wilderness at Risk*, Melbourne: Sun Books, 1982, p. 54; Mark Sabbatini, 'A Healthy Read on Ice Culture: Team Studies Population through Work and Play', *Antarctic Sun*, (8 Dec 2002), http://www.polar.org/antsun/Sun120802/culture-t.html
[52] Holmes, 'The Ice'; Antarctic Support Associates, 'Your Stay at McMurdo'.
[53] Smith, Life on The Ice, p. 55.
[54] Quoting Smith, *Life on The Ice*, p. 55; Sabbatini, 'A Healthy Read'; Holmes, 'The Ice'; Antarctic Support Associates, 'Your Stay at McMurdo'.
[55] Smith, *Life on The Ice*, p. 46.
[56] John May, *The Greenpeace Book of Antarctica: a new view of the seventh continent*. Frenchs Forest NSW: Child & Associates, 1988, p. 130.
[57] 'Modern History Sourcebook: The Warsaw Pact, 1955', http://www.fordham.edu/halsall/mod/1955warsawpact.html

(1957),[58] numerous Moon missions (beginning 1959)[59] and the first manned spaceflight (1961).[60] These latter activities unite scientific advances, empire building and propaganda.[61]

The USSR also constructed numerous 'science cities' during the late 1950s. Akademgorodok was built at great speed and expense in 1957-59 in forest 40km outside Novosibirsk, capital of resource-rich Siberia. 'The small town of academics' had 37 world-class research institutes in technology, natural and social sciences.[62] These settlements served three aims with clear Antarctic parallels. Well-resourced scientists worked "free from... political, ideological and economic pressures" due to "the geographical and psychological distance from Moscow".[63] City-making marked and governed claims to territory. Soviet planners encouraged cultural colonialism: the dissemination of "Moscow work and Moscow culture" throughout the Eastern Bloc.[64] New administrative and cultural centres imposed the nation-state onto the landscape.[65] Thirdly, science cities were "part of the regime's efforts to tame... the sprawling wastes of Russia",[66] a form of "colonial exploitation" of Siberia which required moving "the country's brainpower".[67]

In response to the US's 1948 suggestion that the continent should be governed by a condominium of its territorial claimants and the US, the USSR stated that it refused to recognise any Antarctican regime that did not include the USSR, and characterised the US's initiative as a "fig leaf to cover the American imperialists' design to seize the whole of the Antarctic".[68] Like the US, the USSR chose to reject all territorial claims; the USSR did not advance a specific claim of its own, but reserved the right to do so in the future. As a signal of the Soviet rejection of Antarctican claims, Mirnyy was built in Australia's Antarctic Territory (AAT). Australians objected to Mirnyy, asserting that the station might be a secret rocket launching site or a submarine base.[69]

The First Soviet Antarctic Expedition of 1955-7, consisting of three ships, 425 people (92 of whom wintered) established Mirnyy and its adjacent airfield on the coast of the Davis Sea in 1956. Mirnyy was the first of nine Soviet Antarctic bases built by 1959.[70] Mirnyy's prefabricated plywood and aluminium frame buildings[71] were model Arctic civil service

