



□ I'm excited and surprised that you were able to make it on such short notice.

/ Well please don't be surprised. My flight is tomorrow and even if it weren't I probably would've tried to accommodate this.

□ Great. I'm curious to know more about the talk that you gave in Milan as well.

/ I'll try to frame it in the context of our discussion today. If there is a chance to bring it up I will because that's freshest on my mind.

○ Good. I was interested in the design sub-theme of SHOT this year, because that's not always the case. I was on the executive council for many years and I took this year off because I'd gone to so many conferences in a row. Then lo and behold I found myself a couple hours away, looking at the program with a bit of curiosity.

/ Sure. The design panels – and I think there were two or three of them –one of them I didn't make it to that was called “niche by design”. I believe that was yesterday. I have no information on that but the other two panels which were relevant to design as a field were organized by Yana Boeva who is a former colleague of mine at York University in Toronto. She's now based in Germany. It was a welcome addition as I understood. It was my first time at SHOT. Obviously, as you would know better than me there's a very strong historical bent to most of the content that is expressed there, but I think it was very well received. Particularly the second session that Yana had organized on community and materiality. Irene Posch, Daniela Rosner, Kostas Latoufis from University of Athens –and goodness who was the fourth person... please forgive me! I chaired the panel too.

○ It's a test.

/ Amy Slayton was from-

○ From Drexel, I think.

/ From Drexel. She was the commentator and it was all very fabulous. The surprising thing about that was something that you're just insinuating is that there was... It wasn't just like design name. It was full on design and then what I mean in that sense is that there was no historical perspective in their talks.

○ Interesting.

/ It was nevertheless very well received by the audience and the comments were just fantastic.

○ I also wanted to see Kate Crawford and Trevor Paglen's exhibit on AI.

/ Most people did want to see it. There was a lot of chatter about it at the conference.

Alexander Provan □
Einar Engström /
Harmony Holiday ★
Mara Mills ○

Of course most participants only being there two or three days and having a packed schedule I don't know how many people eventually did make it. There was a symposium yesterday and I can't remember the name of the scholar who was on that panel but there was a lot of interest among the SHOT community to try to attend that symposium.

○ I don't know if we're on air yet. Of course, it might be-

/ There was a ten-second countdown but I didn't hear the numbers.

□ I'm watching live and the bunker seems to be empty.

○ No it's always empty on YouTube. There's no video. It's just audio. We're sitting in the bunker.

/ We're also spectres.

○ Our phones don't work in the bunker so we have no contact with the outside world.

□ How deep is the bunker, do you know?

○ Not very deep at all but it has thick concrete walls. It's a little cold. There's a pile of blankets. In case people are listening, I can audio describe what's happening inside the bunker.

/ We should do that.

□ What does it sound like in there?

○ It's not too echoey because it's a narrow space, a narrow long space. You can see the space online if you're on YouTube.

/ The echoes are triangulating, and phase each other out because of the... as I'm feeling.

○ What shape is this?

/ This would be a 1, 2, 3, 4, 5, 6... a hexagon.

○ It's a little damp.

/ An asymmetrical hexagon.

□ Could you clap so that I can get a sense of the-

○ There's a few insects, like flying mosquito-type insects, which surprised and disappointed me.

There are some very bright fluorescent lights installed, probably newly, right above our heads. I think there's soundproofing on either end: this black material which is probably making the sound better. We're sitting at a long wooden picnic table. We have some cookies and some hot tea and some water. I think the table looks pretty clean in the video but it's actually-

It's very antiseptic.

It's homey actually in person.

Are there cats or dogs or-?

There's no cats.

There are no pets.

/ In my heart there are several cats and I carry them with me.

There's a bunch of paper but nothing to write with.

/ I have multiple apparatuses for writing if you require.

Our laptops are open.

/ What about your space, Alexander?

Well, I'm in my house, in an office that's also my child's bedroom. It's an awkward combination of my things and his things, my dirty clothes and his toys.

