# HarWes R5 vs Harker VZ

## 1

#### Interpretation: Affirmatives may not defend only specific instances of outer space appropriation by private entities as unjust.

#### "The" can either indicate a definite generic or definite description

Ojeda 91 [Almerindo E. Ojeda, PhD linguistics from UChicago, professor of linguistics at UC Davis. "Definite Descriptions and Definite Generics", Linguistics and Philosophy, Vol. 14, No. 4, pp. 367-397, Published August 1991, https://www.harvardlds.org/wp-content/uploads/2019/04/1-s2.0-S0010027718300313-main-3.pdf] HWIC

A definite noun phrase may be taken either as a definite description or as a definite generic. Thus, a noun phrase like the origin of the ballad may denote either the origin of an individual ballad we have been discussing, or else the origin of ballads in general as a literary species. In the first case, the ballad has been taken as a definite description; in the second, it has been taken as a definite generic.2 Notice that the ambiguity between definite descriptions and definite generics can be resolved in certain con texts. Thus, the definite noun phrase the computer is taken only as a definite description in (**la**), a statement about an individual computer; it is taken only as a definite generic in (lb), a statement about computers in general. Similarly, the definite noun phrase the dodo may be taken as a definite description in (2a) while it must be taken as a definite generic in (2b).3

(**1)a**. Turing repaired the computer.

**b**. Turing invented the computer.

(2)a. The dodo is dead.

b. The dodo is extinct.

#### Moral statements are generic normative principles – necessitates the generic interpretation

McDonald 09 [Hugh P. McDonald, professor of philosophy at the New York City College of Technology. "Principles: The Principles of Principles." The Pluralist, vol. 4, no. 3, [University of Illinois Press, Society for the Advancement of American Philosophy], 2009, pp. 98–126, https://www.jstor.org/stable/20708996] HWIC

"Principle" has a great many meanings: origin, beginning, cause, rule, axiom, and so on.5 However, we cannot assume any necessary relation of these meanings. They may be distinct meanings without relations. Neverthe less we can trace some common roots and thereby interconnections of the meanings. I will concentrate here on certain meanings relevant to the prin ciple of principles, that principles are actual. One meaning is that principles are the "ultimate source, origin, or cause of something" or the "originating or actuating agency or force." Principles are connected with the origin and cause of any "something." Moreover, principles may cause the actuality of the something. A second meaning of principles is that they regulate change, whether internally, as the "method of operation of a thing," or as an external cause. That is, principles are regulative, especially including rules for opera tions, involving changes. As rules, they are **universal** for a kind, although there may be exceptions to them in certain modes. A principle, then, is an originating rule that universally regulates the formation, operation, or other changes of any actuality, which as universal applies to that kind of thing. Machines may be built according to a principle and operate on the same or even a different principle. Ships presume the principle of floatation but may be built according to principles of woodworking or those of other materials. The principle can have different modes?whether necessary, as in logical inference; general, as in scientific laws; or actualization of possibilities, as in machines or as in moral principles that we follow, but could do otherwise.6 I will cover modes below.

Principles are also a cause as regulative, combining cause and rule. The principle can be external, as in a chemical catalyst; or internal, as in geneti cally caused changes.7 Both kinds of causes involve relations. Internal prin ciples exhibit "tendencies," to borrow the word used in the dictionary. They continue to operate across time. Actions that come under principles may be of kinds whose causes are separate in time, since we may cease an action for a time and then take it up again; while genetic characteristics are tenden cies whose causes are connected by reproduction. As causal, principles may be originary for a kind. Especially in new technologies, for example, flying machines, the principle that organisms could fly (birds, bats, and insects) preceded the invention of the technology, although the principles of aero dynamics were discovered later. However, flying utilized and actualized the latter principles. In this sense, principles can be constitutive rules as the origin of a kind, whether generic or specific.

External principles are regulative and not attributes. They regulate change, such that change is not chaotic. Principles are not bodies, objects, or entities but are the basis of the judgment or evaluation that the latter will persist, since they follow or are regulated by principles. Moreover, there is another sense in which principles are not attributes, since the relation of bodies, ob jects, or other terms for actualities implies a common principle, an identity that is regulated and constituted by the same actual principle. "Object" is a principle uniting instances normatively, for example, that solids persist unless acted upon by heat, etc.

Scientific, engineering, and practical laws are cases of principles. The "law of gravity" is the principle of gravity. Rules of "right conduct" also exhibit laws. Principles form an identity of different instances that fall under the law, whether generally or invariably. Laws and rules are regulative identities, applicable to different instances, and whether originary, constitutive, or ex ternally regulative. Voluntary adherence to a rule is bringing actions in line with a principle or enacting a principle.

Since principles are general, the statement of a principle includes an abstraction of some identity element of the instance. Principles, then, can constitute the elements in any instance insofar as there are identical ele ments, such as matter, species, and genera. This abstraction both identifies the instance as alike with other instances in some respect and differentiates it from those that do not exhibit the principle. The instance may contain several principles conjointly, matter, the state of the matter, function, aes thetic element, and many others. Thus principles connect like instances in a very complex set of relations. A diamond and a painting may share aesthetic qualities but their material, functional, and cultural principles may be quite different. Since identity and difference are correlative terms, every identity is also a difference and this principle applies to actual principles in the world, one principle of principles. To identify a rock of a certain type as consisting in certain chemical combinations connects it with that kind of mineral in general but also certain chemical elements in general, their physical proper ties (such as consisting of a certain atomic number of protons, electrons, and the like), and other principles. However, it also differentiates the rock from other types with their own specific principles, although some generic prin ciples may overlap, namely, the physical properties of all chemical elements as consisting in protons, electrons, and other principles of atoms. Principles then mark both a difference and an identity. The principles identify a distinc tion, but such identifications differentiate from other identifying principles. The wavelengths for green light are identical at different times of emission from the sun but are not identical with those for red.

**This applies to the res – 1] Upward entailment test – “appropriation by private entities is unjust” doesn’t imply that “appropriation by entities is unjust” because state appropriation might not be unjust 2] Adverb test – "appropriation by private entities is generally unjust" doesn’t substantially change the meaning of the res**

#### B] Violation – they only defend asteroid mining . We’ll insert a noncomprehensive list of some others -- https://en.wikipedia.org/wiki/Private\_spaceflight

#### C] Vote neg—

#### 1] Semantics outweigh --

#### A] Topicality is a constitutive rule of the activity and a basic aff burden, they agreed to debate the topic when they came to the tournament

#### B] It’s the only stasis point we know before the round so it controls the internal link to engagement, and there’s no way to use ground if debaters aren’t prepared to defend it.

#### 2] Limits:

**A] Quantitative – the topic is literally too big to count – every specific type of thing a private entity could do from asteroid mining to launching satellites – unlimited topics incentivize obscure affs that negs won’t have prep on – limits are key to reciprocal prep burden**

**B] Qualitative – spec kills unified generics like the innovation DA**

#### D] Paradigm Issues –

#### 1] T is DTD – their abusive advocacy skewed the debate from the start

#### 2] Use competing interps on T – A] topicality is a yes/no question, you can’t be reasonably topical B] reasonability invites arbitrary judge intervention and a race to the bottom of questionable argumentation

#### 3] No RVIs – A] Forcing the 1NC to go all in on the shell kills substance education and neg strat B] discourages checking real abuse C] Encourages baiting – outweighs because if the shell is frivolous, they can beat it quickly

## 2

#### 1] Settler colonialism is the permeating structure of the nation-state which requires the elimination of indigenous life and land via the occupation of settlers. The appropriation of land turns Natives into ghosts and chattel slaves into excess labor.