[58] Charles L. Robertson, *International Politics Since World War II: A Short History*. New York: Wiley, 1975, p. 236.
[59] 'Soviet Lunar Missions', http://nssdc.gsfc.nasa.gov/planetary/lunar/lunarussr.html
[60] 'Yuri Gagarin', http://starchild.gsfc.nasa.gov/docs/StarChild/whos_who_level1/gagarin.html
[61] See also Klaus Dodds, *Geopolitcs in Antarctica*. Chichester: Wiley, 1997, pp. 37-39.
[62] Paul Josephson, *New Atlantis Revisited: Akademgorodok, the Siberian City of Science*, Princeton: Princeton University Press, 1997, pp. 3-32; 'Part Four: Future Perspectives 2001 Onwards', *Economic and Philosophic Science Review*, 2001, http://www.epsr-marx-lenin.co.uk/Persp2001_Pt4.htm
[63] Josephson *New Atlantis Revisited*, p. xiii-xiv.
[64] L. Perchick, *The Reconstruction of Moscow*, Moscow: Cooperative Publishing Society of Foreign Workers in the USSR, 1936, p. 33, quoted in Greg Castillo, 'Cities of the Stalinist Empire', in Nezzar AlSayyad (ed), *Forms of Dominance: On the Architecture and Urbanism of the Colonial Enterprise*, Aldershot: Avebury, 1992, p. 269.
[65] Castillo, 'Cities of the Stalinist Empire', pp. 272-80.
[66] Robert Cottrell, 'Russia's Dream City', *The New York Review of Books*, April 23, 1998. See also Greg Castillo, 'Cities of the Stalinist Empire', in Nezzar AlSayyad (ed), *Forms of Dominance: On the Architecture and Urbanism of the Colonial Enterprise*, Aldershot: Avebury, 1992, pp. 272-76.
[67] James Hughes and Peter John, 'Local Elites and Transition in Russia: Adaptation or Competition?', *British Journal of Political Science* Vol. 31 (2001), pp. 675-77; 'Part Four: Future Perspectives 2001 Onwards', *Economic and Philosophic Science Review*, 2001, http://www.epsr-marx-lenin.co.uk/Persp2001_Pt4.htm
[68] quoted in P. Jessup and H. Taubenfold, *Control for Outer Space and the Antarctic Analogy*, New York: Columbia University Press, 1959, p. 157.
[69] Sanjay Chaturvedi, *The Polar Regions: A Political Geography*, Chichester: Wiley, 1996, p. 89; Juhan Smuul, *Antarctica Ahoy! The Ice Book*, trans. David Skvirsky, Moscow: Foreign Languages Press, 1959, p. 211; Jeffrey Mhyre, *The Antarctic Treaty System: Politics, Law, and Diplomacy*, Boulder, USA: Westview, 1986, p. 31; Frank Klotz, *America on the Ice: Antarctic Policy Issues*, Washington DC: National Defence University Press, 1990, pp. 29-30.
[70] A. Nudel'man, *Soviet Antarctic Expeditions 1955-59*, trans. N. Kaner, Jerusalem: Israel Program for Scientific Translations, 1966, p. 113.
[71] A. Nudel'man, *Soviet Antarctic Expeditions 1955-57*, p. 10.

structures. The utilitarian buildings sat in a row along an ice cliff, overlooking what was named the Pravda Coast; in a clear citation of the station's ideological foundations, its first street was called 'Lenin Street'. In a show of Soviet insouciance, Mirny's administrative building was nicknamed 'The Pentagon'.[72]

The interiors of Mirnyy's buildings articulate the distinct Soviet approach to Antarctican settlement. Unlike the occupants of McMurdo and Mawson, most of Mirnyy's inhabitants were seasoned polar civil servants, many of whom had over a decade of Arctic experience.[73] Unlike the anti-domestic 'frontier' ethos that characterised McMurdo and Mawson,[74] at Mirnyy, living conditions were as comfortable as Russian civil servants could expect. One of Mirnyy's early occupants describes Mirnyy's buildings as "comfortable and remarkably warm. They have rugs on the floor and the walls…[and are] furnished with the most commonplace wardrobe, sofa, nickel-plated bed, and writing-desk".[75] US exchange scientist Gilbert Dewart wrote in 1959 that "the Russian quarters also had a much more individualistic and homelike quality than the sterile dormitories of the American stations. The décor was Victorian with a Slavic accent, the furnishings those of a comfortable but antiquated hotel…It was indeed more like a settlement than an institutional station".[76] Mirnyy's excellent power station provided unlimited electricity: all buildings were heated by radiators, a public address system piped announcements and music throughout the station, residents communicated using a local telephone network, and the community gathered in the boiler room for twice-monthly saunas. Pigs ate kitchen scraps and provided the occupants with occasional fresh pork. Soviet difference from the masculine frontier ethos that shaped Mawson and McMurdo's interiors extended to personnel: unlike the US and Australia, the Soviet Antarctic missions included some women. The US *Polar Times* characterised Mirnyy as decadent, commenting that the Soviets not only allowed women to work in Antarctica, but that they also dined on caviar and walked on carpets.[77]

