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#### The subject is alienated when it articulates its desires – incomplete signifiers structure the emergence of subjectivity and produce repetitive drives to fill the lack that justify coercive violence. Thus, the ROB is to traverse the fantasy – that means exposing drives.

Matheson 15 Calum Matheson, PhD, 2015, “Desired Ground Zeroes: Nuclear Imagination and the Death Drive,” University of North Carolina at Chapel Hill, [Calum Matheson is author of Desiring the Bomb: Communication, Psychoanalysis, and the Atomic Age (University of Alabama). He is a former high school debater. His research focuses on intersections of rhetoric, media, and theories of psychoanalysis and deconstruction. His current work focuses on right-wing political extremism, conspiracy thinking, and Lacanian concepts of anxiety and psychosis. He has also published work on argument, history of rhetoric, and games. Dr. Matheson is a former debate coach at Harvard University and a current candidate at the Pittsburgh Psychoanalytic Center.], <https://cdr.lib.unc.edu/concern/dissertations/6682x4537>, SJBE

The Real Jacques Lacan’s notion of the Real is notoriously difficult to define. In his book on the subject, Tom Eyers calls it the “most elusive” of Lacan’s concepts, but one that is also one that is “central” and “determining” for psychoanalysis (1). There are common elements of the various definitions. First, an agreement that both the economy of tropes that allows the conditions for meaning to emerge (the Symbolic) and the meanings and values invested in these tropes, including the subject itself (the Imaginary), do not and cannot perfectly capture all of existence or experience. Second, this unassimilable remainder structures the Symbolic and Imaginary, just as they structure each other, and thus all three registers are knitted together as demonstrated in Lacan’s famous “Borromean Knot.” The Real is what escapes mediation, what disrupts language itself. To explain its significance and relationship to desire requires examining its foundational role in the formation of the subject. The Real can be understood as the constitutive lack of the subject, its separation from the rest of existence by the self-definition necessary for it to come into being in the first place. This is made clear in the mirror stage, where the subject moves from a fragmented, disorganized concept of the body to the “finally donned armor of an alienating identity that will mark his [sic] entire mental development with its rigid structure” (Lacan, “Mirror Stage” 78). The formation of a discrete subject (a function in the Imaginary register) is a compromise. Its formation allows for participation in the Symbolic because to participate in that economy of exchange requires a “social I” (Lacan, “Mirror stage,” 79). This participation comes at the cost of alienation because the subject trades in a world of symbols which by their nature stand in for what is not present, and thus inescapably mediate the (Real) world outside of the subject, rather than making it present. This lack built in to the subject is the engine of desire: the subject’s divide from an object is a prerequisite for the desire of such an object, but the condition of mediation makes it impossible to ever incorporate it in a perfectly satisfying way. Thus desire remains unfulfilled and each chase for a symbol leads to another in loop which the very constitution of the subject dictates must be endless. This is the basic operation of the death drive which is not distinct from Eros. Were the impossible to occur and the drive of Eros to be fulfilled, it would be extinguished, as there would be nothing left to desire. Thus all drives aim, in a sense, at their own extinction, and therefore there is in a sense only one—the drive that aims towards the extinction of desire through its complete fulfillment in continuity with the world that was lost when the subject became distinct from it in the mirror stage. Although the death drive might stand in for the singular character of the drive, it should not be understood as a desire for the actual biological death of the subject’s body, or even the desire to inflict death on others. The self-destruction of the death drive is a desire to break the limits of the self as the alienating armor of the subject by experiencing unmediated contact with the Real. Death still defines its operation in other ways. The last portion of Lacan’s “The Function and Field of Speech and Language in Psychoanalysis” explains the metaphorical centrality of death as the center of a torus formed by incessant symbolization. The fort-da game is most significant not because it shows that the child wishes to destroy its mother or even inoculate itself against that possibility, but because it assimilates the child into the Symbolic order through the repetition of the signifiers fort and da, which stand in for presence and absence. Death is central to language because the symbol itself invokes the absence and loss of nonexistence since its function is to stand in for something that is gone. Language swirls around this absent center of death, a primordial absence encased in the inner ring of the torus, while the outer surfaces of language hold all else that cannot be symbolized at bay on the outside (Lacan, “Function and Field” 260-264). Paradoxically, death is necessarily evoked by the symbol as that which is absent and also made possible in the first place by that same symbol. The separation of the subject into its alienating identity as a social object makes a meaningful concept of death possible because without it there is no dasein, no individual, no singular human to die. George Bataille explains this with an entomological example. If a scientist picks one fly from a swarm, that fly is subject to death, because its end means the end of the discontinuous being selected by the entomologist. Without differentiation of its members, however, the swarm lives on; the selection of the fly is for the entomologist, not the animal (Bataille, “Hegel, Death and Sacrifice” 14-16). Thus it is with human beings. The subject is founded by a rejection of its sole animal nature by participating in a world of work and accumulation, mediated by language—essentially Lacan’s Symbolic. Thus individuals are made discontinuous with the general economy of matter and energy from which all things are formed by a conceptual separation inextricably bound up in death. Our existences are thus defined by discontinuity from a world of continuity, and for Bataille as for Lacan, our drives are singular in the sense that sex is a coupling that unifies with another and momentarily overcomes discontinuity just as death is the end of the subject’s brief separation from a universe differentiated only by the dismembering violence of our imposition of symbols upon it (Bataille, Erotism 13-17). The experience of death may still be unique because it suggests the absence implied by the sign and because it can be experienced only once by the subject—and for obvious reasons, cannot be symbolized by anyone with first-hand experience. As Freud argues in “Thoughts For The Times On War and Death,” we cannot even hope to imagine our own deaths because to do so demands that we imagine them from some perspective which would be destroyed in the experience itself. Death and the Real are therefore not identical, but are closely linked. The most important characteristic of the Real is not just that it suggests existence beyond language, but that this world-for-itself (to borrow from Eugene Thacker) intrudes on human reality and reveals it to be incomplete. Encompassing Max Picard’s concept of silence, the Real is not the absence of human reality so much as the traumatic revelation that that reality was always incomplete, always feigned in the face of existence so much more than human mediation has already covered. Chris Lundberg uses Lacan’s distinction between reality, being the social world of human construction, and the Real, being the occasional but inevitable failure of that reality, to develop his own distinction between failed unicity and feigned unicity. The Symbolic operates as an economy of interconnected and mutually-referential tropes weaving a kind of fabric that is the precondition for meaning, an environment in which social relationships can be understood in context. When the unified illusion of the social fails, we are compelled to stitch the tears in that fabric to maintain the world that gives us meaning (Lacan in Public 2-3). An account by Bill Laurence, the only journalist allowed to witness the Trinity test, provides evidence for this rupture and repair. While “not a sound could be heard” for the period after the flash and before the thunder, Laurence saw civilization itself collapse in an instant: The big boom came about one hundred seconds after the great flash—the first cry of a newborn world. It brought the silent, motionless silhouettes to life, gave them a voice. A loud cry filled the air. The little groups that had hitherto stood rooted to the earth like desert plants broke into a dance—the rhythm of primitive man dancing at one of his fire festivals at the coming of spring. They clapped their hands as they leaped from the ground…The dance of the primitive man lasted but a few seconds, during which an evolutionary period of about 10,000 years telescoped. Primitive man was metamorphosed into modern man—shaking hands, slapping his fellow on the back, all laughing like happy children. (12)

#### Narratives of sustainable space exploration are constructed fantasies of risk analysis that desire an impossible knowledge and recreate power hierarchies through controlled risk politics

**Ormord, 12** – James, School of Applied Social Science, University of Brighton, (“Beyond world risk society? A critique of Ulrich Beck’s world risk society thesis as a framework for understanding risk associated with human activity in outer space.” Environment and Planning D: Society and Space 2013, volume 31, pages 727 – 744)