Tuck and Yang 12 (Eve Tuck, Unangax, State University of New York at New Paltz K. Wayne Yang University of California, San Diego, Decolonization is not a metaphor, Decolonization: Indigeneity, Education & Society Vol. 1, No. 1, 2012, pp. 1-40, JKS)

Our intention in this descriptive exercise is not be exhaustive, or even inarguable; instead, we wish to emphasize that (a) decolonization will take a different shape in each of these contexts - though they can overlap - and that (b) neither external nor internal colonialism adequately describe the form of colonialism which operates in the United States or other nation-states in which the colonizer comes to stay. Settler colonialism operates through internal/external colonial modes simultaneously because there is no spatial separation between metropole and colony. For example, in the United States, many Indigenous peoples have been forcibly removed from their homelands onto reservations, indentured, and abducted into state custody, signaling the form of colonization as simultaneously internal (via boarding schools and other biopolitical modes of control) and external (via uranium mining on Indigenous land in the US Southwest and oil extraction on Indigenous land in Alaska) with a frontier (the US military still nicknames all enemy territory “Indian Country”). The horizons of the settler colonial nation-state are total and require a mode of total appropriation of Indigenous life and land, rather than the selective expropriation of profit-producing fragments. Settler colonialism is different from other forms of colonialism in that settlers come with the intention of making a new home on the land, a homemaking that insists on settler sovereignty over all things in their new domain. Thus, relying solely on postcolonial literatures or theories of coloniality that ignore settler colonialism will not help to envision the shape that decolonization must take in settler colonial contexts. Within settler colonialism, the most important concern is land/water/air/subterranean earth (land, for shorthand, in this article.) Land is what is most valuable, contested, required. This is both because the settlers make Indigenous land their new home and source of capital, and also because the disruption of Indigenous relationships to land represents a profound epistemic, ontological, cosmological violence. This violence is not temporally contained in the arrival of the settler but is **reasserted each day** of occupation. This is why Patrick Wolfe (1999) emphasizes that settler colonialism is a structure and not an event. In the process of settler colonialism, land is remade into property and human relationships to land are restricted to the relationship of the owner to his property. Epistemological, ontological, and cosmological relationships to land are interred, indeed made pre-modern and backward. Made savage. In order for the settlers to make a place their home, they must destroy and disappear the Indigenous peoples that live there. Indigenous peoples are those who have creation stories, not colonization stories, about how we/they came to be in a particular place - indeed how we/they came to be a place. Our/their relationships to land comprise our/their epistemologies, ontologies, and cosmologies. For the settlers, Indigenous peoples are in the way and, in the destruction of Indigenous peoples, Indigenous communities, and over time and through law and policy, Indigenous peoples’ claims to land under settler regimes, land is recast as property and as a resource. Indigenous peoples must be erased, must be made into ghosts (Tuck and Ree, forthcoming). At the same time, settler colonialism involves the subjugation and forced labor of chattel slaves, whose bodies and lives become the property, and who are kept landless. Slavery in settler colonial contexts is distinct from other forms of indenture whereby excess labor is extracted from persons. First, chattels are commodities of labor and therefore it is the slave’s person that is the excess. Second, unlike workers who may aspire to own land, the slave’s very presence on the land is already an excess that must be dis-located. Thus, the slave is a desirable commodity but the person underneath is imprisonable, punishable, and murderable. The violence of keeping/killing the chattel slave makes them deathlike monsters in the settler imagination; they are reconfigured/disfigured as the threat, the razor’s edge of safety and terror. The settler, if known by his actions and how he justifies them, sees himself as holding dominion over the earth and its flora and fauna, as the anthropocentric normal, and as more developed, more human, more deserving than other groups or species. The settler is making a new "home" and that home is rooted in a homesteading worldview where the wild land and wild people were made for his benefit. He can only make his identity as a settler by making the land produce, and produce excessively, because "civilization" is defined as production in excess of the "natural" world (i.e. in excess of the sustainable production already present in the Indigenous world). In order for excess production, he needs excess labor, which he cannot provide himself. The chattel slave serves as that excess labor, labor that can never be paid because payment would have to be in the form of property (land). The settler's wealth is land, or a fungible version of it, and so payment for labor is impossible.6 The settler positions himself as both superior and normal; the settler is natural, whereas the Indigenous inhabitant and the chattel slave are unnatural, even supernatural. Settlers are not immigrants. Immigrants are beholden to the Indigenous laws and epistemologies of the lands they migrate to. Settlers become the law, supplanting Indigenous laws and epistemologies. Therefore, settler nations are not immigrant nations (See also A.J. Barker, 2009). Not unique, the United States, as a settler colonial nation-state, also operates as an empire - utilizing external forms and internal forms of colonization simultaneous to the settler colonial project. This means, and this is perplexing to some, that dispossessed people are brought onto seized Indigenous land through other colonial projects. Other colonial projects include enslavement, as discussed, but also military recruitment, low-wage and high-wage labor recruitment (such as agricultural workers and overseas-trained engineers), and displacement/migration (such as the coerced immigration from nations torn by U.S. wars or devastated by U.S. economic policy). In this set of settler colonial relations, colonial subjects who are displaced by external colonialism, as well as racialized and minoritized by internal colonialism, still occupy and settle stolen Indigenous land. Settlers are diverse, not just of white European descent, and include people of color, even from other colonial contexts. This tightly wound set of conditions and racialized, globalized relations exponentially complicates what is meant by decolonization, and by solidarity, against settler colonial forces. Decolonization in exploitative colonial situations could involve the seizing of imperial wealth by the postcolonial subject. In settler colonial situations, seizing imperial wealth is inextricably tied to settlement and re-invasion. Likewise, the promise of integration and civil rights is predicated on securing a share of a settler-appropriated wealth (as well as expropriated ‘third-world’ wealth). Decolonization in a settler context is fraught because empire, settlement, and internal colony have no spatial separation. Each of these features of settler colonialism in the US context - empire, settlement, and internal colony - make it a site of contradictory decolonial desires7. Decolonization as metaphor allows people to equivocate these contradictory decolonial desires because it turns decolonization into an empty signifier to be filled by any track towards liberation. In reality, the tracks walk all over land/people in settler contexts. Though the details are not fixed or agreed upon, in our view, decolonization in the settler colonial context must involve the repatriation of land simultaneous to the recognition of how land and relations to land have always already been differently understood and enacted; that is, all of the land, and not just symbolically. This is precisely why decolonization is necessarily unsettling, especially across lines of solidarity. “Decolonization never takes place unnoticed” (Fanon, 1963, p. 36). Settler colonialism and its decolonization implicates and unsettles everyone.

#### 2] International law’s origins are based on the racist refusal to acknowledge Native sovereignty. Treaty authority is predicated on the nonexistence of indigenous governance and seeks to reconcile Native indifference through genocidal means.

