Alien Megastructures: The Possibility of Extraterrestrial Life and the Rhetoric of Hope in the Anthropocene

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Today I want to discuss the relationship between hope, climate change, geo-engineering and the possibility of alien civilization. Moreover, I want to think of the latter two phenomenon as emblematic of a rhetoric of hope in the age of dire climate emergency. Specifically, I want to talk about the phenomenon surrounding Tabby's Star.

Officially designated KIC 8462852, Tabby's Star was identified by Planet Hunters, a group of citizen scientists sifting large quantities of astronomical data for evidence of exo-planets, and has since gained a reputation as "the most mysterious star in the universe," as Tabetha Boyajian, the star's namesake and lead scientific investigator, has declared. Tabby's Star, an F-class sun (bigger and hotter than our own) 1500 light-years from Earth in

the Cygnus constellation, periodically dims. Periodic dimming is often the sign of exoplanets, as the planets move in front of the particular star and this is why *Kepler*, the space telescope set up to look for these phenomena, first noticed Tabby's Star. What makes Tabby's Star so particularly compelling is that it periodically dims at a rate *much* greater than what would be seen with orbiting planets.

While this would have, and still is, a major boon for academic astronomy research, with numerous papers speculating on the natural phenomenon that could be causing the dimming of Tabby's Star, one paper, published in *The Astrophysical Journal Supplement* by a team at Penn State, speculated that the mysterious periodic dimming of Tabby's Star could be the result of a Dyson sphere. At this point, the dubious processes of scientific journalism kicked into overdrive and an article entitled "The Ĝ [G-hat] Search for Extraterrestrial Civilizations with

Large Energy Supplies. IV. THE SIGNATURES AND INFORMATION CONTENT OF TRANSITING MEGASTRUCTURES" becomes "Have Aliens Built Huge Structures around Boyajian's Star?" in the pages of *Scientific American*.

What happened next will shock you.

But before I get to the really interesting outcomes for scientific funding from the media hype surrounding Tabby's Star, I want to first explain what a Dyson Sphere is, why it's so exciting to consider one orbiting a relatively close star, and why I think the media fixation on alien megastructures is so important for thinking about what rhetorics of hope look like in the relatively hopeless age of mass extinction, resource depletion, and economic stagnation known as the Anthropocene. Along the way, I'll speak to the shifting rhetorics surrounding human exceptionalism, futurity, and fate.

Dyson Spheres

The paper I mentioned earlier, by Jason T. Wright and a team of astronomers, proposed that the Kepler telescope could be used to look for advanced alien civilizations, not just exoplanets. **[slide]** They base this claim off of an article by the physicist Freeman Dyson, first published in 1960. In "Search for Artificial Stellar Sources of Infrared Radiation," Dyson argues that the early SETI initiative must augment its radio-based search for extraterrestrial civilizations with a search for stars that exhibit abnormal emissions of infrared light. He bases his claim off the supposition that, due to the finite amount of energy and living space available to a planetary society, eventually "Malthusian pressures" will drive any sufficiently advanced civilization to better maximize solar energy harvest (Dyson 1667). Thus, "any intelligent species should be found occupying an artificial biosphere which completely surrounds its parent star" and which

has been composed of the material of the star's former planets (Dyson 1667).

By fully surrounding a star with biosphere, Dyson concludes, a civilization will be able to extract 100% of all available energy produced by that star. This teleological scheme for astronomic architecture came to be called a "Dyson Sphere" and was the artifact that Wright et al proposed as an explanation for the dimming of Tabby's Star. This proposal is not, after all outlandish, as Dyson's article emerged out of early proposals **[slide]** for what became the SETI program, as I mentioned. In SETI, radio telescopes are used to listen for alien broadcasts because, at the time this scheme was proposed, our planet was bleeding significant amounts of signal noise into space. The thinking went that if we were doing this, alien civilizations might be as well, and that listening to these broadcasts would give us evidence we are not alone in the universe.

