Nuclear Aesthetics: Technology, Corporeality, and the Politics of Nuclear Weapons Testing

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Abstract: In the following paper, I will attempt to add the existent literature of nuclear aesthetics by analyzing how we might, under a traditional Kantian aesthetic framework, aesthetically appreciate devices that are often seen as purely negative and destructive; nuclear weapons. Specifically, I will examine the relationship between the body and nuclear weapons during the different "regimes" of nuclear testing. To do so, I will first examine the American relationship to nuclear weapons beginning with the detonation of the first device in 1945, all the way through the fear of nuclear war during the Cold War and the current climate of nuclear weapons testing. I will then draw upon the Kantian notion of the sublime and examine how the concepts of mathematical and dynamical sublimity apply to aboveground testing, underground testing, and so-called science-based stockpile stewardship with a focus on the body as the site of the nuclear experience. Finally, I will briefly consider the psychic implications of a post-nuclear world devoid of physical nuclear tests and, ultimately, propose a solution to rekindle a nuclear technoaesthetic experience.

[nuclear weapons, aesthetics, science studies, Kant, sublime, Cold War]

The American Nuclear Ethos

During the 1950s and '60s, the fear of nuclear weapons was omnipresent. Indeed, in 1952, just three years after the Soviet Union detonated their first atomic device, the U.S. Federal Civil Defense Administration released their famous short public service announcement titled *Duck and Cover*. In the nine-minute film, school children are taught about the dangers of "the bomb" from a friendly, anthropomorphized turtle named Bert. Bert and the narrator explain that "the atom bomb can explode any time of the day or night, no matter what you are doing" and that "[w]e must get ready for it."[1] In subsequent years, an increasing number of films were made highlighting the danger of nuclear war, and as footage of mushroom clouds rising miles in the sky were disseminated across the airwaves, the bomb took on an iconographic status; fear of the bomb became a vital part of the American ethos.

On October 10, 1963, the U.S., with the stroke of a pen, signed and ratified the Partial Nuclear Test Ban Treaty (PTBT) which prohibited aboveground nuclear tests; atomic explosions could no longer light up the sky.[2] As the number of visible nuclear tests dwindled, bomb-based iconography slowly became less a part of the American spirit. While the fear of a Soviet attack with ICBMs soared, the cessation of nuclear detonations that were directly viewable caused a twofold shift in consciousness. First, visual representations of the bomb's destructive power declined, while fear of the Soviets in general increased. Second, the bomb was experienced in a fundamentally different way, a way mediated by technology. Indeed, following the decades of aboveground testing during the '40s-'60s, underground testing became the norm where the explosions from nuclear detonations that shook control rooms were ultimately hidden from the eyes of scientists by computer screens and ticker-tape; the technological mediation of the bomb had begun.

The 1990s ushered in two dramatic events: The Soviet Union collapsed and the Comprehensive Nuclear Test Ban Treaty (CTBT), a treaty that effectively prohibited the physical testing of nuclear weapons altogether, was signed. With the collapse of the Soviet Union, the U.S. became the world's uncontested hegemon. Occupying such a position, the people of the U.S. had much less to fear as, although nuclear technologies were more common, the signing and ratification of the Nuclear Non-Proliferation Treaty in 1968, the development of ballistic missile defense technologies, and the uncontested air, sea, and land power of the U.S. made fear of the bomb obsolete. Indeed, following the CTBT, fewer and fewer countries were actually *testing* nuclear devices and so the images of mass destruction and fireballs miles wide slowly vanished from the American consciousness.[3]

It is my contention that although the threat of nuclear war is no less real today than during the '50s and '60s, the signing of the PTBT and CTBT and the subsequent cessation of physical nuclear tests created a condition of psychic numbing whereby the aesthetic experience

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[1] Ray J. Mauer, *'Civil Defense for Schools' (Duck and Cover),'* film script, 1951, pg. 7, 3.
[2] Nuclear Threat Initiative, "Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space and Under Water (Partial Test Ban Treaty) (PTBT)," on *NTI,* updated 10/26/11, accessed 12/11/17. (http://www.nti.org/learn/treaties-and-regimes/treaty-banning-nuclear-test-atmosphere-outer-space-and-under-water-partial-test-ban-treaty-ptbt/)
[3] Nuclear Threat Initiative, "Comprehensive Nuclear-Test-Ban Treaty (CTBT)," on *NTI,* updated 11/28/16, accessed 12/11/17. (http://www.nti.org/learn/treaties-and-regimes/comprehensive-nuclear-test-ban-treaty-ctbt/)

of the bomb was relegated to the background of everyday life. Specifically, it is my view that the bomb, perhaps the only human artifact that can elicit a sense of sublimity, has been aesthetically ignored. The ultimate impact of this numbing, apart from the deleterious effects created by the aesthetic void, has been the realization of Edward Teller's dream of bigger and bigger bombs as the visceral reaction from the public to the physical destruction of buildings displayed in Cold War-era films was replaced by public ambivalence towards whiteboards with numbers as the sublimity of the bomb was mathematicalized.[4] Indeed, nuclear yields are no longer understood by the public in terms of a giant, all-consuming fireball, but rather in terms of abstract discussions of 'tons of TNT.'