Scott 18

(Xavier Scott, Department of Philosophy, York University, Repairing Broken Relations by Repairing Broken Treaties: Theorizing Post-Colonial States in Settler Colonies, Studies in Social Justice, Volume 12, Issue 2, 388-405, 2018, JKS)

The divisibility of sovereignty in the case of non-Europeans allowed colonial states to grant them partial recognition in the form of quasi-sovereignty, thereby enabling the local people to enter into treaties that they could be punished for violating (through just war doctrine) but which could be unilaterally broken by the colonial power once they were no longer politically expedient. Since all the nations of the world are part of a single international community, no country has the right to invade any other. Yet that community was not founded on universal principles, but was based on a European consensus. Since recognition was the basis for membership in the “international community” and the original members of the jus gentium were all European (in practice, if not in theory), the Westphalian system would seem to promote conquest and colonialism abroad, even as it promoted mutual recognition within Europe. The legacy of the Westphalian peace has been a system that simultaneously maintains the historical legality of colonialism, while rejecting it as a principle of justice. The origins of international law were inherently unjust and based on a racist refusal to acknowledge Indigenous sovereignty in its entirety. However, in recognizing the moral and legal chicanery that was required to deny Indigenous sovereignty, we can lay the groundwork for understanding the sovereign violence that European powers committed and how that was then tied to the numerous forms of injustice committed afterwards. Not only did Indigenous peoples have political societies, but European sovereigns and jurists regularly recognized their sovereignty by signing over 800 treaties with different Indigenous communities (Kickingbird, 1995). Siegfried Wiessner (1995) divides the treaty-making conventions between the United States and Indigenous communities into two time periods – prior to and following the end of the War of 1812. Prior to this date, treaties were concluded on a relatively equal basis. They fully recognized the Indigenous governance structures and were ratified by the U.S. Senate using the language of international law. Once the threat of other colonial powers was over, treaties became increasingly used “to regularize and channel the removal of Indians from their traditional vast hunting and fishing grounds to ever smaller, ever more barren areas of land” (Wiessner, 1995, p. 577). The War of 1812 marks a switch from the nation-to-nation relationships that characterized earlier agreements, to a new species of treaty which deprived Indigenous communities of nationhood. I call the means by which colonial states appropriated Indigenous sovereignty “theft,” since it deprived Indigenous peoples of their right to selfdetermination and full use of their traditional territories. Moreover, the quasisovereignty that was granted to Indigenous peoples made the destruction of their communities a requirement to establish the legitimacy of the colonial power’s occupation. Taiaiake Alfred and Jeff Corntassel argue that contemporary settlers are no longer trying to eradicate Indigenous peoples as bodies, but rather “as peoples through the erasure of the histories and geographies that provide the foundation for Indigenous cultural identities and sense of self” (2005, p. 598; emphasis in original). This is both a continuation of the desire to appropriate Indigenous land and an attempt to foreclose the possibility that land that has already been annexed by colonists be returned. Indigenous sovereignty in its current form in the British colonial states continues to act as a form of “quasi-sovereignty” the goal and legacy of which are the assimilation and destruction of Indigenous peoples. The Truth and Reconciliation Commission of Canada (2015) has outlined the crimes the Canadian government committed against Indigenous peoples. While the summary of their findings focuses on the cultural genocide the Canadian state engaged in through residential schools, it acknowledges the physical and biological genocides engaged in by the state as well. It states: Canada asserted control over Aboriginal land. In some locations, Canada negotiated Treaties with First Nations; in others, the land was simply occupied or seized. The negotiation of Treaties, while seemingly honourable and legal, was often marked by fraud and coercion, and Canada was, and remains, slow to implement their provisions and intent. (Truth & Reconciliation Commission of Canada, 2015, p. 1) Australian Prime Minister Kevin Rudd (2008) issued an apology for the “Stolen Generation,” which took Aboriginal and Torres Strait Islander children from their families. The U.S. issued its apology to Indigenous peoples, hidden in section 8113 of a 2010 Defense Appropriations Act. It acknowledges “that there have been years of official depredations, illconceived policies, and the breaking of covenants by the Federal Government regarding Indian tribes” and also “many instances of violence, maltreatment, and neglect inflicted on Native Peoples by citizens of the United States” (111th Congress, 2009, s.8113). All three of these apologies profess a desire to “remove a stain from its past” (Truth & Reconciliation Commission of Canada, 2015, p. 237), for “the nation to turn a new page” (Rudd, 2008), and look towards a future “where all the people of this land live reconciled as brothers and sisters” (111th Congress, 2009, s.8113). Yet the Australian apology made no reference to reparations, the American apology contains a disclaimer that nothing in it is meant to “serve as any settlement against the United States” (111th Congress, 2009, s.8113), and while Canada has attached its apology to court mandated reparations payments, it has failed to reform its relationship with Indigenous peoples by (for exam

ple) reforming the 1876 Indian Act. The existence of sovereignty in a colonial context is predicated on the nonsovereignty of Indigenous peoples. At best, they are granted a form of “quasisovereignty” that is not taken seriously by the international state system and is generally considered to be a temporary stage in the integration of Indigenous peoples into the colonial state.5 The quasi-status of their sovereignty is not a step on the path towards full sovereignty, but towards destruction and the seamless transfer of sovereignty from them to the colonial state. In their critique of the literature on post-colonial theory and antiracist work, Bonita Lawrence and Enakshi Dua ask, “what does it mean to look at Canada as colonized space?” (2005, p. 123). Because settler states are founded on policies that combine extermination and assimilation, the continued existence of Indigenous peoples as peoples depends on the full recognition of their inherent sovereignty. For this reason: To speak of Indigenous nationhood is to speak of land as Indigenous, in ways that are neither rhetorical nor metaphorical. Neither Canada, nor the United States – or the settler states of “Latin” America for that matter – which claim sovereignty over the territory they occupy, have a legitimate basis to anchor their absorption of huge portions of that territory. (Lawrence & Dua, 2005, p. 124) To claim respect for Indigenous sovereignty, therefore, is to deny the legal legitimacy of Settler colonies. This is because of the territoriality and legal supremacy claims of sovereign states. While the development of international law has served to strip Indigenous peoples of their traditional lands, it also contains a number of mechanisms that have been used in other contexts of occupation, violence, and genocide. First, the principle of pacta sunt servanda is the cornerstone of international law (Uribe, 2010; Wiessner 1995) – states are required to abide by their word. The fact that colonial powers broke their treaties with Indigenous governments ought not to mean that it is thereby nullified, but rather that “there may be legal consequences” (Kickingbird, 1995, p. 603). Furthermore, the principle of sovereignty contains a right to reassert authority when territory is unjustly annexed. When a state’s sovereignty is violated, international law calls for its restoration. Following Kirke Kickingbird, I believe that “treaties form the backdrop of the past, confirm rights in the present and provide the basic definition for the evolving future” (1995, p. 605). Only by respecting the traditional rights of Indigenous peoples – including rights to their territories – can colonial states repair the sovereign wrong done in the abrogation of their duty to stand by their treaties.

#### 3] Space management cannot be understood outside of settler colonialism. The infrastructure, institutions, and Eurocentric values of space policy are considered the hallmarks of science and progress, which become weaponized against Indigenous resistance.

Matson and Nunn 17

(Zannah Mae Matson is a PhD student in Human Geography at the University of Toronto, Neil Nunn is a PhD candidate in the Department of Geography and Planning at the University of Toronto, 10-3-17, SPACE INFRASTRUCTURE, EMPIRE, AND THE FINAL FRONTIER: WHAT THE MAUNA KEA LAND DEFENDERS TEACH US ABOUT COLONIAL TOTALITY, Society and Space, <https://societyandspace.org/2017/10/03/space-infrastructure-empire-and-the-final-frontier-what-the-mauna-kea-land-defenders-teach-us-about-colonial-totality/>, JKS)