Dyson's thought experiment suggested an alternate model for detecting advanced, post-terresterial alien civilizations, by arguing that a Dyson sphere would be "radiating as copiously as the star which is hidden inside it, but the radiation would be in the far infrared, around 10 microns wavelength" (Dyson 1667). Because all visible light is being harvested, a Dyson Sphere will only be radiating the less useful spectrum portions. Dyson suggests that looking for such light signatures is another way to detect alien life. So as much as Wright et al was reported as "scientists say star orbited by alien megastructure" with a tone of science fictional amusement, in actuality, the paper is advancing a sound hypothesis based on Dyson's original proposal from 1960.

The whole question of taking seriously, though, is worth addressing here: Dyson's original proposal—that an advanced civilization will mine its outer planets to build a giant sphere

encasing its star—takes seriously something that sounds like it would come from science fiction, because, of course it did. **[Slide]** Dyson later admitted that the original proposal for the Dyson Sphere came from Olaf Stapledon's *Star Maker* (1937). In that novel, a 1930s human is transported out of his body and shown a variety of advanced technological ideas, including something very similar to a Dyson sphere. Stapledon's novel, which is lacking in plot but high on ideas, became a common reference point for many later science fiction authors, who mined its ideas for their own work (Dyson 365). **[Slide]** Dyson (and, perhaps, Stapledon) was also likely influenced by the extended discussion of a spherical energy extractor in J.D. Bernal's 1929 work of speculative non-fiction, *The World, the Flesh, and the Devil*, which speculated on coming radical changes to human existence and about the new social dynamics that might emerge (Bernal 18–28).

Dyson Spheres also takes part in a particular conversation in architecture at the time of the original article that was later popularized and analyzed in detail by Rayner Banham: the question of the Modernist "megastructure." Thanks to Benjamin Bratton's *The Stack*, a significant milestone in recent critical theory I'll address in a second, and the rise in infrastructure studies, I think "megastructure" has more currency than it did even a few years ago, but, in any case, Banham quotes Fumihiko Maki's definition of a megastructure as "a large frame in which all the functions of a city or part of a city are housed" (qtd in Banham 8). **[slide]**As Banham clarifies, the Modernist movement in architecture imbued the tradition of designing comfortable spaces for human life with a particular (and particularly fascist) interest in futurism: using space as a way to remake human life and create "the design of the whole human environment" (Banham 9). This futurism had reached a limit

case by the 1960s: there was too much that slipped out of what could be controlled by the built environment of the home or office. In response, Banham argues, Modernist architecture entered a period of decadence: imagining things like **[slide]** the huge city/highway of Le Corbusier's Fort or **[slide]** building Geodesic domes over Manhattan island, or, in Dyson's case, turning Jupiter into a giant solar energy collector around the entire sun.

As Banham documents, the megastructure Modernists burned out on the unrealizable nature of their goals and the absurdity of the increasing lengths to which they went to prop up their belief in the controllability of human life at any scale. As Banham argues, the megastructure is the death-knell of Modernist architecture.

However, the concept has become en vogue again thanks, as I mentioned, to Benjamin Bratton's massive (and a bit

unhinged) *The Stack: On Software and Sovereignty* (2016) (Bratton 96). In that work, Bratton argues for a revival in megastructural thinking because, as he claims, global software, especially embodied by the scope and scale of cloud computing is, in effect, a megastructure. However, the stakes are higher than they were in Modernist projects such as Dyson's because, as Bratton argues, ours is an accidental megastructure: no one at Google or Facebook set out to build a global mineral, digital, and political infrastructure that would ultimately replace the nation-state as the locus of sovereignty, but, as Bratton makes the case: that's exactly what has happened.

[slide] Bratton connects the accidental megastructure of global computing to the Anthropocene when he talks about the energy consumption involved in completing and operating The Stack. I read Bratton here as arguing that completing an actual, total, functioning model of computational sovereignty at global

scale is a single-shot enterprise: if we miss, we don't have any resources to try something else. This constitutes Bratton's exigence in *The Stack*: documenting the contours of the megastructure we are accidentally building in order to make it work better (more justly, more sustainablu, more functionally, etc) before accidentally, instead, drive modernity off a cliff.