Beck has been criticised for his ‘confusion’ about whether or not exposure to risk is unevenly distributed according to social and geographic divisions (Lupton, 1999, page 68). He has argued that “pollution follows the poor” (Beck, 1999, page 5) and has accepted that the rich can sometimes buy themselves safety, but he has also stated that nuclear contamination, for example, “is egalitarian, and in that sense ‘democratic’” (page 61), and he hopes for our unification into a global “civilizational community of fate” (2006, page 7; also 1992, page 47). In elaborating what he calls a “political economy of risk”, however, he appears to accept that the economic consequences of risk are unevenly socially distributed (1999, page 61). It is therefore surprising that he refers to the subpolitics of risk as an ‘enemyless’ politics. For even if it is accepted that risks themselves unite us in principle, there are clearly, as in the instances discussed above, those who benefit from the proliferation of risk. I have argued throughout the paper that there are serious problems with Beck’s account of how a cosmopolitan public sphere will emerge. The contradictions of risk themselves are portrayed as the most powerful force in undermining the risk makers, whilst it is merely for social movements to make risk scandalous, and various “moralizing groups” to put risk on the social agenda (1999, page 67). **Beck sees progress as** occurring “not through class struggle or revolution as in Marx, but as an unintended consequence of modernity itself” (Lupton, 1999, page 67). Politics “nestles down” in everyday life as risk decisions become impossible to ignore (Beck, 1997, page 152). His hope for cosmopolitan ecological democracy revolves around consumer boycotts and buycotts, and in **balloting over ecological issues**. In his assertion that “in sorting through the trash for recycling, everyone is compelled to cooperate as a minor activist in the overall rescue mission for the earth and humankind” (1997, page 91, emphasis added), activism is dissolved into individualised consumer behaviour administered by the state (see Smith, 2009, page 17). The theoretical problem posed by the relative failure to politicise the public about the risks involved in space activity is precisely that it does not impose itself on the everyday lives of those who stand to suffer. Nor are the risks concentrated in any socially or geographically determined sector of the population, with the exception of localised risks around manufacture and launch facilities such as the Baikonur Cosmodrome. The decision by **SNAP-9A** scientists to design the plutonium capsule to break up in the event of a disaster was in this sense a perfect tactic to avoid politicising any particular group. Issues concerning risk associated with human activity in space may find greater symbolic anchoring in areas immediately surrounding manufacture and launch sites, accounting for the geographic concentration of activism within those areas, but there is no necessary reason why people should engage with them. Accounting for why some people are mobilised to contest these risks whilst others are not, even when they share the same interests, values and knowledge, is difficult using Beck’s theoretical framework. As Lupton (1999, page 62) argues, “a usual response to grave dangers is to deny their existence as a kind of psychological self-protective mechanism, an attempt to maintain a sense of normality”. As she says, Beck accepts this (see Beck, 1995, pages 42–57). He argues that in the most “hopelessly hazardous situations … there is a growing tendency not merely to accept the hazard, but to deny it by every means at one’s disposal” (pages 48–49). He even makes the point that the imperceptibility of danger could in principle make this easy, but comes back again to the idea that we confront unavoidable risk decisions in day-to-day scenarios: “The lake one was about to leap into is revealed as a sewer, the superb, crispy lettuce in one’s mouth turns out to be contaminated and foul” (page 55). The “tolerance of despoliation and hazards”, says Beck, “wears thin only where people see their way of life jeopardized, in a manner they can both know and interpret, within the horizon of their expectations and valuations” (page 46). I have highlighted throughout that, where risks are not directly confronted and are uncertain, the operation of economic power becomes more important. One dimension to how power operates under these circumstances has recurred throughout the paper: the ability to **create and manage fantasies about catastrophe**. The more sophisticated the **technologies** used to **rationalise risk** become, the more significant what it **cannot model** becomes. Various approaches to psychoanalysis have examined how **fantasy creates both** **what is feared** (its ‘horrific’ dimension) **and the pacifying solution that relieves this fear** (its ‘beautific’ dimension). This is true of Kleinian psychoanalysis (eg, Klein, 1946, page 6), but particularly of contemporary Lacanian psychoanalysis, which has dealt with images of catastrophe specifically. This provides tools to explore in more depth Beck’s category of ‘things we are unwilling to know’. The Lacanian social theorist Slavoj Žižek (2008, page xii), for example, adds another category—‘unknown knowns’—to Donald Rumsfeld’s typology of knowledge. Žižek argues that when gaps appear in the symbolic order (in this case rationalising risk discourses) fantasy operates to conceal the true horror of the Lacanian Real; that which cannot be articulated. Žižek (2008, pages 5–6) provides the **example** of **safety demonstrations on aeroplanes**. These demonstrations do not serve to pacify our true fears about a crash landing, but to construct the horrific scenario. The true horror remains our inability to know how the crash scenario will play out. Precisely **the same is true of NASA’s Environmental Impact Statements, which are known to be fabrications but are still preferred to uncertainty** (the UN demands an impossible risk assessment that is probabilistic and geographically limited). The image of a **collision** **cascade** in orbit taking out global communications is also a **fantasy**, as are Haynes’s and McKay’s mutant bacteria. These fantasies each allow us to contemplate uncertainty. But each has a different effect, engineered and selected to function in the interests of those in power. Environmental Impact Assessments provide scenarios that legitimate State acquiescence to capital. They cover over not only science’s failings, but also those of the State and capital in turn. **They function to draw activists into** what Beck (1995, page 42) describes as “**orgies of mathematics and science” that work to prevent a truly reflexive discussion of risk**. Whilst informed activists engage with these scenarios as though they were rationalities (and, for example, demand to see more of the information on which they are based), less informed members of the public leave them to it. **Collision cascade fantasies and solutions for them in the form of fantastic technologies also sustain a relationship between capital and the State in which disaster and solution must be conceived within the existing regime governing space activities**. Not many people have direct economic interests in planetary engineering as yet, bar a marginal group of scientists. Desiring an impossible knowledge, these fantasies give scientists recourse to seek further funding (though more advanced modelling will make the unknown more, not less, terrifying), whilst at the same time making any politicisation of their work seem absurd. Meanwhile, the notion of **planetary engineering itself functions as a fantasy sustaining our unsustainable relationship with the Earthly environment**. Such fantasies are especially effective in **immobilising** public concern because of their remote setting in outer space. Space colonisation advocate Kraaft Ehricke (1972) referred to the development of outer space as the ‘benign industrial revolution’ precisely because it removed the negative consequences of industrial activity to a place where they no longer mattered. The same principle underpinned proposals to dump nuclear waste in outer space. Such a manoeuvre is a form of Beck’s “**symbolic detoxification**”, and the relationship between purity, exclusion, and avoidance has been tackled in the literature on risk (eg, Douglas, 1992; Joffe, 1999). Conclusion I have argued that, whilst many of the descriptive concepts established in Beck’s world risk society thesis can capture the existing state of risk beyond the globe, these risks reveal some of the problems with Beck’s theoretical understanding of risk politics. Contrary to Beck’s understanding, I have argued that there is nothing inevitable about these issues entering into a cosmopolitan public sphere. I have argued that this is especially true given the economic interests that keep uncertainty about these risks away from the public. I recommend that **we should remain sceptical about apparently cosmopolitan international cooperation regarding risk in outer space**, arguing that **this exists only where the interests of states and capital coincide**. I have also outlined some of the ways in which **space activity is** set to increase in order to resolve Earthly problems. These necessarily entail new and **increased risk**s, and are not the result simply of overspecialised science, but are **driven by the need for new capital fixes**. Because of the existence of these mechanisms, it cannot be trusted that progress will be made through the inevitable functional realignment of risk politics. The influence of power on risk politics beyond the global level must instead be recognised and collectively challenged, and **especially the function of fantasy** within this. An equal and open discussion of both the ‘goods’ and ‘bads’ (to use Beck’s terms) produced by space activity can only proceed on this basis.

#### The repetition of drives makes life the enemy and causes extinction

Themi 08 (Tim, Prof @ Deakin U, “How Lacan’s Ethics Might Improve Our Understanding of Nietzsche’s Critique of Platonism: The Neurosis & Nihilism of a ‘Life’ Against Life,” *Cosmos and History: The Journal of Natural and Social Philosophy* 4.1-2, 2008) SJBE, recut from Harvard BoSu

For to circle in too close to the Thing which is ethically forbidden by our reality principles––yet too the real truth of much desire––does hardly give us pleasure at all but anguish of the heaviest kind. Even if done so only as a thought experiment; as a free-association. So go there we generally don’t, and our ‘realities’ reflect as much. But henceforth when desire builds up, damns and flares return of the Thing: this is how Lacan specifically characterises the move we might make that goes beyond the pleasure principle, whose other name for Freud is ‘death-drive’. There where there is no, not pleasure yet jouissance in the transgression that the Thing would bring, a jouissance of transgression which Lacan suggests is the most direct satisfaction of a drive humanly possible[48]. But it’s also one perhaps unconsciously masochistic, that which Freud writes up as being only preliminarily sadistic, in eventually expressing itself as an “unconscious need for punishment”[49]. And if indeed we are feeling guilty, then we may yet still seek to pay the price. Why? For unknowingly possessing and inadvertently re-accessing this Thing in our real, beyond the pleasure-reality principle, our moral transgressions casting shadow long into the unconscious we know next to nothing about, and refuse even to acknowledge.¶ Could it not be thusly then that our time is behind now a sadomasochistic, wilfully ignorant drive towards death for nigh the entire species? Such punishment would too overly suffice, to be sure, for even a two-millennium length in repression…¶ But with our advancements in technological power outmatching by far any correlative advance in the awareness gained as a whole of our prehistoric Thing within: the great 21st century ecological disaster that too many academics and activists now increasingly predict, seems more than just a little possible. But to this increasingly macabre scenario, we must also add the renewed proliferation of nuclear weapons which occurs, no less, amidst a world where vital resources for energy and democracy are wearing thin[50]. For just such reasons, wilful ignorance of the Thing now bares results which Lacan’s Ethics reveals as far too terrifyingly possible to rationally accept; given that we have the Thing armed to the teeth now from that primitive id-like part of the brain, with no Sovereign Good, and all the way into a nuclear age.¶ CONCLUSION: THE NEUROSIS & NIHILISM OF A ‘LIFE’ AGAINST LIFE.¶ This is why Lacan proposes that his enquiry into ethics must be one to go “more deeply into the notion of the real”(LE:11). Further into what he would rather call the real, given that previous notions of ‘nature’ have been too far ‘different’––from being far too Platonic––than his own; and because it’s the very exclusions in these previous notions which upon return, as return of excess, are yielding our most tragic problems.¶ Today when faced with problems of the magnitude of global warming––a special but by no means solo case of adverse environment change at present due to our physical treatment of the planet––we often think the answer is to be more moral, more good, and we are thankful when exponents of the Good in some way bring attention to the problem. However, the idea of the Good as introduced by Plato, and nigh all of its descendants whether secular, rationalist, religious or not, continue to predicate themselves on a radically false picture of the human-condition: if not still of the entire cosmos––which only then lines itself up aside of an age-old repression, a repression of das Ding, that Freudian Thing in our inner real which, when it returns after being disavowed and denied in the name of the Good too long, is even more devastating.¶ Presently we are accelerating along the path of what Lacan discloses as our civilisation’s “race towards destruction”, a “massive destruction”, “a resurgence of savagery”, snaking the paths traced out before us by the centuries long dominion of Western morality [51]; and the nihilism detected by Nietzsche before the turn of the 20th has never threatened to reach such the grand finale. But what I would have us take from this enquiry here is that this is not because we aren’t in accordance enough with a moral ideal of the Sovereign good, but rather, it’s because we aren’t in accordance enough with a proper understanding of the real. It’s because we still at some level think that being more moral, in accordance with the Good’s inherited repressive structures towards our drives, desire, and truthfulness about the real, is actually the answer to––rather than the source of––our most tragic problems.¶ The goal here is by no means then to encourage all to let their Things run wild––which would probably be nothing short of an instant conflagration––but this is why and precisely why we must desist from deluding ourselves under the tightening grip of a Sovereign Good, for this is precisely the move which cuts the Thing loose after pressing down for far too long, a slippery hand’s palming on the coils of a spring, forever readying the subsequent explosion. For when that which is really real––as opposed to what Christian-Platonism falsely called the ‘real’––is forced from mind, it can’t really disappear because it is real, and it tends to end up only in our gun-sights as an imaginary overlaying of an external other, when the signifier ‘enmity’ appears. The earth itself can even seem like the enemy after while, one which like Plato in his Phaedo, we might think then to escape from “as if from a prison”, and especially from “the bonds of the body”, in the hope that we may live one day without the earthly altogether[52]. Following such negations to their logical conclusion, life itself becomes enemy too, for as being made up of the earthly and organic, life could never be free of what it is in essence. And what is the death-drive Freud tells from the start, if not to return us sundry to that dust-bowl of the inorganic; as per that “second death”[53] fantasm Lacan salvages from the Monstre de Sade, which wills to go beyond the destruction of mere beings, by destroying too the principle from which fresh sets could emerge. Such negative devaluations of our earthly, organic life though are really of our own construction: as de Sade, like any pervert, is only the mirror which shows expressed what Platonic-neurotics are but hide inside––a cess-pit of loathing contempt for life, built up from the unconscious and disowned, distorted and damned up, built up, instinctual-ideational elements of their own subjective psyches, phobically ferocious of that Thingly real lying not so dormant, and readying within…¶ But is it now still possible as Nietzsche teaches to say ‘Yes’ to the real of nature both without and within––to return to it!––even though it is more frightful and we are less guaranteed protection of it than the Platonic history of metaphysicians taught? For with the further disclosures of The Ethics of Psychoanalysis––Lacan’s following up and extension of the meta-ethical implications of Freud: perhaps even Nietzsche, our great intellectual übermensch, may too have bitten off more snake-head than he could chew? From certain moments in Nietzsche’s texts we can perhaps interpret that he may have had this Thing in his sights, but saw nothing much to come of it, so instead, elected to turn away, though not without some perhaps hinted at self-amusement.[54]¶ But with psychoanalysis, rightly or wrongly, such truths are out. It doesn’t seem all positive at first, and perhaps it never entirely will. But we must not let this deeper disclosure desist us now from the core Nietzschean project of locating and overcoming the nihilism which begs us to take cover in idealising fictions, as if life as life is not worth living. Not because nihilism and the annihilation of the species is wrong in the sense of being immoral, but rather because it is bad art, mediocre art, and the ‘knowledge’ claims it trumpets on should only make us flare. If we are at our full intellectual and creative will to power, we can only consider such cultural-civil regressions as we saw on display with that whole propaganda comedy that surrounded the war for more oil in Iraq as infantile; the hapless results of sibling rivalries gone too far astray. But we must also resist being caught up in the imaginary of those who would only re-preach to us now of a return to the Good, who would only redeploy such versions of nihilism’s precursory defensive fictions, the pernicious ones, which would only then re-falsify our data, and leave us disappointed when the truth then re-emerges. Doing more harm than good does Platonism in the end by leaving us untrained for the real, with the habit instead to take some truth as ‘error’, and error as ‘truth’––as ‘real’––to the point even of epistemic dysfunction. Take the grotesque intellectual poverty of that whole Christian middle-ages for example, whence put into relation with the heights of Aristotle and his fellow Greeks, as Augustine and Aquinas amplified some of the worst bits of Platonism, and threw the rest into abyss.¶ The overcoming of the moralising good of Christian-Platonism though does by no means imply then a subsequent affirmation of all that brutal Roman like greed, slavery, decadence, circus-bread corruption and mindless colonial expansion that we’ve heard all about, and are hardly so free of with our corporate today––just ask a Latin-American for instance55] For it is possible within the perspectives opened up by Nietzsche, Freud, Lacan, as Silvia Ons puts it, to view a social-historical or individual neurosis of any kind: including the expressed acted-out, perverse-sadistic form that escapes when the Good is temporarily loosed of its repressive grip––and say to the would be Platonist: ‘No, not that, that’s not a cure, that’s a mirage; that’s sheer fantasy, resentment, spite; that’s not a cure it will only make things worse; worse in a different way, but worse nonetheless!’¶ By greater mindfulness then, with guided affirmation towards even that fearsome Freudian Thing that The Ethics of Psychoanalysis has us find now in our inner natures: we can eventually again say ‘Yes’-to-life in such the way that it overcomes the nihilism of not caring too much whether we as individuals or species live or die, whether we as culture or civilisation advance or decline. But we can only do this with fullest efficacy by freeing ourselves of all that wasted neurosis sickness that feels it must deny our Thing like aspect of the real: because from all those Christian-Platonic prejudices of the Good, it has been taught that such ‘things’ are too far beneath it. We must continue instead to train ourselves to stare the real directly in the face, without flinching, and that’s all we can do at least to start. For unless we can continue to utilise, sublimate, enjoy and get a positive, well-guided jouissance out of all aspects of life––including that Freudian Ding in our real––then the chances are we’re going to be at least in part, happy enough in no longer living it: offering not even a puff of genuine political praxis! We either face up to the death-drive snaking long beneath the dank, hidden history of the un-real, anti-real Good of Platonism––or let the disowned, un-understood drive resurge of its own volition until it accidentally finishes us!