In the following paper, I will look at different ways of aesthetically examining nuclear weapons using the Kantian notion of the sublime, analyze the impacts of the aesthetic void created by the PTBT and CTBT, and propose a solution to reinvigorate nuclear aesthetics.

Nuclear Aesthetics: Sublimity and Corporeality

The history of nuclear weapons is marked by three different "testing regimes": aboveground, underground, and science-based stockpile stewardship, each a result of different treaties.[5] In the following section, I will examine the aesthetic experiences within each regime and the shift from the pure sublimity of aboveground nuclear testing to the banality of science-based stockpile stewardship. Before examining each regime in detail, however, it is important to briefly explicate the Kantian notion of the sublime and how sublimity is experienced.

In Kantian aesthetics, the beautiful is contrasted by the sublime, a specific type of aesthetic experience that is 'unbounded' and creates awe in us. Indeed, for Kant, the feeling of the sublime is "a momentary inhibition of the vital forces followed immediately by an outpouring of them that is all the stronger."[6] While Kant's discussion of sublimity is more far reaching, for the purposes of this paper we can understand sublimity, generally, as a feeling evoked by objects of grandeur.[7] A distinction must be made within the realm of the sublime; the distinction between the mathematical and the dynamical. The mathematically sublime, for Kant, is "*what is large beyond all comparison"* and what eludes our comprehension in terms of "scale and vastness."[8] In contrast, the dynamically sublime is something that "arouses fear" in us due to its sheer might. Specifically, while not everything that arouses fear is sublime, everything that is dynamically sublime arouses fear. This fear, however, is not tantamount to being "afraid" of the object, but rather is instantiated when we "*think* of the case where we might possibly want to put up resistance against it, and that any resistance would in that case be utterly futile."[9] Armed with an understanding of the mathematical and dynamical sublime, we can begin to examine the

[4] See Alex Wellerstein's account of Teller's 10,000 megaton bomb proposal: "In Search of a Bigger Boom," on *Restricted Data: The Nuclear Secrecy Blog*, published 9/12/12, accessed 12/12/17. (http://blog.nuclearsecrecy.com/2012/09/12/in-search-of-a-bigger-boom/)
[5] Joseph Masco, "Nuclear technoaesthetics: Sensory politics from Trinity to the virtual bomb in Los Alamos," *American Ethnologist* 31, No. 3 (2004): 1-25.
[6] Immanuel Kant, *Critique of Judgement*, trans. Werner Pluhar (Indianapolis: Hackett, 1987), 98, 103.
[7] Kant, *Critique of Judgement*, 98-99.
[8] Ibid., 103.; Masco, "Nuclear technoaesthetics," 3.
[9] Ibid., 119-120.

aesthetic experiences implicit in the three testing regimes and how the experience of sublimity changed from one of dynamical sublimity, to one of purely mathematical sublimity, to, ultimately, banality.

The regime of aboveground testing was by far the most visceral with large swaths of land destroyed and untold numbers of people displaced; during this period, nuclear tests were full body experiences. For the scientists involved in first tests of the atom and hydrogen bombs, corporeal sensory experience became foregrounded as bodily harm and the physical effects of the blast were of utmost importance. Reports from the Trinity test are telling in this regard as for, different scientists, different senses were assaulted. For Emilio Serge, the flash from the blast was so powerful that he could see it through tinted goggles causing him to worry that "the explosion might set fire to the atmosphere." For Philip Morrison, the heat from the blast was overwhelming, causing him to describe the experience as akin to "opening a hot oven with the sun coming out like a sunrise." In more intense instances, George Kistiakowsky was knocked over while Robert Serber was temporarily flashblinded.[10] Indeed, the experiences of the scientists were mediated only by distance and the "scientist's body was the primary register of the explosion, the physicality of blast effects […] all assaulting human senses and demonstrating the fragility of the human body when confronted by the power of the bomb."[11] The explosion was unlike anything anyone had seen before. It was an example of human engineering, of 'man mastering the atom,' with great destructive potential. The magnitude of the accomplishment and the fear of the post-nuclear world allows us to read the effects of "the gadget" as instantiations of the dynamically sublime – power that, while theoretically graspable, was far beyond anything humans had witnessed previously.