Soviet Antarcticans prided themselves on the contrast between Mirnyy's scientific, civilian, spatiality and the overtly military nature of McMurdo.[78] In Smuul's eyes, the Soviet technological ability to build a comfortable civilian settlement in Antarctica marked the USSR's superiority to the US, as well as signalling Soviet geopolitical power in the Cold War contest for Antarctic domination: "in the station you hear the loud, even hum of the generators, which it is not easy to drown," he writes, "and which makes you realise that the Soviet people have not come here just for a day".[79] As Mirny's occupants conducted their scientific work and prepared themselves for inland tractor traverses to Vostok, Pionerskaya, Oasis, Komsomolskaya, and Sovetskaya stations, the station resonated with "a feeling of pride in our Soviet science…it is a feeling without a trace of boastful scorn for the West or haughty confidence in easy victories. But it carries with it the firm conviction that Soviet science does not have to eat humble pie for anything".[80]

Geopolitics and the IGY governed Mirny's placement, but science and the weather shaped its built environment. Mirny was dominated by science buildings; personnel lived in their workplaces rather than in a separate residential facility.[81] These buildings were in turn

[72] Charlees Swithinbank, *Vodka on Ice: A Year with the Russians in Antarctica*, Sussex: Book Guild, 2002, p. 30.
[73] Gilbert Dewart, *Antarctic Comerades: An American with the Russians in Antarctica*, Columbus: University of Ohio Press, 1989, pp. 28-9.
[74] On Australian Antarctic masculinism and 'frontier' ideals, see Brigid Hains, 'The Graveyard of a Century', in Tom Griffiths and Tim Bonyhady (eds), *Words for Country: Landscape and Langugage in Australia*, Sydney: University of New South Wales Press, 2002, p. 137.
[75] Juhan Smuul, *Antarctica Ahoy! The Ice Book*, p. 105.
[76] Gilbert Dewart, *Antarctic Comerades: An American with the Russians in Antarctica*, p. 47.
[77] 'Women in Antarctic', *Polar Times*, June 1957, p. 28.
[78] Juhan Smuul, *Antarctica Ahoy! The Ice Book*, p. 171.
[79] Juhan Smuul, *Antarctica Ahoy! The Ice Book*, p. 120.
[80] Juhan Smuul, *Antarctica Ahoy! The Ice Book*, p. 31.
[81] Gilbert Dewart, *Antarctic Comerades: An American with the Russians in Antarctica*, p. 47.

dominated by the weather: Mirny experiences both snowfall and violent winds, leading to the station's burial in drift snow by the end of its second year. Gabled rooves were erected over the buildings to prevent their collapsing under the weight of the snow, and three-tiered entrances allowed occupants to access the buildings according to the depth of the drift.[82]

The USSR announced its intention to maintain Mirnyy beyond the IGY, prompting concern from Australia and the US.[83] Mirnyy station was not just a temporary science station; it had become an assertion of the Soviet determination to maintain its status as an Antarctic power.

MAWSON

Australian Antarctic spatiality differs substantially from US and Soviet models: since 1933, Australia has claimed 42% of Antarctica as its sovereign possession. In the 1950s, Australian anxiety about its jurisdiction over this massive claim triggered its decision to construct a permanent scientific station in the Australian Antarctic Territory (AAT). This station would not only make visible Australia's geopolitical presence in Antarctica, according to the law of effective occupation, it would also cement Australia's legal claim to nearly six million square kilometres of Antarctica.[84] Phillip Law, Director of the Australian Antarctic Division, asserted in 1955 that Mawson station needed to be built and permanently maintained because "we own a slice of the territory down there nearly as large as Australia itself! Because we believe our frozen empire down there is valuable and will become more valuable as time goes by".[85]

On 2 January 1954 a wintering team of nine Australian men and one French observer landed at Horseshoe Harbour, due south of Pakistan. The rocky Mawson station site became a busy one: the men had to move all of their gear from the iced-in ship to the shore. Despite regular blizzards and the difficulties of moving gear from the ship to the shore, the men managed to build their tiny colony of three prefabricated huts and a few 'caravans', and on Saturday 13 February 1955 expedition leader Phillip Law ceremonially proclaimed the site Australian.