Mauna Kea is a dormant volcano and the highest point on the archipelago of Hawai’i. When measured from its base at seafloor, it is the tallest mountain on earth. These towering heights, in a region of the world with minimal light pollution has also earned Mauna Kea recognition of being one of the best spots on the planet for examining the cosmos. Long before the development of modern space infrastructure, however, the peak of Mauna Kea was regarded by native Hawaiians as among the most sacred places on the archipelago of Hawai’i. The place where earth meets the heavens. These divergent perspectives are embedded within a larger relationship of imperial domination that has seeded a century of unrest. While the primary focus of the protest was to challenge a half-century disregard for this sacred site by numerous entities and interests, the Battle for Mauna Kea cannot be understood outside Hawaii’s 125 year-long history of colonial occupation. In 1893, the Hawaiian Kingdom and its Queen, Lydia Kamaka’eha Lili’uokalani, were overthrown by a US led military coup (Long, 2017). Speaking to a spirit of resistance that has existed on the islands since the coup, scholar-activist K. Kamakaoka’ilima Long (2017: 15) states: “four decades of land struggles and cultural historical recovery… have grown a Hawaiian sovereignty movement… playing out in both land defense and as a movement to re-realize Hawaiian political independence as a sovereign state.” This recent assertion of self-determination, now known as the battle for Mauna Kea, has grown to become a global movement with broad support from high-profile figures and the hashtags #Wearemaunakea, #ProtectMaunaKea, and #TMTshutdown trending widely on social media. More than just a source of inspiration for the groundswell anti-colonial movements around the world, this story provides a context to better understand ongoing colonial occupation that is reinforced through the constitutive power of space infrastructure. Working from decades of resistance that culminated in the “battle for Mauna Kea,” we engage the notion of colonial totality to conceptualize the resistance to space infrastructure and the ongoing US occupation of Hawaii, reflecting on what this movement provides for better understanding totality and the relationship between space infrastructure and the shifting nature of colonial occupation more broadly. The notion of totality describes the process by which occupied spaces are coded with Western values in the form of normalized cultures, epistemologies, and institutions that produces an “atomistic image of social existence” (Quijano, 2007: 174). The institutions, ideologies and systems that advocate for the construction of space infrastructure exemplify this process. Astronomers frame the building of the observatory infrastructure as an essential piece in advancing our knowledge of outer space and ultimately achieving ‘universal’ progress. The resistance to development of these infrastructural systems is an invitation to consider the relationship between space as a frontier of discovery and ongoing questions of settler colonialism; the blockade has made visible the inherent relationship between the infrastructure of scientific exploration and the logic of totalizing colonial rationality that enables the development of massive telescopes on occupied land. While these perspectives of colonial totality provide a useful understanding of power and institutions that shape this conflict, we suggest that the Hawaiian land defenders’ refusal of the normalizing force of space infrastructure demonstrates the complexities and conditions relating to the notion of totality and ultimately the inadequacies of the concept. During a public comment period at 2015 University of Hawai‘i Board of Regents meeting, Dr. Pualani Kanaka’ole Kanahele gestures to both the totalizing colonial discourse that suppresses her cultural beliefs and the importance of fighting back against these systems: … we believe in the word of our ancestors…they say we are the products of this land and that is our truth…and that is what we are fighting for. This is our way of life. This is not our job. We don’t earn money from doing this. But for generations after generations, we will continue to be doing what we are doing today. What Dr. Kanahele speaks of goes beyond the physical destruction of the sacred ancestral site, to describe a hegemonic normalization and occupation that actively effaces traditional Hawaiian ways of being in the world. The words and actions of the land defenders challenge totalizing structures that classify space according to a narrow set of beliefs about the world. Working from these acts of resistance, we want to suggest that the Hawaiian sovereignty movement illuminates how systems of scientific thought and the project of space exploration rely on Euro-western values being the standard by which all other values are measured. It is this wide acceptance of these structures and principles of reasoning that serve to justify the construction of infrastructure that at once reproduces and fortifies these myths. This self-reinforcing relationship between the production of space infrastructure and the logics that justify it speaks to a powerful aspects of colonial totality: the way it gains power by rendering illegible the very elements relied upon to actively produce the other. The generally unquestioned salience of space infrastructure is a powerful example of this. As Quijano (2007: 174) describes, the relationship between colonialism and scientific discourse is a mutually reinforcing and “part of, a power structure that involved the European colonial domination over the rest of the world.” In Hawai’i, we see the settler colonial process of cultural attrition operating through a totalizing force of colonial knowledge systems that extend beyond physical occupation of land to include an erasure of Indigenous Hawaiian ways of knowing. Although the spatialities and technologies associated with this form of stellar navigation are radically dissimilar, we suggest that on a basic level, this form of space exploration is continuous with a lineage of Euro-western projects of discovery. In short, space as the ‘final frontier’ is not simply a metaphor but speaks to the role of astronomy in upholding the ongoing projection of values onto new territories and extending power and acquisition of territory to those complicit in colonial processes. This extends both to the world’s highest peaks and into the heavens. Space infrastructure is central to this ongoing frontier process that seeks to code ‘new’ territories as knowable according to certain values and, as a result, casts inhabitants who fall outside this paradigm as irrational, less-than-human, and exploitable. However, as Lowe (2015: 2) warns, these abstract promises of human freedoms and rational progress are necessarily discordant with the “global conditions on which they depend.” Which is to say that these atomistic systems dispose of the very relationships and elements of life that make them possible. A belief in respecting the sacredness of the world is just one example of this. It is also essential to recognize the process of establishing colonial totality is one that imperial forces have worked tirelessly to instill. Recognizing this helps to disrupt an appearance of givenness that colonial occupation relies upon. The land defenders have been vocal about this, reminding of us of the fact that since the arrival of James Cook to the Hawaiian Islands in 1778, settler colonial campaigns have been advancing longstanding patterns of cultural removal, fueled by beliefs in colonial supremacy. Following the coup and overthrow of the Hawaiian monarchy by US-led forces, a colonial oligarchy banned Hawaiian languages from schools and formalized English as the official language for business and government relations (Silva, 2004: 2-3). This legislation eroded language, culture, and sacred practice; and is an example of what Ngũgĩ wa Thiong’o (cited in Silva, 2004: 3) describes as a “cultural bomb” of settler colonialism that serves to “annihilate a people’s belief in their names, in their languages, in their environment, in their heritage of struggle, in their unity, in their capacities and ultimately in themselves.” According to Chickasaw theorist Jodi Byrd, continually reflecting on the historical and ongoing work that maintains the conditions of settler colonialism is essential to resisting the tendency for colonial constraint to appear inevitable, unresolvable, and complete (Byrd, 2011; see also Simpson, 2014). There was nothing, easy, given, or natural about processes of colonial occupation. While we acknowledge the usefulness of totality for thinking about colonial supremacy, we have concerns about its tendency to inscribe an inaccurate depiction of Euro-western superpower with total ideological control over subjugated Indigenous population. Put differently, we are cautious of the work that the notion of totality does to reinforce a too widely accepted view of Indigenous populations as helplessly dominated, or even anachronistic. The Hawaiian sovereignty movement demonstrates that this is not the case. What the battle at Mauna Kea has shown—akin to other efforts of refusal, such as those at Standing Rock—is that the war against colonialism is ongoing. At present, it appears the land protectors have been successful in their goals of halting construction, as the development team behind the project has begun considering secondary sites for the telescope. The resistance at Mauna Kea, then, is a powerful symbol of the possibility of rupturing the normative totality of Modernist scientific rationality, but it also underscores the recalcitrance of the structures of control and the challenges of pushing back against colonial occupation. However, despite this rupturing of hegemonic ideas of science and progress through the resistance movement, the dominant response from the scientific community has been largely one of confusion and perplexity. This reaction to the uprising speaks to the power of the narratives that cement the Western framework as ‘truth,’ ‘natural,’ and ‘given.’ For these representatives of state and international institutions, violent control is re-framed as co-existence to achieve Modernist notions of progress, while the claims of Indigenous people are reduced to frivolous demands with primitive and irrational connections to the past. This, of course, exists with little consideration of the irony of how this frenzy to build infrastructure that works to “know” the cosmos may be read as equally irrational. This essay has sought to consider the relationship between infrastructure and colonialism, emphasizing that even the most futuristic space telescopes have embedded within them a lineage of Euro-western cultural supremacy. It is important to recognize the extant materiality of these infrastructures as a manifestation of hegemonic systems that perpetuate myths of rationality and Euro-western cultural supremacy. The battle for Mauna Kea movement highlights the importance of remembering the long historical processes and extensive exertion of colonial constraint and cultural removal that has been necessary to maintain control of the land. Despite the social processes that naturalize colonial infrastructure, there is nothing essential, necessary, or pre-ordained about enormous telescopes. The success of the land defenders at Mauna Kea, and the support the movement gained around the world, shows us that Euro-western forces and the infrastructure that is central to maintaining their normative influence, are replete with fissures and contradictions worth pushing against. In spite of the hegemonic forces of modernity and rationality behind the construction of the TMT and a continued attempt to assert colonial totality, the battle at Mauna Kea indicates these hegemonic forces have been far from totalizing. The colonial powers do not have the final word. The land defenders at Mauna Kea have demonstrated a powerful vision for disrupting normative ways of occupying land and knowing the cosmos inspiring us to think further on the complexities of mobilizing infrastructure to resist colonialism. It is within these ruptures that we see a potential for a continued learning from the stars and our social existence.