Once the PTBT was passed in 1963, aboveground nuclear testing ceased and the underground regime of the '60s-'90s began. The start of underground testing marked a salient shift in the aesthetic experience of nuclear weapons. Indeed, where aboveground testing was an era marked by direct sensory experiences of the destructive power of the bomb, both to human flesh and to structures, the experiences of nuclear detonations during the underground testing-era were heavily mediated ones where "the shifting experimental regimes open to weapons research since 1945 have worked to strip the exploding bomb of its visceral threat to the body of the scientist."[12] What's more, as the experience of the bomb became mediated, the fundamental problem ceased to be how to "protect the human body from the effects of the explosion but, rather, making the exploding bomb visible to human senses" as underground testing required prosthetic senses.[13] As the location of experience changed from the effectively unmediated body to the body mediated by technology, the dynamism of nuclear testing lost its sublime power. What's more, the focus of research shifted from the physical effects of the bomb to the mathematical feasibility of arbitrarily large nuclear devices. Indeed, as the threat of corporeal harm became further removed from scientists, weapons research shifted to yield calculations and attempts to understand what occurs the moment a bomb goes off.

Where testing during the aboveground regime was concerned with technological feasibility and whether nuclear devices would even work, the focal point of nuclear science

[10] Cited in Masco, "Nuclear technoaesthetics," 3-4.
[11] Ibid., 4.
[12] Ibid., 3.
[13] Ibid., 7.

shifted from feasibility to understanding and abstraction. Following the Trinity test, Los Alamos scientists knew that bringing fissile materials together *would* create a chain reaction, and thus the task became to figure out what happened *when* the chain reaction occurred. As such, the locus of experience of the bomb shifted from the site of physicality to mathematical abstraction. Increasingly small units of time were devised to measure to the inner workings of a bomb, with scientists trying to work on the smaller than microsecond level, and the bomb became awe inspiring in a fundamentally different way; it became mathematically complex. It is thus under Kant's understanding of the mathematical sublime that we can attempt to make sense of the shift in aesthetic experience.

For Kant, the mathematically sublime is that which is not only utterly complex and "*large beyond comparison,"* but is outside the realm of cognition being judgmentally awe-inspiring.[14] For example, Los Alamos scientists had to define an entirely new unit of time to measure what was occurring during the detonation of a nuclear device: "the shake." A shake, equivalent to the time it took for one atom of uranium to fission (1/100,000,000th of a second) became the standard nuclear chronographic metric.[15] The juxtaposition between something incredibly small, a shake, and something incredibly large, the explosion created in the span of a shake, is mathematically awesome and overwhelmed the scientists in a different way than the dynamism of aboveground testing.

As the years went on and nuclear testing became increasingly stigmatized, interest groups lobbied for stronger test bans which ultimately culminated in the signing of the CTBT in 1996 which effectively banned the physical testing of nuclear weapons entirely, ushering in the era of science-based stockpile stewardship (SBSS). SBSS was the final nail in the aesthetic coffin of nuclear testing that virtualized the aesthetic experience of the bomb. Indeed, where the testing of the bomb during the underground-era was mediated by technology and prosthetic senses, the 'testing' of weapons during the SBSS-era was testing in an entirely different sense: instead of physically examining explosive yields, models were generated to see what would happen to the inner workings of the bombs as they aged and, if they became "sick," how they might be "cured."[16]

The new generations of weapons scientists being recruited into the SBSS program were promised not the aesthetic experience of sublimity that came with the physical detonations of nuclear devices, but rather the experience of testing the bomb's component parts and "tending to" them, while working on better bombs.[17] Further, the bomb took on a new form: the body "of the weapons scientists themselves," as for the new generation of weapons scientists, "the intellectual pleasure […] and a tactile sensory experience of the exploding bomb are being merged through a massively engineered technoaesthetic spectacle in virtual reality."[18] Indeed,

> [t]he achievement of aboveground testing was to invent the atom and hydrogen bombs and weaponize their form; it was also to dramatize the destructive power of these technologies in a way that brought their military reality home to all viewers. The achievement of the underground test regime was then to systematically eliminate those

[14] Masco, "Nuclear technoaesthetics," 3, 8; Kant, *Critique of Judgement,* 103.
[15] Masco, "Nuclear technoaesthetics," 8.
[16] Ibid., 12, 14.
[17] Ibid., 16.
[18] Ibid., 18.