#### Vote negative to embrace the lack – this requires being open to the anxiety that occurs from an encounter with the other and breaks down fantasy and drives.

McGowan 13 Todd McGowan, 2013, “Enjoying What We Don’t Have: The Political Project of Psychoanalysis,” University of Nebraska Press/Lincoln and London, SJBE

The alternative — the ethical path that psychoanalysis identifies — demands an embrace of the anxiety that stems from the encounter with the enjoying other. If there is a certain ethical dimension to anxiety, it lies in the rela- tionship that exists between anxiety and enjoyment. Contra Heidegger, the ethics of anxiety does not stem from anxiety’s relation to absence but from its relation to presence — to the overwhelming presence of the other’s enjoyment. In some sense, the encounter with absence or nothing is easier than the encounter with presence. Even though it traumatizes us, absence allows us to constitute ourselves as desiring subjects. Rather than producing anxiety, absence leads the subject out of anxiety into desire. Confronted with the lost object as a structuring absence, the subject is able to embark on the pursuit of the enjoyment embodied by this object, and this pursuit provides the subject with a clear sense of direction and even meaning. This is precisely what the subject lacks when it does not encounter a lack in the symbolic structure. When the subject encounters enjoyment at the point where it should encounter the absence of enjoyment, anxiety overwhelms the subject. In this situation, the subject cannot constitute itself along the path of desire. It lacks the lack — the absence — that would provide the space through which desire could develop. Consequently, this subject confronts the enjoying other and experiences anxiety. Unlike the subject of desire — or the subject of Heideggerean anxiety — the subject who suffers this sort of anxiety actually experiences the other in its real dimension.¶ The real other is the other caught up in its obscene enjoyment, caught up in this enjoyment in a way that intrudes on the subject. There is no safe distance from this enjoyment, and one cannot simply avoid it. There is nowhere in the contemporary world to hide from it. As a result, the contem- porary subject is necessarily a subject haunted by anxiety triggered by the omnipresent enjoyment of the other. And yet, this enjoyment offers us an ethical possibility. As Slavoj Žižek puts it, “It is this excessive and intrusive jouissance that we should learn to tolerate.”27 When we tolerate the other’s “excessive and intrusive jouissance” and when we endure the anxiety that it produces, we acknowledge and sustain the other in its real dimension.¶ Tolerance is the ethical watchword of our epoch. However, the problem with contemporary tolerance is its insistence on tolerating the other only insofar as the other cedes its enjoyment and accepts the prevailing symbolic structure. That is to say, we readily tolerate the other in its symbolic dimen- sion, the other that plays by the rules of our game. This type of tolerance allows the subject to feel good about itself and to sustain its symbolic identity. The problem is that, at the same time, it destroys what is in the other more than the other — the particular way that the other enjoys.¶ It is only the encounter with the other in its real dimension — the encounter that produces anxiety in the subject — that sustains that which defines the other as such. Authentic tolerance tolerates the real other, not simply the other as mediated through a symbolic structure. In this sense, it involves the experience of anxiety on the part of the subject. This is a difficult posi- tion to sustain, as it involves enduring the “whole opaque weight of alien enjoyment on your chest.”The obscene enjoyment of the other bombards the authentically tolerant subject, but this subject does not retreat from the anxiety that this enjoyment produces. If the embrace of the anxiety that accompanies the other’s proximate enjoyment represents the ethical position today, this does not necessarily provide us with an incentive for occupying it. Who wants to be ethical when it involves enduring anxiety rather than finding a way — a drug, a new authority, or something — to alleviate it? What good does it do to sustain oneself in anxiety? In fact, anxiety does the subject no good at all, which is why it offers the subject the possibility of enjoyment. When the subject encounters the other’s enjoyment, this is the form that its own enjoyment takes as well. To endure the anxiety caused by the other’s enjoyment is to experience one’s own simultaneously. As Lacan points out, when it comes to the enjoyment of the other and my own enjoyment, “nothing indicates they are distinct.” Thus, not only is anxiety an ethical position, it is also the key to embracing the experience of enjoyment. To reject the experience of anxiety is to flee one’s own enjoyment.¶ The notion that the other’s enjoyment is also our own enjoyment seems at first glance difficult to accept. Few people enjoy themselves when they hear someone else screaming profanities in the workplace or when they see a couple passionately kissing in public, to take just two examples. In these instances, we tend to recoil at the inappropriateness of the activity rather than enjoy it, and this reaction seems completely justified. The public display of enjoyment violates the social pact with its intrusiveness; it doesn’t let us alone but assaults our senses. It violates the implicit agreement of the public sphere constituted as an enjoyment-free zone. And yet, recoiling from the other’s enjoyment deprives us of our own.¶ How we comport ourselves in relation to the other’s enjoyment indi- cates our relationship to our own. What bothers us about the other — the disturbance that the other’s enjoyment creates in our existence — is our own mode of enjoying. If we did not derive enjoyment from the other’s enjoyment, witnessing it would not bother us psychically. We would sim- ply be indifferent to it and focused on our own concerns. Of course, we might ask an offending car radio listener to turn the radio down so that we wouldn’t have to hear the unwanted music, but we would not experience the mere exhibition of alien enjoyment through the playing of that music as an affront. The very fact that the other’s enjoyment captures our attention demonstrates our intimate — or extimate — relation to it. This relation becomes even clearer when we consider the epistemo- logical status of the enjoying other. Because the real or enjoying other is irreducible to any observable identity, we have no way of knowing whether or not the other really is enjoying. A stream of profanity may be the result of someone hurting a toe. The person playing the car radio too loud while sitting at the traffic light may have simply forgotten to turn down the radio after driving on the highway. Or the person may have difficulty hearing. The couple’s amorous behavior in public may reflect an absence of enjoyment in their relationship that they are trying to hide from both themselves and the public.¶ Considering the enjoyment of the other, we never know whether it is there or not. If we experience it, we do so through the lens of our own fantasy. We fantasize that the person blasting the radio is caught up in the enjoyment of the music to the exclusion of everything else; we fantasize that the public kisses of the couple suggest an enjoyment that has no concern for the outside world. Without the fantasy frame, the enjoying other would never appear within our experience.¶ The role of the fantasy frame for accessing the enjoying other becomes apparent within Fascist ideology. Fascism posits an internal enemy — the figure of the Jew or some analogue — that enjoys illicitly at the expense of the social body as a whole. By attempting to eliminate the enjoying other, Fascism hopes to create a pure social body bereft of any stain of enjoy- ment. This purity would allow for the ultimate enjoyment, but it would be completely licit. This hope for a future society free of any stain is not where Fascism’s true enjoyment lies, however. Fascists experience their own enjoyment through the enjoying other that they persecute. The enjoy- ment that the figure of the Jew embodies is the Fascists’ own enjoyment, though they cannot avow it as their own. More than any other social form, Fascism is founded on the disavowal of enjoyment — the attempt to enjoy while keeping enjoyment at arm’s length. But this effort is not confined to Fascism; it predominates everywhere, because no subjects anywhere can simply feel comfortable with their own mode of enjoying.¶ The very structure of enjoyment is such that we cannot experience it directly: when we experience enjoyment, we don’t have it; it has us. We experience our own enjoyment as an assault coming from the outside that dominates our conscious intentions. This is why we must fantasize our own enjoyment through the enjoying other. Compelled by our enjoyment, we can’t do otherwise; we act against our self-interest and against our own good. Enjoyment overwhelms the subject, even though the subject’s mode of enjoying marks what is most singular about the subject.¶ Even though the encounter with the enjoying other apprehends the real other through the apparatus of fantasy, this encounter is nonetheless genuine and has an ethical status. Unlike the experience of the nonexistent symbolic identity, which closes down the space in which the real other might appear, the fantasized encounter with the enjoying other leaves this space open. By allowing itself to be disturbed by the other on the level of fantasy, the subject acknowledges the singularity of the real other — its mode of enjoying — without confining this singularity to a prescribed identity.¶ The implications of privileging the encounter with the disturbing enjoy- ment of the real other over the assimilable symbolic identity are themselves disturbing. The tolerant attitude that never allows itself to be jarred by the enjoying other becomes, according to this way of seeing things, further from really encountering the real other than the attitude of hate and mis- trust. The liberal subject who welcomes illegal immigrants as fellow citizens completely shuts down the space for the other in the real. The immigrant as fellow citizen is not the real other. The xenophobic conservative, on the other hand, constructs a fantasy that envisions the illegal immigrant awash in a linguistic and cultural enjoyment that excludes natives. This fantasy, paradoxically, permits an encounter with the real other that liberal tolerance forecloses. Of course, xenophobes retreat from this encounter and from their own enjoyment, but they do have an experience of it that liberals do not. The tolerant liberal is open to the other but eliminates the otherness, while the xenophobic conservative is closed to the other but allows for the otherness. The ethical position thus involves sustaining the liberal’s toler- ance within the conservative’s encounter with the real other.