#### 4] This debate is not private space good/bad, but instead a question of Native sovereignty and the power to invoke the plan. The 1AC eclipses the authority of Native nations, so in response we affirm the long tradition of Indigenous internationalism across colonial borders.

Estes 19

(Nick Estes is a citizen of the Lower Brule Sioux Tribe. He is an Assistant Professor in the American Studies Department at the University of New Mexico. In 2014, he co-founded The Red Nation, an Indigenous resistance organization. For 2017-2018, Estes was the American Democracy Fellow at the Charles Warren Center for Studies in American History at Harvard University. Chapter 6: Internationalism, Our History Is the Future: STANDING ROCK VERSUS THE DAKOTA ACCESS PIPELINE, AND THE LONG TRADITION OF INDIGENOUS RESISTANCE, 2019, hardback, JKS)

The Treaty Council, however, was not the first or only version of what historian Daniel Cobb calls a “global Indigenous identity.” Rather, it belonged to and drew from a long tradition of Indigenous internationalism.5 Prior to European contact, Indigenous nations had often entered into relations with each other for alliance, kinship, war, peace, or trade. As shown in previous chapters, agreements were made not solely between human nations, but also among nonhuman nations as well, such as the buffalo and the land. Such treaties were, and continue to be, the basis of diplomacy and the evidence of a prior and continuing status of Indigenous nationhood. Sovereign nations do not enter into international relations or treaties with domestic or “internal” populations. On the contrary, the very basis of sovereignty is the power to negotiate relationships between those who are seen as different— between other sovereigns and nations. But concepts of “sovereignty” and “nation” possess different meanings for Indigenous peoples than for their European-derived counterparts. And they are not entirely consistent, either, with the aspirations for a nation-state that came to define decolonization movements in the Third World. While doing important defensive work, on face value these Western and Third World concepts only partially reflect traditions of Indigenous resistance. Far beyond the project of seeking equality within the colonial state, the tradition of radical Indigenous internationalism imagined a world altogether free of colonial hierarchies of race, class, and nation. This vision allowed revolutionary Indigenous organizations such as the Treaty Council to make relatives, so to speak, with those they saw as different, imagining themselves as part of Third World struggles and ideologies, and entirely renouncing the imperialism and exceptionalism of the First World (while still living in it). They were in the First World but not of it—much like American Indians are in, but not entirely of, the United States. Indigenous peoples across North America and the world have fought, died, and struggled to reclaim, restore, and redefine these powerful ideas. Their goal has been to take their proper place in the family of nations. Radical Indigenous internationalism, however, predates AIM and the Treaty Council. Contemporary pan-Indigenous movements were a result of more than a decade of Red Power organizing that began in the early 1960s, nearly a decade before the creation of AIM. Earlier, in the 1950s, Flathead scholar and writer D’A

rcy McNickle and the National Congress of American Indians had explored a similar intellectual and political terrain of internationalism. And before that, the Society of American Indians advocated for a seat at the table during the 1919 Paris peace talks and representation at the League of Nations. Each distinct instance posed a similar question: If Indigenous peoples are nations, why are they not afforded the right to self-determination? Two strands of thinking about self-determination for the colonial world prevailed following the First World War. In the first, US President Woodrow Wilson argued for self-determination with a limited set of rights that would not radically upset the colonial order. Such liberal internationalism, however, glaringly omitted Indigenous peoples, as they understood themselves as nations that existed prior to the formation of settler states. Rarely were Wilson’s principles applied to North America or the United States; nor were they ever intended to extend to Indigenous peoples. A second, more radical vision put forward by Communist revolutionary V. I. Lenin argued for the right of colonized nations to secede and declare independence from their colonial masters. This view was echoed by the Third World decolonization movement, as part of a global Socialist and Communist revolution, and it has frequently been applied in the Asian, African, and South American contexts. But this view remained almost entirely absent in North America, except among radical Indigenous, Black, Asian, Caribbean, and Chicanx national liberation movements. The Treaty Council advocated Indigenous nationhood as part of this global anti-colonial movement and in line with Third World liberation movements. After decades of experiencing land loss, enduring bare survival, attempting to work with federal programs, filing court cases, defeating termination legislation, and facing mass relocation, an assertion of Oceti Sakowin sovereignty went from ambition to prescription. Few avenues remained other than the pursuit of international treaty rights. Treaties made with the United States were proof of nationhood. But what legal institution would uphold this position if the United States refused to? If the goal was to reverse the unjust occupation of an entire continent, the advancement of Indigenous rights through the very legal and political systems that justified that occupation in the first place had proven limited in some instances, and hopeless in others. To survive, AIM and the Treaty Council therefore had to look elsewhere to make their case—beyond the confines of the most powerful political construct in world history, the nation-state. Prior to and during colonization, Indigenous nations had self-organized into deliberate confederacies, alliances, and governments. The Nation of the Seven Council Fires (the Oceti Sakowin), for instance, is a confederacy of seven different nations of Lakota-, Dakota-, and Nakota-speaking peoples in the Northern Plains and Western Great Lakes. They are hardly unique; in North America alone there are the Creek Confederacy in the Southeast, the Haudenosaunee Confederacy of Six Nations in the Northeast, the Council of Three Fires (made up of Ojibwes, Odawas, and Potawatomis) in the Great Lakes region, the United Indian Nations in the Ohio River valley (under the Shawnee leadership of Tecumseh), the All Indian Pueblo Council of the Southwest, and the Iron Confederacy of the Northern Plains. Many other political confederacies also flourished prior to, alongside, and in spite of settler states in North America. And their legacies are hardly relegated to the primordial past. Modern Oceti Sakowin internationalism, for instance, traces its origins to the early twentieth century, an era generally viewed as a low point for Indigenous activism and resistance. In North America alone, an estimated precolonial population of tens of millions of Indigenous peoples had been reduced to about 300,000, and for Flathead historian D’Arcy McNickle, writing in 1949, two processes contributed greatly to this decimation: the institution of private property and the destruction of Indigenous governance that once held land in common. Indigenous nations at the time also possessed little in the way of either collective property or political power, as Indigenous territory had been drastically diminished, and the reservation system had overthrown or almost entirely dissolved customary governments. If Indigenous peoples once constituted the tree of the Americas, whose roots deeply entwined in the land, the cultivation of “growth from the severed stump,” McNickle argued, was the pivotal challenge of the twentieth century.7 Physical extermination and the repression of Indigenous political power verified the United States’ genocidal intent, but these had not accomplished their purpose. And despite otherwise stating pluralistic claims to inclusion, McNickle concluded that the United States simply “can not tolerate a nation within a nation.” If Natives were to be assimilated, they would be assimilated as individuals and not as nations. In the popular imaginary, Natives disappeared into the wilderness of history, were never truly nations, and had been overpowered by a superior civilization. If they were nations, they were eclipsed and replaced by the real nation—the United States. Such erasure notwithstanding, vibrant Indigenous political traditions persisted. But to the untrained eye, nothing was awry. From the severed stump began to regrow the tree of life—the tree of resistance that would blossom into revolt decades later.