Hope

So, having said all that, I want to get back to aliens. In *Alien Life and Human Purpose*, Joseph Packer argues that "[a]lien life serves as a cosmic Rorschach test, a great unknown factor to which individuals can project their hopes, fears, and desires" (Packer 5). To that end, I want to connect the hype surrounding a possible alien megastructure orbiting Tabby's Star to the argument about megastructures in Dyson, Banham, and Bratton with Packer's idea that aliens show us how we hope.

[slide] Packer's argument is especially interesting in the context of alien megastructures and Anthropocenic hope because, as he unpacks, conversations about aliens build from an argument first made in Plato between unity and plurality when it comes to other worlds. As Packer articulates, unity is the view of human exceptionalism, not only on Earth but cosmically, while plurality names the possibility of a universe suffused with cognition and advanced live. Here, Packer articulates a central argument in his book: that the argument against alien life is originally connected to teleological thinking through the figure of human destiny. We are alone in the universe and, therefore, we are destined to be its masters.

[slide] In *Twilight of the Anthropocene Idols*, Claire Colebrook argues for the Anthropocene narrative as a rear-guard action against radical philosophy, attempting to return a universal "man" as the subject of politics after a half century of

successfully interrogating and demolishing this concept as the ground for community (Colebrook 91). Similarly, Packer suggests that aliens are important because the plural universe they represent "could alter social relations for the better by opening space for alternative ways of being," in ways recognizable to the radical thought Colebrook sees as imperiled by the apocalyptic return of man (Packer 219). In other words, aliens point us toward the possibility of the future as difference.

Of course, the history of colonial violence re-enacted as space colonization in science fiction muddies the waters on Packer's claims a bit, but drawing attention to the body of feminist and progressive science fiction that refuses those protocols to instead imagine a future negative universalism can reveal models for resisting that association. As a recent example of this kind of radical investment in negative universalism, **[slide]** I would draw your attention to Becky Chambers's

Wayfarer novels (*The Long Way to a Small, Angry Planet* and *A Closed and Common Orbit*) as strong attempts to imagine the future as personal growth amidst truly radical difference and as important reminders of the need to decouple exploration and colonization in our cultural imagination.

So, I want to argue that the interest in a possible alien megastructure surrounding Tabby's Star is emblematic of a kind of pluralistic hope in an age in which human exceptionalist arguments, in the guise of techno-solutionism, are increasingly on the rise. Moreover, the willingness to invest in this hope marks this issue. After the general interest in the alien megastructure stories in the popular press, Tabitha Boyajian launched a Kickstarter campaign to raise money to rent time on the Las Cumbres Observatory Global Telescope Network to gather more data about what, exactly, is happening with Tabby's Star.

The Kickstarter campaign was a huge success: 1762 people donated $107,421 to fund the study of the star. That's a lot of people hoping for a Dyson Sphere.

While I think there's some really interesting arguments about the future of science funding embedded in this narrative, I am primarily interested in the widespread, though not entirely surprising, willingness for the general public to fund basic scientific research that might prove the existence of alien civilizations. However, to continue with alien megastructures, the initial results from the data funded by Kickstarter do not match Dyson's initial hypotheses about light emitted from a Dyson Sphere. The current working hypothesis is that the star is surrounded by a giant dust cloud; of course, there is a variant model for a Dyson Sphere called a Dyson Swarm that imagines a huge series of small, independent energy collectors in orbit

around a star, so Tabby's Star could still be an advanced alien society.

The "and yet" of a possible Dyson *Swarm* is what interests me most about this story. Dyson's whole article, when reduced to its core argument, is super strange: advanced societies *will* produce a Dyson Sphere, so we *must* start looking for them. Not only does it predicate *our* future as advanced industrial beings but it predicts that all advanced industrial futures will be our future. This move is important for nuancing Packer's distinction between unity and plurality and associating one with teleology and the other with difference. Dyson is predicating an argument for human teleology on the very notion of difference itself: aliens, who are not us, are just like us (of course this *Star Trek*'s whole song and dance, too, right?).