## 2

#### Interpretation: Affirmatives must not defend the implementation of an action.

#### Resolved in context of the resolution is a statement of value.

UPitt n.d. – University Of Pittsburgh Communications Services Webteam, copyright 2015-21, "Basic Definitions," Department of Communication , <https://www.comm.pitt.edu/basic-definitions> CHO

Affirmative/Pro. The side that “affirms” the resolution (is “pro” the issue). For example, the affirmative side in a debate using the resolution of policy, Resolved: The United States federal government should implement a poverty reduction program for its citizens, would advocate for federal government implementation of a poverty reduction program. Argument. A statement, or claim, followed by a justification, or warrant. Justifications are responses to challenges, often linked by the word “because.” Example: The sun helps people, because the sun activates photosynthesis in plants, which produce oxygen so people can breathe. Constructive Speech. The first speeches in a debate, where the debaters “construct” their cases by presenting initial positions and arguments. Cross-examination. Question and answer sessions between debaters. Debate. A deliberative exercise characterized by formal procedures of argumentation, involving a set resolution to be debated, distinct times for debaters to speak, and a regulated order of speeches given. Evidence. Supporting materials for arguments. Standards for evidence are field-specific. Evidence can range from personal testimony, statistical evidence, research findings, to other published sources. Quotations drawn from journals, books, newspapers, and other audio-visuals sources are rather common. Negative/Con. The side that “negates” the resolution (is “con” the issue). For example, the negative side in a debate using the resolution of fact, Resolved: Global warming threatens agricultural production, would argue that global warming does not threaten agricultural production. Preparation Time. Debates often necessitate time between speeches for students to gather their thoughts and consider their opponent's arguments. This preparation is generally a set period of time and can be used at any time by either side at the conclusion of a speech. Rebuttal Speech. The last speeches in a debate, where debaters summarize arguments and draw conclusions about the debate. Resolution. A specific statement or question up for debate. Resolutions usually appear as statements of policy, fact or value. Statement of policy. Involves an actor (local, national, or global) with power to decide a course of action. For example, Resolved: The United States federal government should implement a poverty reduction program for its citizens. Statement of fact. Involves a dispute about empirical phenomenon. For example, Resolved: Global warming threatens agricultural production. Statement of value. Involves conflicting moral dilemmas. For example, Resolved: The death penalty is a justified method of punishment. Topic. A general issue to debate. Topics could be “The Civil War,” “genetic engineering,” or “Great Books.”

#### “Is” is a linking verb – no implementation since it’s a description.

GM n.d. – “Linking Verbs," Grammar Monster, <https://www.grammar-monster.com/glossary/linking_verbs.htm> CHO

What Are Linking Verbs? (with Examples) A linking verb is used to re-identify or to describe its subject. A linking verb is called a linking verb because it links the subject to a subject complement (see graphic below). Infographic Explaining Linking Verb A linking verb tells us what the subject is, not what the subject is doing. Easy Examples of Linking Verbs In each example, the linking verb is highlighted and the subject is bold. Alan is a vampire. (Here, the subject is re-identified as a vampire.) Alan is thirsty. (Here, the subject is described as thirsty.)

#### Violation: they defend a ban.

#### Negate for limits and ground – justifies infinite unpredictable advantages which overstretches research spiking generics. Precision outweighs – non-topical affs violate tournament rules so the judge doesn’t have the jurisdiction to vote on them and it controls the internal to pragmatic offense in a question of models.

#### TVA – read a whole res phil aff – creates better ethics and critical thinking and outweighs on uniqueness – switching to policy solves your offense.

#### Drop the debater to deter future abuse.

#### CI- Reasonability is arbitrary and we don’t know the brightline while prepping. Collapses since it uses an offense/defense paradigm to win it.

#### No RVIs- A] Illogical- you don’t win for being fair B] Encourages baiting theory which proliferates abuse C] Chills checking abuse for fear of the RVI

#### DTA on 1AR shells – they can blow up blippy shells in the 2AR but I split time and can’t preempt the 2AR causing intervention making it irresolvable so don’t drop me

#### Reasonability on 1AR shells – 1AR theory is aff-biased because the 2AR gets to line-by-line with new answers

#### Time skews not a voter

#### Condo’s k2 neg flex since we test the aff from multiple angles. We’d always lose if they stuck us with a straight turn that is all of the 1ar which also answers pics bad

## 3

#### Interpretation: Debaters must disclose all constructive positions on open source with highlighting on the 2021-22 NDCA LD wiki after the round in which they read them.

#### Violation – No TOC rounds and Alta Round 4

![Table

Description automatically generated

#### Solves accessibility

Overing 18 – Bob Overing, LD Scholar (“Holiday Disclosure Post #6 – 10 Things Edition” JANUARY 12, 2018. http://www.premierdebate.com/disclosure-post-6/)

**Open source improves on usual disclosure practices** in the obvious way – **you can read their evidence for better prep**aration – and in a number of smaller ways too. **It solves the analytics problem** I discussed above, **so round-altering uncarded arguments are available** (though this doesn’t really apply to Harvard-Westlake), **and it gives access to evidence from paywalled articles**. **Every season I coach debaters who lack access to major databases; for schools without robust online library offerings or teams without college coaches, this matters a lot**.

#### 2] Evidence ethics – open source is the only way to verify pre-round that cards aren’t miscut or highlighted or bracketed unethically. That’s a voter – maintaining ethical ev practices is key to being good academics and we should be able to verify you didn’t cheat. Not disclosing certain rounds because they’re lay incentivizes lying by calling everything lay and doesn’t solve our offense since those cards can still be evidence ethics and read against other people.

## 4

#### CP: The appropriation of outer space through lunar mining by private entities should be banned except for the appropriation of lunar heritage sites in the Sea of Tranquility by helium-3 mining. States ought to clarify that the lunar mining of helium-3 is permissible under the Outer Space Treaty by adding an optional protocol under Article II.

#### Tranquility mining is key – it has the highest known density of He-3.

O’Reilly 16 LUNAR EXPLORATION FOR HE-3 Bryan O’Reilly The Ohio State University 2016 <https://core.ac.uk/download/pdf/159567253.pdf> SM

* Mare Tranquillitatis = science word for Sea of Tranquility

Schmitt (2006) summarized initial research on the exploration for lunar He-3 that identified potential areas of high He-3 concentration. Mare Tranquillitatis, for example, is considered a particularly attractive site for a manned lunar base and the mining of lunar He-3. This site also holds Fe, Ti, and other minerals important for cost-effective, on-site production of construction materials and O2 from mineralized oxygen. In siting a manned lunar base, water may be extracted atomically bound OH- and lunar ice, and other issues that need to be addressed in choosing a manned lunar base.

The present research study further tests the recommended locations (e.g. Mare Tranquillitatis) of high He-3 concentrations. In particular, the utility of satellite-based Gamma Ray Spectrometers (GRS) is investigated to indirectly map He-3 abundances in terms of the surficial abundances of gamma-radiating elements like titanium, oxygen and iron that reflect distributions of lunar ilmenite (e.g., Hasebe et al., 2008). In addition, satellite microwave measurements may be used to estimate regolith thickness, maturity, and dielectric constants to help map out He-3 concentrations and other lunar mineral deposits (Wang, 2010).

Satellite remote sensing data from past lunar missions are used to estimate TiO2 and hydrogen concentrations, and the solar wind flux over the crust to identify lunar He-3 prospects. These results may help constrain the fiscal and technological viability of mining lunar He-3.

Current uses of helium-3 far outpace its supply and production on Earth. This shortage is detrimental to areas ranging from national security to important physics and medical research. The growing decrease of He-3 stores also drastically limits efforts to make He-3-D fusion a realistic energy source. However, the growing demand may well be satisfied with the He-3 concentrations hosted within the regolith of our closest celestial neighbor, the Moon. Indeed, the mining of He-3 on the Moon is an imminent, if not the next, giant leap for space exploration (Schmitt, 2006).

Elements of this research were presented at the fall’15 Undergraduate Student Poster Forum and the spring’16 Denman Undergraduate Research Forum of The Ohio State University. Further aspects of this research were presented at the annual conferences of the Geologic Society of America (O’Reilly and von Frese, 2015) and NASA’s Lunar and Planetary Institute (O’Reilly and von Frese, 2016).

METHODS

National Aeronautics and Space Administration (NASA) data collection

The elemental abundance data for this research were collected from NASA’s publicly available Planetary Data System (PDS) Geoscience Node. Specifically, the data were observed by the Lunar Prospector (LP) mission’s gamma ray and neutron spectrometer tools and processed by the LP Spectrometer Team as part of a NASA Lunar Data Analysis Program. Elemental abundances of Ti were derived from LP gamma ray spectrometer (Feldman et al., 1999) observations acquired during the high-altitude portion of the LP mission. For the Ti distribution, the data are given in units of elemental weight percent (Prettyman et al., 2002). The half-degree hydrogen abundances came from the LP neutron spectrometer epithermal neutron data that had been corrected by the thermal neutron data (Feldman et al., 2001). Equations 3 and 4 of Feldman et al. (2001) show how the corrected epithermal data were converted into hydrogen abundances as parts per million (ppm). Note, however, that these abundances can be unreliable in regions of high thorium and rare-Earth element abundances (Maurice et al., 2004).

In general, using the above method yields an average ±1.7 wt% uncertainty in the TiO2 estimates (Elphic et al., 2002). Estimates from areas with higher levels of TiO2 are considered to be more reliable than those from lower TiO2 areas. Uncertainties in H estimates are typically less than 1% over latitudes ±70° and increase significantly towards the poles (Feldman et al., 2001). Estimates of H taken from large lunar craters in the South Pole showed uncertainties averaging around 50% (Feldman et al., 2001).

Modeling

The raw elemental abundance data were converted from the original ASCII files to Microsoft Excel through the “paste special” tool for import into MATLAB. Once imported, the data were processed by the scripts in Appendix A to produce various lunar abundance maps. The script in Figure A1 produces contour maps of the elemental data on the lunar near and far sides using the M\_Map MATLAB mapping package (Pawlowicz 2014). This script uses the sinusoidal map projection to produce equal-area representations of the abundance data.

The script in Figure A2 produces stereographic projections of abundances in the lunar polar regions. Equation 1 (Fa and Ya-Qiu, 2007) was used to estimate crustal exposure to solar wind flux as a percentage in terms of lunar longitude (θ) and latitude (Φ) in degrees, and the constant flux (F0) at a subsolar point. Here, f represents the amount of time the lunar surface is fully shielded from solar winds by Earth’s magnetotail in the span of 28 days (one orbital period). To produce the normalized solar wind flux, the model assumed F0 = 0.5, and f = 0.25 based on the amount of time the moon is in the magnetotail. Equation 1 was implemented by the MATLAB script in Figure A3 to produce a contour map (Figure 2) of the lunar near and far side exposures in percent of the maximum solar wind flux over a single lunar orbital period. These maps in the sinusoidal map projection were obtained using the previously cited M\_map mapping package.