#### 5] The process and agents of political change matter. Indigenous internationalism must be asserted through Native sovereignty and organizing. We preempt the perm and the plan- they still collude with settlerism, which trades off with meaningful resistance.

Simpson 16

(Leanne Betasamosake Simpson, renowned Michi Saagiig Nishnaabeg scholar. She holds a PhD from the University of Manitoba, and teaches at the Dechinta Centre for Research & Learning in Denendeh. An Interview with Eve Tuck (Unangax̂), Indigenous Resurgence and Co-resistance, Critical Ethnic Studies, Vol. 2, No. 2 (Fall 2016), pp. 19-34, JKS)

PLACE-BASED INTERNATIONALISM

Eve: One idea that Wayne and I floated in our call for papers is that how a person or community understands the roots or source of injustice will have implications for how they go about undoing that injustice. Does this make sense to you? Might it be too simplistic or problematic?

Leanne: I think we need to be a bit careful here, particularly in the academy. I think Indigenous peoples understand pretty well injustice in their own lives whether or not they can articulate it using the language of colonialism or decolonization. I think movements that link social realities with political systems and focus on creating real-world-on-the-ground alternatives are powerful. I worry that too much of our energy goes into trying to influence the system rather than creating the alternatives. It matters to me how change is achieved. Change achieved through struggle, organizing, and creating the alternatives produces profoundly different outcomes than change achieved through recognition-focused protest, and pressuring the state to make the changes for us. That is a recipe for co-option. I think it is important to understand root causes of injustice, but it is also important to understand think strategically and intelligently about approaches to undoing that injustice. I think that diagnosis and strategic action must be done within grounded normativity. Indigenous thought has a tradition of place-based internationalism that I think is this beautifully fertile spot because it links place-based thinking and struggle with the same decolonial pockets of thinking throughout the world. Nishnaa- beg have been linking ourselves to the rest of the world since the beginning of time, and throughout our resistance to colonialism we have our people traveling throughout the world to link with other communities of resistors. Grassy Narrows First Nation comes to mind in their nearly four- decade fight against mercury poisoning in their river system and the relationship they have made with the Japanese community in Mnimata.6 We need to use our experiences in the past to think critically about how we respond to injustice today. Right now, Indigenous peoples in Canada need to be thinking critically about the implications of seeking recogni- tion within the colonial state because we have a government that is very good at neoliberalism and seducing our hope for their purposes. Again, Glen Sean Coulthard, in Red Skin, White Masks, using the Dene nation’s experience in the 1970s, provides a blistering critique of the pitfalls of seeking political recognition within state structures. He makes the point that continually seeking recognition with the settler-colonial state is a process of co-option and neutralization, and is a way of bringing Indigenous peoples into the systems that guts our resistance movements, for instance, and we get very little in return.7 In fact, in terms of dispossession—that is, the removal, murdering, displacement, and destruction of the relation- ship between Indigenous bodies and Indigenous land—this serves only to facilitate land loss, not improve things. Engagement with the system changes Indigenous peoples more than it changes the system. This can be destructive in terms of resurgence because resurgent movements are trying to do the opposite—we are trying to center Indigenous practices and thoughts in our lives as everyday acts of resistance, and grow those actions and processes into a mass mobilization. I think it is useful to apply this same critique of recognition to orga- nizing and mobilizing with the purpose of making a switch from mobi- lizing around victim-based narratives—that is, publically demonstrating the pain of loss as a mechanism to appeal to the moral and ethical fabric of Canadian society (which has over and over again proven to be morally bankrupt when it comes to Indigenous peoples)—to using that same pain and anger to fuel resurgent actions. This organizing from within grounded normativity has always fueled Indigenous resistance and continues to happen all the time in Indigenous communities—it is just often misread by others. The community of Hollow Water First Nation created the Community Holistic Circle of Healing as a Nishnaabeg restoration of relationships, or a restorative justice model to address sexual violence in their community.8 Christi Belcourt’s Walking with Our Sisters exhibit has created a traveling display of 1,800 moccasin vamps as a way of honoring and commemorating missing and murdered Indigenous women and children in Canada and the United States. The exhibit does not rely on state funding.9 Thousands of volunteers made the vamps. The exhibit works with local communities and their cultural and spiritual practices to install the exhibit and do the necessary ceremony and community processes. Walking with Our Sisters works with local organizers a year in advance of installation, using Indigenous processes to embed the art in community on the terms of the local community. There is also the work of countless urban Indigenous organizations supporting the families of MMIWG2S people. The Native Youth Sexual Health Network provides on-the-ground, community-embedded, peer-to-peer support around sex- ual health and addiction for youth.10 The Akwesasne Freedom School provides Mohawk education for Mohawk children.11 The Iroquois national and Haudenosaunee women’s lacrosse teams travel using Haudenosau- nee passports instead of American or Canadian ones.12 The Unist’ot’en Camp pursues land protection resurgent action and the reclamation of the original name of Mount Douglas, PKOLS, in the city of Victoria, British Columbia.13

#### 6] The role of the ballot is to center indigenous scholarship and resistance-- Any ethical commitment requires that the aff place themselves in the center of Native scholarship and demands.

Carlson 16

(Elizabeth Carlson, PhD, is an Aamitigoozhi, Wemistigosi, and Wasicu (settler Canadian and American), whose Swedish, Saami, German, Scots-Irish, and English ancestors have settled on lands of the Anishinaabe and Omaha Nations which were unethically obtained by the US government. Elizabeth lives on Treaty 1 territory, the traditional lands of the Anishinaabe, Nehiyawak, Dakota, Nakota, and Red River Metis peoples currently occupied by the city of Winnipeg, the province of Manitoba, (2016): Anti-colonial methodologies and practices for settler colonial studies, Settler Colonial Studies, DOI: 10.1080/2201473X.2016.1241213, JKS)

Arlo Kempf says that ‘where anticolonialism is a tool used to invoke resistance for the colonized, it is a tool used to invoke accountability for the colonizer’.42 Relational accountability should be a cornerstone of settler colonial studies. I believe settler colonial studies and scholars should ethically and overtly place themselves in relationship to the centuries of Indigenous oral, and later academic scholarship that conceptualizes and resists settler colonialism without necessarily using the term: SCT may be revelatory to many settler scholars, but Indigenous people have been speaking for a long time about colonial continuities based on their lived experiences. Some SCTs have sought to connect with these discussions and to foreground Indigenous resistance, survival and agency. Others, however, seem to use SCT as a pathway to explain the colonial encounter without engaging with Indigenous people and experiences – either on the grounds that this structural analysis already conceptually explains Indigenous experience, or because Indigenous resistance is rendered invisible.43 Ethical settler colonial theory (SCT) would recognize the foundational role Indigenous scholarship has in critiques of settler colonialism. It would acknowledge the limitations of settler scholars in articulating settler colonialism without dialogue with Indigenous peoples, and take as its norm making this dialogue evident. In my view, it is critical that we not view settler colonial studies as a new or unique field being established, which would enact a discovery narrative and contribute to Indigenous erasure, but rather take a longer and broader view. Indigenous oral and academic scholars are indeed the originators of this work. This space is not empty. Of course, powerful forces of socialization and discipline impact scholars in the academy. There is much pressure to claim unique space, to establish a name for ourselves, and to make academic discoveries. I am suggesting that settler colonial studies and anti-colonial scholars resist these hegemonic pressures and maintain a higher anti-colonial ethic. As has been argued, ‘the theory itself places ethical demands on us as settlers, including the demand that we actively refuse its potential to re-empower our own academic voices and to marginalize Indigenous resistance’.44 As settler scholars, we can reposition our work relationally and contextually with humi- lity and accountability. We can centre Indigenous resistance, knowledges, and scholarship in our work, and contextualize our work in Indigenous sovereignty. We can view oral Indigenous scholarship as legitimate scholarly sources. We can acknowledge explicitly and often the Indigenous traditions of resistance and scholarship that have taught us and pro- vided the foundations for our work. If our work has no foundation of Indigenous scholarship and mentorship, I believe our contributions to settler colonial studies are even more deeply problematic