Mawson's buildings were modelled on kangaroo-carcase refrigerators from Central Australia: if they could keep the heat out, their designers reasoned, they could also keep out the cold (Law notes 4).[86] The box-shaped huts were designed to be able to be erected in one day by unskilled labourers, and able to fit into small shipping spaces and landing craft.[87] They had tiny windows, and trapdoors in the rooves so that occupants could access the outdoors even if drift accumulated around the building. Made of plywood panels sandwiched around insulation, and sheathed in shiny aluminium designed to protect them from snowblast, Mawson's early buildings were utilitarian in appearance. Because they could only be constructed on flat ground, the early buildings were scattered around the site, rather than being arranged in rows.[88] Living

[82] P. Sen'ko (ed), *Seventh, Eighth, and Ninth Soviet Antarctic Expeditions 1962-1964*, trans. N. Kaner, Jerusalem: Israel Program for Scientific Translations, 1970, p. 78.
[83] Sanjay Chaturvedi, *The Polar Regions: A Political Geography*, p. 90; Gillian Triggs, , *International Law and Australian Sovereignty in Antarctica*, p. 134; Klaus Dodds, *Geopolitics in Antarctica*, p. 92; Peter Beck, *The International Politics of Antarctica*, London: Croom Helm, 1986, p. 50..
[84] Gillian Triggs, , *International Law and Australian Sovereignty in Antarctica*, p. 134.
[85] Phillip Law, Mayoral Address, Melbourne Town Hall, 18 Nov. 1955, handwritten notes, Phillip Garth Law Collection, National Library of Australia, 04/009.
[86] Phillip Law, 'Man's Microclimate in the Antarctic', Lecture to Federal Conference of the Australian Institute of Refrigeration, Air Conditioning, and Heating, 23 March 1976, Lecture notes, Phillip Garth Law Collection, National Library of Australia, 04/026.
[87] Phillip Law and John Bechervaise, *ANARE: Australia's Antarctic Outposts*, Melbourne, Oxford University Press, 1957, p. 60.
[88] Phillip Law, 'Mawson: An Antarctic Municipality', Annual Smoke Social Lecture to Ausrtalian Institute of Engineers, 8 April 1964, handwritten notes, Phillip Garth Law Collection, National Library of Australia, 04/018.

and working quarters were kept separate, requiring most occupants to brave the elements at least once a day; designers saw this as beneficial to morale.[89]

Law designed Mawson as an expansionist site, planning where its future developments would be constructed. By the end of the 1955, Mawson station consisted of numerous scattered caches of fuel, a dog-line to the west, and six buildings;[90] by 1957 this number increased to 30.[91] Five of these buildings were prefabricated, but Biscoe hut was a traditional timber structure that Law purchased from the 1950 Norway-Sweden-Britain expedition.[92] Biscoe hut was Mawson's main living and dining quarters: a long table occupied its centre, and ten bunks lined its walls. The men liked Biscoe: with its pitched roof and wooden walls, it felt more cosy than the practical boxes of the prefabricated buildings.[93] In its resemblance to the wooden huts of the Scott and Mawson expeditions, it interpellated the men architecturally into the tradition of imperial Antarctic exploration. The 1958 documentary *Address Antarctica* affirmed that Mawson was a masculine frontier space, "with one big advantage [over Australia]: no little woman to criticise and nag the master of the house. For this is a man's world".[94] The station's nomenclature sets up an invocation of the imperial era through hut names such as Biscoe, Weddell, Ross, Balleny, Shackleton, and Wilkins, all of whom were involved in Antarctic exploration. Finally, the station's name itself clearly cites the colony's filial relation to its imperial forbear Sir Douglas Mawson; as Law stated in the 1962 documentary *Antarctic Pioneers*, "young men, energetic and adventurous, will live and work in this new world, in a home that proudly bears the name of Mawson, the man who in 1911, went on ahead".[95]

Although it was unoccupied through the winters of 1960-63,[96] Mawson remained a hub of spatial production. Every year, the new annual group of colonists erected new buildings. Each brief summer season, men fanned out from the station on mapping and measuring journeys. While internationally-cooperative science was Mawson's primary activity, its geopolitical work remained nationalist: based on the presence of its three continental bases, Australia's claim to Antarctic sovereignty was upheld by the Treaty.