𝟐 + 𝒔𝒊𝒏(𝜽 − 𝒇𝝅) − 𝒔𝒊𝒏(𝜽 + 𝒇𝝅), |𝜽| ≤ 𝝅(. 𝟓 − 𝒇) 1) 𝑭(𝜱,𝜽)=𝑭𝟎𝒄𝒐𝒔(𝜱)∗{𝟏+𝒔𝒊𝒏(|𝜽|−𝒇𝝅),𝝅(𝟎.𝟓−𝒇)≤|𝜽|≤𝝅(.𝟓+𝒇)

𝟐, 𝝅(. 𝟓 + 𝒇) ≤ |𝜽| ≤ 𝝅

RESULTS

Solar Flux

Figure 2 shows that the Moon’s orbit around Earth largely affects the intensity of solar exposure on its surface, with the near side receiving significantly lower exposure than the far side. This is due to Earth’s magnetosphere which, during a full Moon when the near side is facing the Sun, rests within Earth’s magnetotail shielded from solar radiation.

[Figure omitted] Figure 2. Solar flux as a percent of solar wind flux exposure per lunar cycle for the near (top) and far (bottom) sides of the lunar surface between 65°S - 65°N.

Titanium Distribution

The distribution of Ti correlates with large impact events (Schmitt, 2006), and thus the highest Ti concentrations are within the maria of the lunar near side (Figure 3). Mare Tranquillitatis, in particular, appears to have the highest overall concentration. On the moon, Ti occurs as the mineral ilmenite (FeTiO3) with the crystal structure that locks in the small He-3 atoms. The blank strip surrounding 180°E in Figure 3 reflects a no-data area due to lack of orbital coverage by the satellite (Feldman et al., 1999).

Diurnal Heating

Areas within ±60 ̊ latitudes experience large average daily temperature shifts. The Apollo 15 site (26.13224 N, 3.63400 E), for example, underwent a shift from 374 ̊K to 92 ̊K (Heiken et al., 1991). The areas around the poles typically stay within 10 ̊ of 115 ̊K with even smaller variations in permanently shadowed craters (Vasavada et al., 1999). Volatiles are essentially baked out of the regolith when subjected to these extreme temperature changes (Cocks, 2010).

Polar Migration

After volatiles are released from the lunar regolith, they are either redeposited on the lunar surface or released into space (Cocks 2010). Figure 4 shows the increase of hydrogen around the poles compared to lower longitudes. This measurable increase is attributed to permanently shadowed craters, which prevent massive temperature fluctuations and provide shielding from micrometeoroids. The blank strips surrounding 180°E in Figure 4 reflect areas with no data due to lack of orbital coverage by the satellite (Feldman et al., 1999).

Wt. %

AR = (5.6, 0) ASD = 0.8929 AM = 0.6560 CI = 0.5

[Figure omitted] Figure 3. Weight percent Ti distribution for the near (top) and far (bottom) sides of the lunar surface from 65°S - 65°N. Mare Tranquillitatis is highlighted (8.5°N, 31.4°E) as an area of high Ti. Map statistics include the amplitude range (AR) of (max, min) values, amplitude standard deviation (ASD), amplitude mean (AM), and contour interval (CI) in weight %.

AR = (169.01, 0.0215) ASD = 23.04

AM = 57.06

CI = 20

ppm

[Figure omitted] Figure 4. Volatile hydrogen concentrations in ppm for the lunar north pole (top left) from 90°N - 65°N, south pole (top right) from 90°S - 65°S, and the far side (bottom) from 90°W - 90°E and from 65°S - 65°N of the lunar surface. Map statistics include amplitude range (AR) of (max, min) values, amplitude standard deviation (ASD), amplitude mean (AM), and contour interval (CI) in ppm.

DISCUSSION

The data above contain implications for the search for large concentrations of He-3. The only method for deposition of He-3 is through exposure of the regolith to solar radiation carrying the isotope. Figure 5 shows the geometry of the Moon’s exposure to solar radiation over a single orbital period (28 days). Accordingly, most of this exposure occurs on the far side of the Moon when it is between the Sun and Earth outside the magnetosphere.

In general, the areas of high solar exposure are also subject to extreme diurnal

[Figure omitted] Figure 5. A 2-D geometric rendering of the relationship between the Sun (orange), Earth (large circle), and the moon (small circle) throughout a lunar orbital period. The moon is positioned outside the magnetosphere (green dashed line) during a new moon exposing the far side (light blue). The moon is positioned inside the protective magnetotail (red dashed line) during a full moon preventing exposure of the near side (dark blue).

temperature fluctuations. During the lunar orbital period, these drastic temperature changes will occur due to the prolonged exposure or protection from solar radiation causing the deposited volatiles to leave the regolith and possibly be re-ionized and –deposited onto the lunar surface (Cocks, 2010). This implies that many of the volatiles initially deposited by solar wind exposure do not remain stably in place. The distribution of hydrogen measured in Figure 4 suggests that the volatiles in general may be concentrated around the poles.

Much like hydrogen, He-3 is also deposited in the regolith through solar wind. However, exposing these elements to extreme temperature shifts causes them to vaporize and leave the lunar surface. Some of these volatiles are re-ionized due to subsequent solar wind exposure and possibly deposited again near the poles where they are better protected from temperature changes (Cocks, 2010). This mechanism could help explain the larger polar accumulations of volatiles.

The lunar polar regions offer protection from extreme temperature variations, which also may be provided by the presence of permanently shadowed craters. These craters not only protect volatiles from vaporizing out of the regolith, but they also shield the regolith from micrometeorite impacts that disturb the surface encouraging the further release of volatiles. These polar regions are estimated by the Lunar Prospector team (Schmitt, 2000) to contain roughly 5 to 15 times more hydrogen. Figure 6 shows an example of the permanently shadowed Shackleton crater.

[Figure omitted] Figure 6. The Shackleton crater located near the South Pole, where the colors indicate the percentage of time illuminated during a single lunar orbital period. The rim of the crater contains zero (white) and near zero illumination values which identify it as a permanently shadowed crater (Zuber et al., 2012).

Another important aspect to consider is the relationship between titanium (Ti) and He-3. The majority of Ti on the Moon appears in the form of ilmenite (FeTiO3). Tests done on lunar ilmenite, olivine, pyroxene, and plagioclase show that for grains in the same size range from the same soil, ilmenite (FeTiO3) contains 10 to 100 more times as much He-3 (Fa and Ya-Qiu, 2007). The structure of ilmenite, seen in Figure 7, is better able to hold onto the small He-3 ions when subjected to extreme conditions. This suggests that He-3 is more protected from the effects of massive temperature shifts than other volatiles when high concentrations of Ti are present. Figure 3 shows that most of the Ti on the Moon appears in the large impact craters of the nearside.

[Figure omitted] Figure 7. The crystal structure of Ilmenite. The alternating layers of Fe and Ti along with the rhombohedral shape shown above allow for tighter confinement of loose He-3 ions (Ribeiro and Lazaro, 2014).

With all of these factors considered, two areas of particular interest are suggested for holding large concentrations of He-3. They include Mare Tranquillitatis (8.5 ̊N 31.4 ̊E) that has the highest concentration of Ti on the lunar surface, and thus also possible large He-3 stores. The second area of interest is the South Pole Aitken basin with large permanently shadowed craters that enhance its ability to hold volatiles like He-3 through diurnal heating shifts over the lunar orbital period. These permanently shadowed craters would protect the volatiles from temperature shifts and the regolith from being disturbed by micrometeorite impacts.

CONCLUSIONS

Lunar resource development is an extensive and expensive effort, however, this study seeks to introduce the need to explore for these resources. This study examined the shortage of available He-3 and the affected industries. Hopes in the distant future for clean fusion energy also rest on access to this valuable resource. As U.S. stockpiles diminish and demand continues, the economic incentive for the acquisition of He-3 deposits on the moon becomes an increasingly attractive option.

The objective of this study was to use available satellite data to estimate possible locations of large lunar He-3 deposits. From the analysis of NASA’s satellite gamma ray data, two areas were targeted for possibly holding large concentrations of He-3. Specifically, Mare Tranquillitatis was identified as holding enhanced ilmenite concentrations and other elements that would be essential in any mining mission. The South Pole Aitken basin was also targeted due to its large permanently shadowed areas that enhance its ability to hold volatiles and prevent their migration due to diurnal heating. In general, these results are also consistent with previous lunar site recommendations for locating large He-3 concentrations (e.g. Schmitt, 2006).

#### Only mining at Tranquility sites is economically feasible and profitable – it’s the only location with enough data to be categorized as a measured resource.

Schmidt 06 “Return to the Moon exploration, enterprise, and energy in the human settlement of space” Harrison Schmidt [an American geologist, retired NASA astronaut, university professor, former U.S. senator from New Mexico, and the most recent person living, and only civilian to have walked on the Moon. Schmitt is the last surviving crew member of Apollo 17] <https://www.amazon.com/Return-Moon-Exploration-Enterprise-Settlement/dp/0387242856> SM

Economic geologists — who study the value, quantity, and origin of mineral deposits — use the terms "measured," "indicated," and "inferred" to distinguish resources that are at decreasing levels of certainty in terms of available tonnage at a specified value (see Figure 6.4).87 Exploration, drilling, and sample analysis, or other direct means, have delineated "measured reserves" to the extent that further investments of capital for actual production are warranted. Of course, such investments only will be made if the value and tonnage, or volume, make economic sense in the time frame that the resource can be sold in a forecasted market. "Indicated resources" have enough geological definition to be included in long-term mine planning but will require additional investment in quantitative exploration before they can become defined as measured resources ready for production. "Inferred resources" are based on geological inference but are too speculative to be included in planning until further exploration takes place.

The current economic and geological position of lunar helium-3 in the titanium-rich portions of Mare Tranquillitatis is shown in Figure 6.4. Relative to the figure, upward, positive economic change in lunar helium-3 will be determined by increases in the cost of alternative sources of terrestrial energy, particularly coal. Downward, negative economic change would be caused by higher than anticipated lunar development costs. Increases in geological certainty could arise from direct sensing of helium-3 from orbital spacecraft; however, it definitely will come from detailed mapping and the fusion of all pertinent geochemical and geotechnical data prior to mining.

The first consideration an economic geologist makes relative to a potential resource must involve its estimated value, against which the costs of production can be weighed. What is the likely price per unit that can be realized in the marketplace at the point in the future when the production operations begin? The value of lunar helium-3 for fusion electrical power plants on Earth will be a function of the demand and supply of competitive energy sources. As already discussed in the previous chapter (Section 5.3), helium-3 will be in direct future competition with steam coal for power generation. Forecasting coal prices in the 2010-2015 time frame will be important to evaluating the competitive value of lunar helium-3. Prices for thermal or steam coal in Asia (4% of world demand, rising at 10% annually) have begun to rise rapidly, up 70-80% in 2004.88 In fact, some analysts expect steam coal to reach and hold over $2.50/million BTU in 2005.89 Spot prices have approached $2.00 in the United States for the eastern stoker coal in 2004.9° Therefore, forecasting coal prices of at least $2.50/million BTU, appears to be a reasonable planning assumption for 2010-2015.9' This gives a conservative estimate that the energy equivalent value of 100 kg of helium-3 in 2010-2015 would be about $140 million.

6.3.2 Mining analysis With this value of $140 million 100 kg in mind, how much helium-3 is reasonably available in the richest (highest grade or concentration) known portions of the lunar regolith? Working with the Wisconsin Fusion Technology Institute team in the 1980s, the late Professor Eugene Cameron,92 one of the world's foremost economic geologists, made the

[Figure omitted] FIGURE 6.4 Current position of lunar helium-3 in titanium-rich portions of Mare Tranquillitatis relative to demonstrated economic potential. (Graphic background courtesy of P. J. Brown, University of Wisconsin—Madison)

first estimates of the quantities of helium-3 expected to be present in titanium-rich regolith on the Moon. Cameron, using available spectro-scopic data on titanium concentration as discussed in Section 6.2.3, determined that the highest grade area for helium-3 totaled about 84,000 km2 and another 195,000 km2 of medium grade concentrations all within Mare Tranquillitatis.