## Case

### Turn

#### Asteroid mining is critical to future survival – it can fund more space exploration, eliminate resource scarcity, build space cities to house millions, and manufacture organs to save lives

Elvis 21 [Martin Elvis is a senior astrophysicist at the Center for Astrophysics | Harvard & Smithsonian. He is the author of Asteroids: How Love, Fear, and Greed Will Determine Our Future in Space (2021). “Riches in space.” Aeon. July 2, 2021. <https://aeon.co/essays/asteroid-mining-could-pay-for-space-exploration-and-adventure>] HW AL

Asteroids are the remnants of our solar system’s youthful exuberance, the leftover crumbs from when the planets formed. For much of the space age, asteroids were ignored in favour of the far more glamorous planets, and the Moon. The asteroids – dark, misshapen rocks, hard to see and hard to find – have long flown beneath our notice. But that was a mistake. They have a crucial role to play in the future of our species – in fact, the survival and flourishing of humanity are tied up with asteroids. There are three reasons. They bear messages from the beginnings of the solar system, before our Earth came into being, and how we got here matters to where we’re going. They are also hoards of resources that might lead us to a future without scarcity. And last – a minor detail – a single asteroid could wipe us off the face of our planet. Let’s look at each in turn. Asteroids are the remnants of collisions between some of the first mini-planets (called ‘planetesimals’) that formed in abundance when the solar system was no older than a few million years. As a result, many asteroids are just piles of broken rubble held together by their own weak gravity, about a million times more feeble than the gravity we feel here on Earth. Untangling the eventful history of the solar system is easier with asteroids because they’re unsullied envoys from those turbulent early times. Unlike the planets, nothing much has happened to the asteroids in the past few billion years. And there are millions of them, the vast majority orbiting the Sun between Mars and Jupiter in a band called the ‘Main Belt’. An animation depicts a mapping of the positions of known near-Earth objects at points in time over the past 20 years, and finishes with a map of all known asteroids as of January 2018. Courtesy of JPL/NASA Perhaps 10,000 asteroids the size of sports stadiums are on orbits that swing close to Earth. As the dinosaurs would attest, our planet occasionally gets hit. But the results aren’t always a bad thing: it’s looking likely that Earth’s oceans were filled by water brought by asteroids. Along with water, asteroids might even have brought the ingredients of life to Earth in the form of so-called ‘prebiotic’ molecules, including amino acids and, as recently found, components of proteins and sugars. Learning more about asteroids means learning more about our origins. What can we actually do with asteroids? That brings us to my favourite thing about them: their resources. Being an idealistic astrophysicist, my interest is in the money to be made from them. That really is idealistic because, if we can make a profit mining the asteroids, then doing bigger things in space will become a lot cheaper. Capitalism has its faults, but one thing it does well is to make things cheaper. I want to use it as a tool so that we can build far bigger telescopes than we could practically realise today. What do astronomers want? More light! Bigger telescopes! Asteroid mining could make that dream a reality. The siren call of asteroids for miners is that the Main Belt asteroids contain vast amounts of resources. The iron found in asteroids adds up to some 10 million times the iron that we have in proven reserves on Earth. That’s a lot. It’s enough to build many rings of iron girders all the way around Earth’s orbit, along the lines of the science fiction novel Ringworld (1970) by Larry Niven. Not that a ringworld is a sensible thing to make, but it is a really big ring. More plausibly, with that much iron we could build cities in space, as envisaged by the physicist Gerard K O’Neill in the 1970s. Each of these cities would be big enough for a million people to live in. They would be rotating cylinders, and as a citizen of one you would be walking around inside the cylinder’s surface, feeling a fake gravity from the centrifugal force. That’s the scale of resources we’re talking about. These vast material supplies could make for an era that people call ‘post-scarcity’, where there’s plenty for everyone, just as there is in the 23rd century of the Star Trek science fiction franchise. The starship crew on Star Trek don’t work to keep themselves fed and housed, that’s taken for granted. They work for adventure and exploration. Asteroid wealth could help all of us take a step towards that happy state. The problem is how to get started. Iron in space is not going to make for giant profits in the short run. On the ground, it sells for less than $200 a ton. It would be worth more in space, but unfortunately there’s no one to buy huge tonnages of iron in space. To adapt the tagline from the Alien movies – ‘In space, no one can hear you sell.’ It certainly isn’t worth bringing space iron back to Earth since the cost of doing so would far exceed the price it could command. Starting to mine space for resources will have to begin with something so valuable that the cost of obtaining it in space is small by comparison. For now, the best bets are precious metals and – surprise – water. Precious metals are obvious. Platinum sells for about $33.5 million a ton, and we know from meteorites that some asteroids are richer in platinum than any mine on Earth. That sounds promising. Platinum sales run at about 200 tons, or billions of dollars, per year. The bad news is that ‘richer than any mine on Earth’ is still concentrations of just tens of grams per ton, and extracting those precious grams isn’t easy. We can’t just bring an asteroid near to Earth to start extracting the platinum where we can have heavy machinery to work on it. That would take way too much fuel because, to carry more mass, rockets have to carry exponentially more fuel; unlike airplanes, they don’t get the oxygen for free from their surroundings, they have to pull it along with them. Any refining of platinum will have to be done robotically out in the native orbit of the asteroid. That’s quite a challenge. Water is a less obvious money-maker. The surprise is that water is also worth millions per ton – if it’s sold in space. Water in space is really useful. It’s good for drinking, and the oxygen in it is good for breathing. You can split the hydrogen from the oxygen in H2O and you’ve got rocket fuel, and water is good at absorbing radiation to protect people from cancer-causing cosmic rays. So, in principle, water in orbit is pretty valuable. The good news is that up to 10 per cent of a water-rich asteroid can be water. It won’t be simple ice, most likely, but will be bound into clays and other rocks. Even better, water is much easier to extract than precious metals. Simply heating up the rock will release water that can then be captured. How much is space water worth? Until recently, it cost $20 million to get a ton of water into even a low orbit – say, to the International Space Station (ISS). To get a ton of water to a high orbit, like the 24-hour orbit of TV transmitting satellites, would cost about three times as much. SpaceX has started to cut that cost; for now, it’s charging about $3 million a ton to a low orbit on a Falcon 9 rocket. Water from asteroids might be able to compete with those prices and still return a nice profit. But the bad news is that, right now, there’s no one in space who wants to buy water. At least not yet. That might be about to change. We won’t get to build cities in space unless we can build simpler space stations first, and do so at an affordable cost that can scale. If we have space stations, they will need supplies, especially of water and perhaps construction materials. That demand could create a business delivering these supplies from space instead of from Earth. In this case, the asteroids would have the most to offer. So space stations – particularly commercial space stations – are the key to acquiring asteroid resources. Why build space stations? There are three primary uses: research, manufacturing and tourism. Research has always been done on the ISS, but facilities and time have been in short supply. In recent years, the equipment has improved a lot, but astronaut time is still scarce. Each astronaut has to look after multiple experiments. Multitalented and smart as the astronauts all are, they simply can’t have all the experience of the scientists whose experiments they’re operating. A lot of effort goes into automating those experiments so that the astronauts aren’t overwhelmed. It would be far more efficient if the scientists who invent the experiments also get to be the ones who carry them out in space. Then their years of experience could be put to good use operating and watching over their studies. Spotting subtle anomalies that could be a sign of a failure, or of a discovery, is much better done in person by experts. But, until now, scientists didn’t have that opportunity, and they would have likely declined it if offered the chance. That’s because training for a mission to the ISS takes more than two years full-time and requires learning Russian. If you take two years off from doing your research, then you’re no longer at the forefront and you’ll have lost your edge. Few top scientists would risk that, however much fun it might be to float in space. We scientists live for our research. Fortunately, the new commercial stations will be much easier to train for, taking a couple of months or so, because they’ll have a single manufacturer with consistent, uniform interfaces, and a separate professional crew to deal with maintenance and emergencies. The companies with advanced plans so far are all US-based, so English will be the language used. As English is the lingua franca of science, it poses little challenge to scientists worldwide. Manufacturing in space has always seemed like a fool’s errand. Whatever you make out there would have to be worth outrageous amounts to cover the shipping costs back to Earth. Now, though, those costs have come down almost 10-fold, with more reductions promised. As a result, a few items do pass that test. Already, there are first tests taking place on the ISS to see if the advantages of manufacturing in almost zero gravity (‘micro-gravity’) are really as great as some have suggested. The most popular idea is to make super-powerful optical fibres that could carry far more data traffic than current transoceanic fibres can. They could potentially do so more cheaply because they would be simpler: they wouldn’t need repeater stations. Certainly, the demand is there, since there’s no limit to the number of cat videos we must share. These ‘ZBLAN’ optical fibres showed dramatic improvements when small amounts were made during brief, half-minute long intervals of weightlessness on a parabolic flight. There are a few companies already trying to make ZBLAN fibres on the ISS. The results must be promising because they went back after their first attempt. A kilogram of fancy optical fibres already sells for about $1 million to $20 million. That will pay for the postage and still give you change! Another idea is to 3D-print human organs in space. Why? Printing ears on Earth has been done, using a scaffolding that later dissolves away. But some organs are trickier, and scaffolds don’t always work. Without that support, the layers of cells tend to slip and slide out of position, which is not the desired effect for something meant to keep you alive. In micro-gravity, the slipping and sliding should be much smaller. The goal is eventually to be able to print a human heart. A heart weighs less than a kilogram. Even with packaging to keep it healthy, **the transport cost of bringing a new heart down to Earth is going to be far less than it’s worth to the recipient.** Again, first experiments toward this goal are underway on the ISS.