THE SCIENTIFIC COMMONWEALTH

Although Mawson, Mirnyy, and McMurdo were constructed by separate national governments in order to further their own polar political ambitions, in practice the stations were sites of unprecedented international cooperation and exchange. The US and the USSR regularly exchanged scientists for periods of one year; at the height of the Cold War, Soviet and American Antarctic personnel lived together in harmony. Stations also exchanged meteorological information.[97] Occasional visits and ongoing radio chess matches between occupants of these three stations further cemented international camaraderie in Antarctica. The Treaty formalised the international nature of stations by allowing Treaty nations the right to inspect any Antarctic facility: this form of internal policing maintained the stations as open spaces while at the same time ensuring that Treaty provisions such as nonmilitarisation were

[89] Parliamentary Standing Committee on Public Works, *Minutes of Evidence Relating to the Redevelopment of Australian Antarctic Bases*, Part One, Canberra: Parliament of the Commonwealth of Australia, 1981, p. 15.
[90] Phillip Law and John Bechervaise, *ANARE: Australia's Antarctic Outposts*, p. 56.
[91] R. Swan, *Australia in the Antarctic: Interest, Activity, and Endeavour*, Melbourne: Melbourne University Press, 1961, p. 292.
[92] 'Mawson Station', Australian Heritage Commission Register of the National Estate, http://www.ahc.gov.au/cgi-bin/ahdb/search.pl?mode=place_detail;place_id=18810
[93] *Mawson Station Heritage Plan*, Hobart: Australian Antarctic Division, 1995, p. 93.
[94] *Address Antarctica*, 16mm film, Cine Service for the Australian Antarctic Division, 1958.
[95] *Antarctic Pioneers*, 16mm film, Dir. Frank Hurley and Phillip Law, Film Australia, 1962.
[96] Juan Carlos Beltramino, *The Structure and Dynamics of Antarctic Population*, New York: Vintage, 1993, p. 32.
[97] A. Nudel'man, *Soviet Antarctic Expeditions 1955-57*, p. 16.

maintained.[98] The stations thus functioned simultaneously as mutually antagonistic geopolitical assertions and as sites of international scientific cooperation and negotiation.

CONCLUSION

The Antarctic research stations examined here are clearly products of Cold War geopolitics intertwined with science. They are shaped by conflicting ideas of territory and ways to occupy and possess it. These built environments also themselves helped achieve three nations' geopolitical intentions: they produced modern colonial spaces in the form of buildings and tracks, through human subjects and distinctive practices.[99] Antarctic space is often considered homogenous, its research stations purely rational and effectively identical. This paper reveals the heterogeneity of Antarctic settlements and spatial cultures during the Cold War. The three stations' spatial histories were unique and competing. Their differences afticulated national antagonisms. Mawson was built to legally perfect a claim to polar space, McMurdo and Mirnyy to override claims. All were designed to foreground their states' competitive scientific prowess. McMurdo was also military.

The period 1954-64 in Antarctica shows the transformation of traditional colonialism into particularly modern forms. A comment on the U.S. is generally applicable: "The justifications for the program are increasingly defined by scientific results more than national security".[100] Of course "[s]cientific activities themselves have political overtones";[101] as do the many non-technical buildings and behaviours.

The Antarctic Treaty serves as a remarkable example of the sublimation of national military and territorial objectives into international scientific cooperation, providing a template for more progressive agreements on the moon and outer space.[102] The Treaty is nonetheless a political, ideological and functional compromise, and although ostensibly scientific and non-exploitative, Antarctica's modern colonialism remains a "scramble for territory".[103] The 1954-64 period of Antarctic spatiality resulted in the particularly modern conjunction of sovereign, non-sovereign, and cooperatively scientific spaces that, held together by the delicate balances provided by the Treaty, continue to comprise Antarctica today.

[98] Peter Beck, *The International Politics of Antarctica*, p. 74.
[99] Henri Lefebvre, *The Production of Space*, Oxford: Blackwell, 1991, pp. 33-39.
[100] Noel Broadbent and Lisle Rose, 'Historical Archaeology and the Byrd Legacy: The United States Antarctic Service Expedition, 1939-41', *Virginia Magazine of History and Biography*, Vol. 110 No. 2 (2002), pp.237ff.
[101] Klaus Dodds, *Geopolitcs in Antarctica*. Chichester: Wiley, 1997, p. 41, quoting Taubenfeld 1961.
[102] Peter Beck, *The International Politics of Antarctica*. London: Croom Helm, 1986, pp. 278-79; Keith Suter, *Antarctica: Private Property or Public Heritage?* Leichhardt NSW: Pluto Press, 1991, pp. 15-16. See also Philip Jessup and Howard Taubenfeld, *Controls for outer space, and the Antarctic analogy.* New York: Columbia University Press, 1959.
[103] Klaus Dodds, *Geopolitcs in Antarctica*. Chichester: Wiley, 1997, p. 35.