#### Helium-3 fusion possible now—Solves warming and energy infrastructure reliability

**Whittington 21** (Mark, contributor to the Hill. “Solving the climate and energy crises: Mine the Moon's helium-3?”<https://thehill.com/opinion/technology/540856-solving-the-climate-and-energy-crises-mine-the-moons-helium-3> February 28, 2021)DR 22

Solar System Resources has agreed to provide 500 kilograms of helium-3 mined from the Moon to U.S. Nuclear Corp. in the 2028-2032 timeframe.

According to [a paper](https://mdcampbell.com/Helium-3version2.pdf) published by Jeff Bonde and Anthony Tortorello, helium-3 is an isotope that has been deposited in lunar soil over billions of years by solar wind. Roughly 1.1 million metric tons of the isotope exists on the Moon down to a depth of several meters. Twenty-five metric tons of helium-3, about a quarter of the cargo capacity of a SpaceX Starship, would suffice to fuel all the power needs of the United States for a year.

The announcement does not reveal how Solar System Resource proposes to mine the helium-3. The company’s website is very heavy on breathtakingly inspirational verbiage and light on how it intends to raise the money and develop the technology to mine the solar system’s resources. However, the paper suggests that a rover could scoop up lunar regolith, separate helium-3 along with oxygen and hydrogen, store them and eject the processed lunar soil. The gasses would be taken back to a lunar base where the oxygen and hydrogen would be put to good use and the helium-3 stored for later export to Earth.

The announcement also does not reveal what U.S. Nuclear Corp. intends to do with the helium-3 once it takes delivery. The company, which builds radiation detection devices, has a subsidiary, [Magneto-Inertial Fusion Technology, Inc.,](https://www.usnuclearcorp.com/magneto-inertial-fusion-technologies/) that is researching a fusion technology called [staged Z-pinch.](https://arpa-e.energy.gov/sites/default/files/04_WESSEL.pdf) This would create a fusion reaction long enough and sustained enough to become a power source. Presumably, an abundant store of helium-3 could be an asset for those experiments.

Fusion using helium-3 has advantages and disadvantages over using deuterium, an isotope of hydrogen and tritium, another isotope of hydrogen.

Deuterium and tritium fusion releases radioactive neutrons that will damage and weaken the containment vessel. Periodically, a fusion reactor using this method would have to be taken offline for decontamination. Tritium is also radioactive, making its handling difficult and dangerous. A deuterium and helium-3 fusion creates helium and charged protons as byproducts and few or no radioactive particles.

The main disadvantage of fusion using helium-3 is that it would take a far greater amount of energy to achieve it than the conventional deuterium and tritium variety. According to [Open Mind,](https://www.bbvaopenmind.com/en/science/physics/helium-3-lunar-gold-fever/#:~:text=In%201986%2C%20scientists%20at%20the,produce%20energy%20by%20nuclear%20fusion.) Frank Close, a physicist at the University of Oxford, regards fusion using helium-3 as “moonshine.” Close suggests that a deuterium and helium-3 fusion will still produce some radioactive neutrons.

Gerald Kulcinski, director of the [Fusion Technology Institute](https://fti.neep.wisc.edu/fti.neep.wisc.edu/index.html) at the University of Wisconsin at Madison, disagrees. Close’s objection is based on using conventional fusion technology. The Fusion Technology Institute has achieved some progress in minimizing radioactive neutron production using different technology.

#### Extinction from energy collapse – turns the case and solves “flashpoints”

Greene 19 [Sherrell R. Greene Mr. Greene received his B.S. and M.S. degrees in Nuclear Engineering from the University of Tennessee. He is a recognized subject matter expert in nuclear reactor safety, nuclear fuel cycle technologies, and advanced reactor concept development. Mr. Greene is widely acclaimed for his systems analysis, team building, innovation, knowledge organization, presentation, and technical communication skills. Mr. Greene worked at the Oak Ridge National Laboratory (ORNL) for over three decades. During his career at ORNL, he served as Director of Research Reactor Development Programs and Director of Nuclear Technology Programs. . "Enhancing Electric Grid, Critical Infrastructure, and Societal Resilience with Resilient Nuclear Power Plants (rNPPs)." <https://ans.tandfonline.com/doi/pdf/10.1080/00295450.2018.1505357?needAccess=true> edited for ableist language in brackets[]]

Societies and nations are examples of large-scale, complex social-physical systems. Thus, societal resilience can be defined as the ability of a nation, population, or society to anticipate and prepare for major stressors or calamities and then to absorb, adapt to, recover from, and restore normal functions in the wake of such events when they occur. A nation’s dependence on its Critical Infrastructure systems, and the resilience of those systems, are therefore major components of national and societal resilience.

There are a variety of events that could deal ~~crippling~~ [Incapacitating] blows to a nation’s Grid, Critical Infrastructure, and social fabric. The types of catastrophes under consideration here are “very bad day” scenarios that might result from severe GMDs induced by solar CMEs, HEMP attacks, cyber attacks, etc.5

As briefly discussed in Sec. III.C, the probability of a GMD of the magnitude of the 1859 Carrington Event is now believed to be on the order of 1%/year. The Earth narrowly missed (by only several days) intercepting a CME stream in July 2012 that would have created a GMD equal to or larger than the Carrington Event.41 Lloyd’s, in its 2013 report, “Solar Storm Risk to the North American Electric Grid,” 42 stated the following: “A Carrington-level, extreme geomagnetic storm is almost inevitable in the future…The total U.S. population at risk of extended power outage from a Carrington-level storm is between 20-40 million, with durations of 16 days to 1-2 years…The total economic cost for such a scenario is estimated at $0.6-2.6 trillion USD.” Analyses conducted subsequent to the Lloyd’s assessment indicated the geographical area impacted by the CME would be larger than that estimated in Lloyd’s analysis (extending farther northward along the New England coast of the United States and in the state of Minnesota),43 and that the actual consequences of such an event could actually be greater than estimated by Lloyd’s.

Based on “Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack: Critical National Infrastructures” to Congress in 2008 (Ref. 39), a HEMP attack over the Central U.S. could impact virtually the entire North American continent. The consequences of such an event are difficult to quantify with confidence. Experts affiliated with the aforementioned Commission and others familiar with the details of the Commission’s work have stated in Congressional testimony that such an event could “kill up to 90 percent of the national population through starvation, disease, and societal collapse.” 44,45 Most of these consequences are either direct or indirect impacts of the predicted collapse of virtually the entire U.S. Critical Infrastructure system in the wake of the attack.

Last, recent analyses by both the U.S. Department of Energy46 and the U.S. National Academies of Sciences, Engineering, and Medicine47 have concluded that cyber threats to the U.S. Grid from both state-level and substatelevel entities are likely to grow in number and sophistication in the coming years, posing a growing threat to the U.S. Grid.

These three “very bad day” scenarios are not creations of overzealous science fiction writers. A variety of mitigating actions to reduce both the vulnerability and the consequences of these events has been identified, and some are being implemented. However, the fact remains that events such as those described here have the potential to change life as we know it in the United States and other developed nations in the 21st century, whether the events occur individually, or simultaneously, and with or without coordinated physical attacks on Critical Infrastructure assets.

#### Extinction from warming—feedback loops bypass defense

Ng ’19 [Yew-Kwang; May 2019; Professor of Economics at Nanyang Technology University, Fellow of the Academy of Social Sciences in Australia and Member of the Advisory Board at the Global Priorities Institute at Oxford University, Ph.D. in Economics from Sydney University; Global Policy, “Keynote: Global Extinction and Animal Welfare: Two Priorities for Effective Altruism,” vol. 10, no. 2, p. 258-266]

Catastrophic climate change

Though by no means certain, CCC causing global extinction is possible due to interrelated factors of non‐linearity, cascading effects, positive feedbacks, multiplicative factors, critical thresholds and tipping points (e.g. Barnosky and Hadly, [2016](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0005); Belaia et al., [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0008); Buldyrev et al., [2010](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0016); Grainger, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0027); Hansen and Sato, [2012](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0029); IPCC [2014](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0031); Kareiva and Carranza, [2018](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0033); Osmond and Klausmeier, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0056); Rothman, [2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0066); Schuur et al., [2015](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0069); Sims and Finnoff, [2016](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0072); Van Aalst, [2006](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0079)).[7](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-note-1009_67)

A possibly imminent tipping point could be in the form of ‘an abrupt ice sheet collapse [that] could cause a rapid sea level rise’ (Baum et al., [2011](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0006), p. 399). There are many avenues for positive feedback in global warming, including:

* the replacement of an ice sea by a liquid ocean surface from melting reduces the reflection and increases the absorption of sunlight, leading to faster warming;
* the drying of forests from warming increases forest fires and the release of more carbon; and
* higher ocean temperatures may lead to the release of methane trapped under the ocean floor, producing runaway global warming.

Though there are also avenues for negative feedback, the scientific consensus is for an overall net positive feedback (Roe and Baker, [2007](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0065)). Thus, the Global Challenges Foundation ([2017](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0026), p. 25) concludes, ‘The world is currently completely unprepared to envisage, and even less deal with, the consequences of CCC’.

The threat of sea‐level rising from global warming is well known, but there are also other likely and more imminent threats to the survivability of mankind and other living things. For example, Sherwood and Huber ([2010](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0071)) emphasize the adaptability limit to climate change due to heat stress from high environmental wet‐bulb temperature. They show that ‘even modest global warming could … expose large fractions of the [world] population to unprecedented heat stress’ p. 9552 and that with substantial global warming, ‘the area of land rendered uninhabitable by heat stress would dwarf that affected by rising sea level’ p. 9555, making extinction much more likely and the relatively moderate damages estimated by most integrated assessment models unreliably low.

While imminent extinction is very unlikely and may not come for a long time even under business as usual, the main point is that we cannot rule it out. Annan and Hargreaves ([2011](https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/1758-5899.12647#gpol12647-bib-0004), pp. 434–435) may be right that there is ‘an upper 95 per cent probability limit for S [temperature increase] … to lie close to 4°C, and certainly well below 6°C’. However, probabilities of 5 per cent, 0.5 per cent, 0.05 per cent or even 0.005 per cent of excessive warming and the resulting extinction probabilities cannot be ruled out and are unacceptable. Even if there is only a 1 per cent probability that there is a time bomb in the airplane, you probably want to change your flight. Extinction of the whole world is more important to avoid by literally a trillion times.