### AT: Collisions

#### Status quo efforts to remedy the space environment can solve Kessler syndrome – their impact is also overhyped and at best non-unique. Prefer our card’s probability analysis report and empirical examples

Lewis 15 [Hugh Lewis, Senior Lecturer in Aerospace Engineering. “Space debris, Kessler Syndrome, and the unreasonable expectation of certainty.” Room Space Journal of Asgardia. 2015. <https://room.eu.com/article/Space_debris_Kessler_Syndrome_and_the_unreasonable_expectation_of_certainty>] HW AL

There is now widespread awareness of the space debris problem amongst policymakers, scientists, engineers and the public. Thanks to pivotal work by J.C. Liou and Nicholas Johnson in 2006 we now understand that the continued growth of the debris population is likely in the future even if all launch activity is halted. The reason for this sustained growth, and for the concern of many satellite operators who are forced to act to protect their assets, are collisions that are expected to occur between objects – satellites and rocket stages – already in orbit. In spite of several commentators warning that these collisions are just the start of a collision cascade that will render access to low Earth orbit all but impossible – a process commonly referred to as the ‘Kessler Syndrome’ after the debris scientist Donald Kessler – the reality is not likely to be on the scale of these predictions or the events depicted in the film Gravity. Indeed, results presented by the Inter-Agency Space Debris Coordination Committee (IADC) at the Sixth European Conference on Space Debris show an expected increase in the debris population of only 30% after 200 years with continued launch activity. **Collisions are still predicted to occur, but this is far from the catastrophic scenario feared by some.** Constraining the population increase to a modest level can be achieved, the IADC suggested, through widespread and good compliance with existing space debris mitigation guidelines, especially those relating to passivation (whereby all sources of stored energy on a satellite are depleted at the end of its mission) and post-mission disposal, such as de-orbiting the satellite or re-orbiting it to a graveyard orbit. Nevertheless, the anticipated growth of the debris population in spite of these robust efforts merits the investigation of additional measures to address the debris threat, according to the IADC. On the face of it, there appears to be considerable procrastination or, worse, apathy towards the development of guidelines for debris removal in spite of calls for action. But is this really the case? This probability tree shows the possible outcomes from drawing two cards from a pack of 52 regular playing cards. It can be used to illustrate the difficulties accociated with the choice of which piece of space junk to remove. No progress? In the nine years following the publication of the work by Liou and Johnson **there has been considerable interest shown in remediation of the space environment. In particular, significant effort has been invested across the globe in the development of methods to remove objects from low Earth orbit.** The European Space Agency, for example, recently announced its intention to seek ministerial approval for a mission to deorbit a European spacecraft in the next decade. The Agency has conducted numerous studies to investigate appropriate and reliable methods to achieve this. A key driver for these widespread efforts has come from the work conducted using computer codes – evolutionary models – of the debris environment, which suggest that the growth of the debris population can be prevented if particular spacecraft or rocket stages are removed. In the computer simulations, these objects are identified as the most likely to collide and so the consequence of their removal in reality should be a reduction in the number of collisions that will occur in the environment, which would curb the generation of new fragmentation debris. Given that is has been nearly a decade since the publication of the work by Liou and Johnson, it is surprising to some that no guidelines have yet been introduced at the international or national level, which detail the remediation measures that can be taken by government and industry. In fact, a recent announcement by NASA of a focus on technology development rather than in-flight demonstrations of debris removal technologies was greeted with some criticism. On the face of it, there appears to be considerable procrastination or, worse, apathy towards the development of plans or guidelines for debris removal in spite of calls for action. But is this really the case? The real issue comes from the seemingly simple task of identifying the correct debris to remove from orbit … In fact, the situation is not as simple as it might appear; there are some fundamental questions that remain to be answered about debris removal. Of particular concern are issues relating to ownership, liability and transparency. Many of the technologies that have been put forward for debris removal could also be used to remove or disable an active spacecraft, for example. Hence, it can be argued that these technologies could be used as weapons. There are also questions about the cost of a sustained programme of debris removal – some engineers put it at tens of trillions of dollars. However, perhaps the most important reason for the lack of relevant guidelines is that we don’t yet know how to accomplish remediation, by which we mean cleaning up space, in practice. That is not to say that we don’t know what technologies we might need. As mentioned above, there has been considerable effort already expended towards understanding these requirements and moving the necessary technology forwards. For one-off use, some technologies are very nearly ready. The real issue comes from the seemingly simple task of identifying the correct debris to remove from orbit. Until we can solve this problem, the likelihood is that debris remediation will not succeed, the debris population will continue to grow – seemingly out of our control – and the attempt will come at great cost. Without the reasonable expectation of success, it is virtually impossible to define appropriate and robust guidelines that can be used to direct remediation endeavours.