[Slide] In Catherynne M. Valente's recent novel *Space Opera* (2018), our ability to actually think through the difference

implied by alien life is put to the test, as you can see here (Valente 2). Valente continues like this for several pages ("[life] has all the restraint of a toddler left too long at day care without a juice box" is a particular favorite of mine) and the novel attempts to capture the idea that a universe suffused with alien life is unlikely to be remotely humanoid (Valente 3). These radically alien aliens are an important counterpoint to Dyson's idea that all alien civilizations have the same teleology.

Moreover, the enthusiasm for a Dyson Sphere surrounding Tabby's Star is not an enthusiasm for radical difference. Instead, I think, it uses alien civilization (a common source for thinking through radical difference as Valente and Chambers do) to imagine, instead, a comfortable destiny for humanity: somewhere a civilization can skirt the ecological costs of industrialization. Further, Packer argues for the inherent political stakes of alien first contact, writing that "the discovery of life

will collapse teleology, Truth, and absolute morality [and] politicize" efforts at interspecies communication "in a way that further complicates them" (Packer 218).

I want to think about these complications by discussing science fiction author Stanislaw Lem. In his philosophical master statement, *Summa Technologiae*,**[slide]** he describes the Dyson Sphere in very different terms than we have seen, so far. Particularly, he refers to such an undertaking as "encystment," the process of using advanced technologies to enclose and cut off civilization from the outside world, exactly like the self-contained energy extraction system of the Dyson Sphere.

As you can see on this slide, Lem sees this inward turn as a response to what he calls "the information crisis," the second inevitable step in the process of cybernetic expansion: after the creation of new information channels, those information channels become glutted with information and begin to

oversaturate our cognitive responses to novelty (futurist Alvin Toffler called this "future shock" in his influential 1970 book about the consequences of too much futurity). Lem's diagnosis of this information crisis is as stark as any of the other prognostications we've seen today, with the other two responses besides encystment to be the production of "intelligence amplifiers" that enable "a radical restructuring of science as a system that acquires and transmits information" or the gradual devolution of the species caused by slow resource depletion (Lem 86). There's a lot of grim fatalism in all this futurist hope.

So, in conclusion, the minor media circus that developed two years ago surrounding the possibility of a Dyson Sphere orbiting Tabby's Star interests me because it strikes me as a key point for thinking about how we use the possibility of extraterrestrial civilizations to imagine our own future. The specific invocation of an alien megastructure—rather than just

"alien industrial civilization" generally—is important to this story. The Anthropocene increasingly forces us to confront the ruins of industrialization *and* the likelihood of any continuation of civilization itself coming through an engagement with advanced technologies themselves, though perhaps as Bratton suggests toward different ends (and I'll be happy to discuss Anarchist post-civilization theory and/or the feminist arguments for why techno-solutionism is a bad idea in the q&a if anyone is interested).

For me, I wanted to write a paper about aliens, megastructures, and midcentury futurism because I think those things are awesome and I want you to, too, but, I ended up being gloomier than I had hoped. The reality is this: thinking a response to the Anthropocene is hard; having hope for the future is harder still, and not just because everything is so dark and sad right now. As I've hoped to show, even imagining alien

megastructures risks committing us to the kind of masculine fatalism that radical philosophy has challenged us to think ourselves out of (and I'd suggest taking a look at Joanna Zylinska's *End of Man* if you're interested in further thinking through this issue) (Zylinska, n.p.). At the same time, though, the alternative feels, literally, hopeless. The thing I'll leave you with, though, is what gives me hope in this story: 1700 sufficiently motivated people raised $100,000 to study a weird stellar object. In an age where basic scientific research is increasingly imperiled in the United States, that strikes me as a small glimmer in the darkness. [**slide**]

Thanks

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