## Case

#### Fiat is a voting issue:

**[A] The practice of fiat is ludicrous – nothing they say can be methodologically actualized, making it intellectually meaningless and a bad model for debate – vote neg on presumption.**

**Schlag 90** SCHLAG, PROFESSOR OF LAW @ UNIVERSITY OF COLORADO, 90 (PIERRE, STANFORD LAW REVIEW, NOVEMBER) SJCP//JG

In fact, normative legal thought is so much in a hurry that it will tell you what to do even though there is not the slightest chance that you might actually be in a position to do it.  For instance, when was the last time you were in a position to put the difference principle   n31 into effect, or to restructure  \*179  the doctrinal corpus of the first amendment? "In the future, we should. . . ." When was the last time you were in a position to rule whether judges should become pragmatists, efficiency purveyors, civic republicans, or Hercules surrogates?  Normative legal thought doesn't seem overly concerned with such worldly questions about the character and the effectiveness of its own discourse.  It just goes along and proposes, recommends, prescribes, solves, and resolves.  Yet despite its obvious desire to have worldly effects, worldly consequences, normative legal thought remains seemingly unconcerned that for all practical purposes, its only consumers are legal academics and perhaps a few law students -- persons who are virtually never in a position to put any of its wonderful normative advice into effect.

#### [B] Cruel optimism— assumes the ability for an ideal world to actualize, which allows students to generate affective bonds to that world—the inevitable non-actualization of their imagination experiment leaves students in a state of psychosis unable to understand themselves in the world—outweighs on tangibility.

#### Bleiker is bad

#### Extnction is a new link, circular, form over content

#### Interpretation: Affirmatives must defend a policy action, not follow-on or compliance. Utopian fiat—they can say something like “States ought to not go to war” making it impossible to negate. The violation is preemptive.

#### Circumvention – AFF ISN’T BINDING, OPTIONAL PROTOCALS ARE OPTIONAL. THAT MEANS CIRCUMVENTION EACH STATE DECIDES WHETHER TO RATIFY.

Together Scottish Alliance for Children’s Rights, No Date, https://www.togetherscotland.org.uk/about-childrens-rights/un-convention-on-the-rights-of-the-child/optional-protocols/

Human rights treaties are often followed by ‘Optional Protocols’. These set out extra provisions which have been written after the treaty was adopted. **Optional protocols** can be used to:

expand upon the obligations in the original treaty, or

address new and emerging concerns which the treaty does not cover.

**These protocols are ‘optional’ because they are not automatically binding on the states which have ratified the original treaty. It is up to each state to decide whether or not it wants to be bound by an Optional Protocol. If it wants to be bound then it must ratify the Optional Protocol.**

#### Nuclear war now spurs political will for disarmament without causing extinction.

Deudney 18 [Associate Professor of Political Science at Johns Hopkins University. 03/15/2018. “The Great Debate.” The Oxford Handbook of International Security. www.oxfordhandbooks.com, doi:10.1093/oxfordhb/9780198777854.013.22] Recut Justin

Although nuclear war is the oldest of these technogenic threats to civilization and human survival, and although important steps to restraint, particularly at the end of the Cold War, have been achieved, the nuclear world is increasingly changing in major ways, and in almost entirely dangerous directions. The third “bombs away” phase of the great debate on the nuclear-political question is more consequentially divided than in the first two phases. Even more ominously, most of the momentum lies with the forces that are pulling states toward nuclear-use, and with the radical actors bent on inflicting catastrophic damage on the leading states in the international system, particularly the United States. In contrast, the arms control project, although intellectually vibrant, is largely in retreat on the world political stage. The arms control settlement of the Cold War is unraveling, and the world public is more divided and distracted than ever. With the recent election of President Donald Trump, the United States, which has played such a dominant role in nuclear politics since its scientists invented these fiendish engines, now has an impulsive and uninformed leader, boding ill for nuclear restraint and effective crisis management. Given current trends, it is prudent to assume that sooner or later, and probably sooner, nuclear weapons will again be the used in war. But this bad news may contain a “silver lining” of good news. Unlike a general nuclear war that might have occurred during the Cold War, such a nuclear event now would probably not mark the end of civilization (or of humanity), due to the great reductions in nuclear forces achieved at the end of the Cold War. Furthermore, politics on “the day after” could have immense potential for positive change. The survivors would not be likely to envy the dead, but would surely have a greatly renewed resolution for “never again.” Such an event, completely unpredictable in its particulars, would unambiguously put the nuclear-political question back at the top of the world political agenda. It would unmistakeably remind leading states of their vulnerability It might also trigger more robust efforts to achieve the global regulation of nuclear capability. Like the bombings of Hiroshima and Nagasaki that did so much to catalyze the elevated concern for nuclear security in the early Cold War, and like the experience “at the brink” in the Cuban Missile Crisis of 1962, the now bubbling nuclear caldron holds the possibility of inaugurating a major period of institutional innovation and adjustment toward a fully “bombs away” future.

#### No nuclear winter – conservative models prove rainout.

Reisner et al. 18 [Jon, Atmospheric researcher at LANL Climate and Atmospheric Sciences; Gennaro D'Angelo, UKAFF Fellow and member of the Astrophysics Group at the School of Physics of the University of Exeter, Research Scientist with the Carl Sagan Center at the SETI Institute, currently works for the Los Alamos National Laboratory Theoretical Division; Eunmo Koo, scientist in the Computational Earth Science Group at LANL, recipient of the NNSA Defense Program Stockpile Stewardship Program award of excellence; Wesley Even, R&D Scientist at CCS-2, LANL, specialist in computational physics and astrophysics; Matthew Hecht is a member of the Computational Physics and Methods Group in the Climate, Ocean and Sea Ice Modelling program (COSIM) at LANL, who works on modeling high-latitude atmospheric effects in climate models as part of the HiLAT project; Elizabeth Hunke, Lead developer for the Los Alamos Sea Ice Model, Deputy Group Leader of the T-3 Fluid Dynamics and Solid Mechanics Group at LANL; Darin Comeau, Scientist at the CCS-2 COSIM program, specializes in high dimensional data analysis, statistical and predictive modeling, and uncertainty quantification, with particular applications to climate science; Randall Bos is a research scientist at LANL specializing in urban EMP simulations; James Cooley is a Group Leader within CCS-2. 3/16/18 “Climate Impact of a Regional Nuclear Weapons Exchange: An Improved Assessment Based On Detailed Source Calculations.” Journal of Geophysical Research: Atmospheres, vol. 123, no. 5] Recut Justin