> disturbing aspects of the bomb—nuclear fallout as well as blast and radiation effects—from public view, allowing the challenge of weapons science to lie in perfecting the bomb as a complex technology. The underground regime contained the bomb both physically and cognitively, allowing the process of conducting weapons research to be increasingly abstracted from the military reality of the technology.[19]

The crowning achievement of SBSS was to fully abstract the bomb from the physical world and situate it within a purely virtual realm. SBSS succeeded in stripping the bomb of its power to do physical harm and replaced it with a scientific fetishization with mathematical complexity. The ultimate shift has been one from understanding nuclear weapons *as weapons*, to one that "maintain[ed] a conceptual understanding of what it means to detonate a nuclear device."[20]

The Aesthetic Void of the Post-Cold War-Era

As the aesthetic experience of the bomb shifted from one of dynamic sublimity, to mathematical sublimity, to banality, an aesthetic void was created. Not only was a vital experience of the late 20th century lost, but with it went our restraint. Indeed, as images of blown out buildings were hidden from public view and replaced by computer models, our collective understanding of the dynamically sublime was exterminated and nuclear weapons became fully abstracted. As testing ceased and full body sensory experiences of the blast became folk-legends, yields were no longer understood in terms of the destruction nuclear devices could cause to various human structures. Instead, blast yields were understood as abstract values on a whiteboard in a Los Alamos office where one warhead equaled X-many tons of TNT; a unit of measurement completely divorced from everyday experience. Indeed, whereas testing regimes that emphasized physical testing above mathematical understanding created a sense of awe and fear in the onlookers, the slow but steady virtualization of the bomb led to a world where the destructive power was not measured in terms of buildings destroyed or cars overturned or senses assaulted, but was instead measured in terms of increasingly abstract units that became harder for the public to grasp. As the bomb became increasingly distant from everyday experience, public concern, and with it, denuclearization campaigns, died down. Further, as the effects of the bomb were removed from public experience and were accessible to an increasingly select few who understood the nuances of nuclear physics, untempered science could have its way. The ultimate result of this was the proliferation of higher yield nuclear devices whose construction exemplified Oppenheimer's famous comment in 1954 before the United States Atomic Energy Commission's hearing on nuclear security: "when you see something that is technologically sweet, you go ahead and do it and you argue about what to do about it only after you have your technological success."[21]

What's more, the lack of physical testing and the increased emphasis on SBSS and calculative testing made it such that newer generations of world leaders became unaware of the visceral and awesome power of the bomb. The bomb, instead of being seen as a device that had power rivaling that of Zeus himself, was seen as a tactical tool to be used as leverage in international agreements and as a deterrent to prevent conflict. Further, the bomb ceased to be

[19] Ibid., 10.
[20] Ibid., 19.
[21] J. Robert Oppenheimer, "The Matter of J. Robert Oppenheimer," *United States Atomic Energy Commission Personnel Security Board report on J. Robert Oppenheimer* (April 13, 1954), 95.

seen as a weapon of mass destruction and instead became a tactical weapon that could, if needed, win a conflagration.[22] While there of course have been arms reductions treaties over the past few decades, the levels of distrust between the U.S., Russia, China, and other nuclear powers have made such reductions relatively slow. What's more, the lack of physical testing has taken away a fundamental experience of the atomic age. Once the first bomb was exploded in New Mexico, humanity entered a nuclear age where a new aesthetic experience was not only possible, but lauded. Nuclear iconography was a huge part of the American ethos during the Cold War-era and as testing ceased, the public (and indeed the scientists as well) lost access to an aesthetic experience of sublimity that had characterized the post-Trinity years.

Ultimately, the lack of physical testing has had two major impacts: the loss of a vital aesthetic experience, and a lack of meaningful nuclear safeguards. While the previous experiences of nuclear awe created not only senses of sublimity and fear, but drove denuclearization campaigns, the decline of testing created a void in public consciousness that was once filled with by a collective American ethos. At the end of the day, in order to both promote arms control and to reinvigorate a sense of the nuclear sublime and bring back the fear that was present in the dynamic sublimity of the aboveground, post-Trinity-era, I think we ought to return to public spectacles of warhead testing as we have lost something important. We have created a device that rivals the power of the Gods and there's no going back from that. We have crossed the threshold into the atomic age, and thus we might as well embrace the aesthetics of it and perhaps, just maybe, we can live in a safer nuclear world.

[22] Masco, "Nuclear technoaesthetics," 14.

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