The no-rubble simulation produces a significantly more intense fire, with more fire spread, and consequently a significantly stronger plume with larger amounts of BC reaching into the upper atmosphere than the simulation with rubble, illustrated in Figure 5. While the no-rubble simulation **represents the worst-case scenario** involving vigorous fire activity, **only a relatively small amount of carbon makes its way into the stratosphere** during the course of the simulation. But while small compared to the surface BC mass, stratospheric BC amounts from the current simulations are significantly higher than what would be expected from burning vegetation such as trees (Heilman et al., 2014), e.g., the higher energy density of the building fuels and the initial fluence from the weapon produce an intense response within HIGRAD with initial updrafts of order 100 m/s in the lower troposphere. Or, in comparison to a mass fire, wildfires will burn only a small amount of fuel in the corresponding time period (roughly 10 minutes) that a nuclear weapon fluence can effectively ignite a large area of fuel producing an impressive atmospheric response. Figure 6 shows vertical profiles of BC multiplied by 100 (number of cities involved in the exchange) from the two simulations. The total amount of BC produced is in line with previous estimates (about 3.69 Tg from no-rubble simulation); however, the majority of BC resides **below the stratosphere** (3.46 Tg below 12 km) and can be **readily impacted by scavenging from precipitation** either via pyro-cumulonimbus produced by the fire itself (not modeled) or other synoptic weather systems. While the impact on climate of these more realistic profiles will be explored in the next section, it should be mentioned that **these estimates are** still **at the high end**, considering the inherent simplifications in the combustion model that lead to **overestimating BC production**. 3.3 Climate Results Long-term climatic effects critically depend on the initial injection height of the soot, with larger quantities reaching the upper troposphere/lower stratosphere inducing a greater cooling impact because of longer residence times (Robock et al., 2007a). Absorption of solar radiation by the BC aerosol and its subsequent radiative cooling tends to heat the surrounding air, driving an initial upward diffusion of the soot plumes, an effect that depends on the initial aerosol concentrations. **Mixing and sedimentation** tend to **reduce this process**, and low altitude emissions are also significantly impacted by precipitation if aging of the BC aerosol occurs on sufficiently rapid timescales. But once at stratospheric altitudes, aerosol dilution via coagulation is hindered by low particulate concentrations (e.g., Robock et al., 2007a) and lofting to much higher altitudes is inhibited by gravitational settling in the low-density air (Stenke et al., 2013), resulting in more stable BC concentrations over long times. Of the initial BC mass released in the atmosphere, most of which is emitted below 9 km, **70% rains out within the first month** and 78%, or about 2.9 Tg, is removed within the first two months (Figure 7, solid line), with the remainder (about 0.8 Tg, dashed line) being transported above about 12 km (200 hPa) within the first week. This outcome differs from the findings of, e.g., Stenke et al. (2013, their high BC-load cases) and Mills et al. (2014), who found that most of the BC mass (between 60 and 70%) is lifted in the stratosphere within the first couple of weeks. This can also be seen in Figure 8 (red lines) and in Figure 9, which include results from our calculation with the initial BC distribution from Mills et al. (2014). In that case, only 30% of the initial BC mass rains out in the troposphere during the first two weeks after the exchange, with the remainder rising to the stratosphere. In the study of Mills et al. (2008) this percentage is somewhat smaller, about 20%, and smaller still in the experiments of Robock et al. (2007a) in which the soot is initially emitted in the upper troposphere or higher. In Figure 7, the e-folding timescale for the removal of tropospheric soot, here interpreted as the time required for an initial drop of a factor e, is about one week. This result compares favorably with the “LT” experiment of Robock et al. (2007a), considering 5 Tg of BC released in the lower troposphere, in which 50% of the aerosols are removed within two weeks. By contrast, the initial e-folding timescale for the removal of stratospheric soot in Figure 8 is about 4.2 years (blue solid line), compared to about 8.4 years for the calculation using Mills et al. (2014) initial BC emission (red solid line). The removal timescale from our forced ensemble simulations is close to those obtained by Mills et al. (2008) in their 1 Tg experiment, by Robock et al. (2007a) in their experiment “UT 1 Tg”, and © 2018 American Geophysical Union. All rights reserved. by Stenke et al. (2013) in their experiment “Exp1”, in all of which 1 Tg of soot was emitted in the atmosphere in the aftermath of the exchange. Notably, the e-folding timescale for the decline of the BC mass in Figure 8 (blue solid line) is also close to the value of about 4 years quoted by Pausata et al. (2016) for their long-term “intermediate” scenario. In that scenario, which is also based on 5 Tg of soot initially distributed as in Mills et al. (2014), the factor-of2 shorter residence time of the aerosols is caused by particle growth via coagulation of BC with organic carbon. Figure 9 shows the BC mass-mixing ratio, horizontally averaged over the globe, as a function of atmospheric pressure (height) and time. The BC distributions used in our simulations imply that the upward transport of particles is substantially less efficient compared to the case in which 5 Tg of BC is directly injected into the upper troposphere. The semiannual cycle of lofting and sinking of the aerosols is associated with atmospheric heating and cooling during the solstice in each hemisphere (Robock et al., 2007a). During the first year, the oscillation amplitude in our forced ensemble simulations is particularly large during the summer solstice, compared to that during the winter solstice (see bottom panel of Figure 9), because of the higher soot concentrations in the Northern Hemisphere, as can be seen in Figure 11 (see also left panel of Figure 12). Comparing the top and bottom panels of Figure 9, the BC reaches the highest altitudes during the first year in both cases, but the concentrations at 0.1 hPa in the top panel can be 200 times as large. Qualitatively, the difference can be understood in terms of the air temperature increase caused by BC radiation emission, which is several tens of kelvin degrees in the simulations of Robock et al. (2007a, see their Figure 4), Mills et al. (2008, see their Figure 5), Stenke et al. (2013, see high-load cases in their Figure 4), Mills et al. (2014, see their Figure 7), and Pausata et al. (2016, see one-day emission cases in their Figure 1), due to high BC concentrations, but it amounts to only about 10 K in our forced ensemble simulations, as illustrated in Figure 10. Results similar to those presented in Figure 10 were obtained from the experiment “Exp1” performed by Stenke et al. (2013, see their Figure 4). **In that scenario as well, somewhat less than 1 Tg of BC remained in the atmosphere after the initial rainout**. As mentioned before, the BC aerosol that remains in the atmosphere, lifted to stratospheric heights by the rising soot plumes, undergoes sedimentation over a timescale of several years (Figures 8 and 9). This mass represents the effective amount of BC that can force climatic changes over multi-year timescales. In the forced ensemble simulations, it is about 0.8 Tg after the initial rainout, whereas it is about 3.4 Tg in the simulation with an initial soot distribution as in Mills et al. (2014). Our more realistic source simulation involves the worstcase assumption of no-rubble (along with other assumptions) and hence serves as an upper bound for the impact on climate. As mentioned above and further discussed below, our scenario induces perturbations on the climate system similar to those found in previous studies in which the climatic response was driven by roughly 1 Tg of soot rising to stratospheric heights following the exchange. Figure 11 illustrates the vertically integrated mass-mixing ratio of BC over the globe, at various times after the exchange for the simulation using the initial BC distribution of Mills et al. (2014, upper panels) and as an average from the forced ensemble members (lower panels). All simulations predict enhanced concentrations at high latitudes during the first year after the exchange. In the cases shown in the top panels, however, these high concentrations persist for several years (see also Figure 1 of Mills et al., 2014), whereas the forced ensemble simulations indicate that the BC concentration starts to decline after the first year. In fact, in the simulation represented in the top panels, mass-mixing ratios larger than about 1 kg of BC © 2018 American Geophysical Union. All rights reserved. per Tg of air persist for well over 10 years after the exchange, whereas they only last for 3 years in our forced simulations (compare top and middle panels of Figure 9). After the first year, values drop below 3 kg BC/Tg air, whereas it takes about 8 years to reach these values in the simulation in the top panels (see also Robock et al., 2007a). Over crop-producing, midlatitude regions in the Northern Hemisphere, the BC loading is reduced from more than 0.8 kg BC/Tg air in the simulation in the top panels to 0.2-0.4 kg BC/Tg air in our forced simulations (see middle and right panels). The more rapid clearing of the atmosphere in the forced ensemble is also signaled by the soot optical depth in the visible radiation spectrum, which drops below values of 0.03 toward the second half of the first year at mid latitudes in the Northern Hemisphere, and everywhere on the globe after about 2.5 years (without never attaining this value in the Southern Hemisphere). In contrast, the soot optical depth in the calculation shown in the top panels of Figure 11 becomes smaller than 0.03 everywhere only after about 10 years. The two cases show a similar tendency, in that the BC optical depth is typically lower between latitudes 30º S-30º N than it is at other latitudes. This behavior is associated to the persistence of stratospheric soot toward high-latitudes and the Arctic/Antarctic regions, as illustrated by the zonally-averaged, column-integrated mass-mixing ratio of the BC in Figure 12 for both the forced ensemble simulations (left panel) and the simulation with an initial 5 Tg BC emission in the upper troposphere (right panel). The spread in the globally averaged (near) surface temperature of the atmosphere, from the control (left panel) and forced (right panel) ensembles, is displayed in Figure 13. For each month, the plots show the largest variations (i.e., maximum and minimum values), within each ensemble of values obtained for that month, relative to the mean value of that month. The plot also shows yearly-averaged data (thinner lines). The spread is comparable in the control and forced ensembles, with average values calculated over the 33-years run length of 0.4-0.5 K. This spread is also similar to the internal variability of the globally averaged surface temperature quoted for the NCAR Large Ensemble Community Project (Kay et al., 2015). These results imply that surface air temperature differences, between forced and control simulations, which lie within the spread may not be distinguished from effects due to internal variability of the two simulation ensembles. Figure 14 shows the difference in the globally averaged surface temperature of the atmosphere (top panel), net solar radiation flux at surface (middle panel), and precipitation rate (bottom panel), computed as the (forced minus control) difference in ensemble mean values. The sum of standard deviations from each ensemble is shaded. Differences are qualitatively significant over the first few years, when the anomalies lie near or outside the total standard deviation. Inside the shaded region, differences may not be distinguished from those arising from the internal variability of one or both ensembles. The surface solar flux (middle panel) is the quantity that appears most affected by the BC emission, with qualitatively significant differences persisting for about 5 years. The precipitation rate (bottom panel) is instead affected only at the very beginning of the simulations. The red lines in all panels show the results from the simulation applying the initial BC distribution of Mills et al. (2014), where the period of significant impact is much longer owing to the higher altitude of the initial soot distribution that results in longer residence times of the BC aerosol in the atmosphere. When yearly averages of the same quantities are performed over the IndiaPakistan region, the differences in ensemble mean values lie within the total standard deviations of the two ensembles. The results in Figure 14 can also be compared to the outcomes of other previous studies. In their experiment “UT 1 Tg”, Robock et al. (2007a) found that, when only 1 Tg of soot © 2018 American Geophysical Union. All rights reserved. remains in the atmosphere after the initial rainout, temperature and precipitation anomalies are about 20% of those obtained from their standard 5 Tg BC emission case. Therefore, the largest differences they observed, during the first few years after the exchange, were about - 0.3 K and -0.06 mm/day, respectively, comparable to the anomalies in the top and bottom panels of Figure 14. Their standard 5 Tg emission case resulted in a solar radiation flux anomaly at surface of -12 W/m2 after the second year (see their Figure 3), between 5 and 6 time as large as the corresponding anomalies from our ensembles shown in the middle panel. In their experiment “Exp1”, Stenke et al. (2013) reported global mean surface temperature anomalies not exceeding about 0.3 K in magnitude and precipitation anomalies hovering around -0.07 mm/day during the first few years, again consistent with the results of Figure 14. In a recent study, Pausata et al. (2016) considered the effects of an admixture of BC and organic carbon aerosols, both of which would be emitted in the atmosphere in the aftermath of a nuclear exchange. In particular, they concentrated on the effects of coagulation of these aerosol species and examined their climatic impacts. The initial BC distribution was as in Mills et al. (2014), although the soot burden was released in the atmosphere over time periods of various lengths. Most relevant to our and other previous work are their one-day emission scenarios. They found that, during the first year, the largest values of the atmospheric surface temperature anomalies ranged between about -0.5 and -1.3 K, those of the sea surface temperature anomalies ranged between -0.2 and -0.55 K, and those of the precipitation anomalies varied between -0.15 and -0.2 mm/day. All these ranges are compatible with our results shown in Figure 14 as red lines and with those of Mills et al. (2014, see their Figures 3 and 6). As already mentioned in Section 2.3, the net solar flux anomalies at surface are also consistent. This overall agreement suggests that the **inclusion of organic carbon aerosols, and** ensuing **coagulation** with BC, **should not dramatically alter the climatic effects** resulting from our forced ensemble simulations. Moreover, aerosol growth would likely **shorten the residence time of the BC particulate in the atmosphere** (Pausata et al., 2016), possibly **reducing the duration of these effects.**

#### The mini-nuclear winter solves warming without causing extinction.

Sorin Adam Matei 12. – Ph.D., Associate Dean of Research and Professor of Communication, College of Liberal Arts and Brian Lamb School of Communication, Purdue University. 3-26-2012. ["A modest proposal for solving global warming: nuclear war – Sorin Adam Matei." Matei. <https://matei.org/ithink/2012/03/26/a-modest-proposal-for-solving-global-warming-nuclear-war/>] Recut Justin

We finally have a solution for global warming. A discussion on the board [The Straight Dope](http://boards.straightdope.com/sdmb/showthread.php?t=646285) about the likely effect of a nuclear war brought up the hypothesis that a nuclear war on a large scale could produce a mini-nuclear winter. Why? Well, the dust and debris sent into the atmosphere by the conflagrations, plus the smoke produced by the fires started by the explosions would cover the sun for a period long enough to lower the temperature by as much as 40 degrees Celsius for a few months and by up to 2-6 degree Celsius for a few years. One on top of the other, according to this [Weather Wunderground contributor](http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1208), who cites a[bona fide research paper on nuclear winter](http://www.atmos-chem-phys.org/7/2003/2007/acp-7-2003-2007.pdf), after everything would settle down we would be back to 1970s temperatures. Add to this the decline in industrial production and global oil consumption due to industrial denuding of most large nations and global warming simply goes away. I wonder what [Jonathan Swift would have thought about this proposal?](http://www.gutenberg.org/files/1080/1080-h/1080-h.htm)

#### Scholarly consensus says emerging technology will destroy the universe – that should outweigh.

Packer 7 – Joe [MA in Communication from Wake Forest University, PhD in Communication from the University of Pittsburgh and Professor of Communication at Central Michigan University, Alien Life in Search of Acknowledgment, p. 62-63] Recut Justin

Once we hold alien interests as equal to our own we can begin to revaluate areas previously believed to hold no relevance to life beyond this planet. A diverse group of scholars including Richard Posner, Senior Lecturer in Law at the University of Chicago, Nick Bostrom, philosophy professor at Oxford University, John Leslie philosophy professor at Guelph University and Martin Rees, Britain’s Astronomer Royal, have written on the emerging technologies that threaten life beyond the planet Earth. Particle accelerators labs are colliding matter together, reaching energies that have not been seen since the Big Bang. These experiments threaten a phase transition that would create a bubble of altered space that would expand at the speed of light killing all life in its path. Nanotechnology and other machines may soon reach the ability to self replicate. A mistake in design or programming could unleash an endless quantity of machines converting all matter in the universe into copies of themselves. Despite detailing the potential of these technologies to destroy the entire universe, Posner, Bostrom, Leslie, and Ree’s only mention of alien life in their works is in reference to the threat aliens post to humanity. The rhetorical construction of otherness only in terms of the threats it poses, but never in terms of the threat one poses to it, has been at the center of humanity’s history of genocide, colonization, and environmental destruction. Although humanity certainly has its own interests in reducing the threat of these technologies evaluating them without taking into account the danger they pose to alien life is neither appropriate nor just. It is not appropriate because framing the issue only in terms of human interests will result in priorities designed to minimize the risks and maximize the benefits to humanity, not all life. Even if humanity dealt with the threats effectively without referencing their obligation to aliens, Posner, Bostrom, Leslie, and Ree’s rhetoric would not be “just,” because it arbitrarily declares other life forms unworthy of consideration. A framework of acknowledgement would allow humanity to address the risks of these new technologies, while being cognizant of humanity’s obligations to other life within the universe. Applying the lens of acknowledgment to the issue of existential threats moves the problem from one of self destruction to universal genocide. This may be the most dramatic example of how refusing to extend acknowledgment to potential alien life can mask humanity’s obligations to life beyond this planet.