/ Are they distinguishable?

You have to dig through the pile in order to sort them out. I'm in a much less interesting environment; I have a lot of writing implements. I'm sorry I can't be there in person.

Maybe I'll see you later this week though at Harmony's event.

You're coming back when, in a couple of days?

Tuesday. That event is on Wednesday I think.

Great. I was wondering if you'd be back in time. Please join us.

This very, very small world that this conversation has turned out to be, even though I haven't met Harmony or you before.

/ No, correct. Correct.

○ I feel like we should maybe introduce ourselves. I like the idea that we're having a conversation about a conference inside of another conversation about this biennial, but maybe we should just introduce ourselves assuming that we're on air.

/ Let's make that assumption and if we're proven wrong then we can reintroduce ourselves at that time.

○ Exactly.

□ Or un-introduce ourselves.

/ Yeah. Or un-introduce... and then proceed to re-introduce ourselves once more. Yes.

○ Alexander, do you want to start?

□ Yeah. Obviously, my name's Alexander Provan. I'm joining remotely from New York and I am a writer and editor. I'm the editor of the magazine *Triple Canopy* and we've been doing a lot of work related to sound and listening. This conversation came together in part as a reflection of those interests and includes a few people who are contributing to an upcoming issue. I've actually previously participated in a bunker-ish talk organized by Lara in a structure she built – which was not as bunker-ish. It was made of wood and it was at the Artissima Art Fair in Torino in 2012, I believe. This is my second such experience so far.

○ This is Mara Mills. I'll just say, before I introduce myself, I'm very interested in where this “discussing words in bunkers” as part of art projects comes from, because I know that this very weekend one of my friends is in Philadelphia participating in an art project by Allyson Mitchell (who teaches I think at York, where you are located) which is called the *Lesbian Haunted House – Killjoy's Castle*. They're discussing the word “lesbian” in a room of the haunted house. When I realized that my friend and I were both discussing words in these alternate spaces, it seemed like something was emerging there.

□ It seems like the bunker is haunting contemporary art.

○ Well my friend made a joke that the word “lesbian” could be discussed in a bunker just as well as in a haunted house which I thought was funny (as a lesbian myself). I'm a professor of media studies officially – my official identity at New York University. My PhD is in history of science. This a field that lays claim, rightly or wrongly, to the word paradigm. It'll be interesting to see what everyone here thinks about the invention of the paradigm concept as we understand it today in English. I'll talk a little bit from my background as a historian of science.

/ Great. My name is Einar Engström. I am a former editor of *LEAP Magazine* and thus was formerly based in Beijing, China. Currently I am based in Toronto, Canada and I am a PhD candidate in the Department of Science and Technology Studies at York University. My dissertation is concerned with the history of synthetic sound. I'll just leave that at that and see what I can draw from my project... and bring into our conversation today.

○ We are all sound people. I didn't mention that. I also work on the history of electroacoustics and especially the history of research at AT&T, Western Electric, and the Bell System. I think I only say one or two things about sound in the little material I prepared. I talk more about disease and disability. I also should say I co-direct the Center for Disability Studies at NYU. Those things inflect a little bit about my reading and understanding of the history of the word paradigm.

I'm going to start, mainly because I'm giving a historical overview, and I know that others will jump in with totally different methodological and theoretical perspectives on this word. I should say as I was thinking about the word paradigm I realized I was much less interested in the meaning, or multiple meanings, of this word than I am in the origin of the term and how it went viral—or as I'll discuss, bacterial—in English in the 1960s.

If we rely on the ambiguous evidence of Google Ngram, we see immediately that paradigms are almost nonexistent before 1962 and then they jet off astronomically, or exponentially I should say. What was it that happened in that year? 1962 was the year, of course, that Thomas Kuhn published his tour-de-force, *The Structure of Scientific Revolutions*. Kuhn was a physicist-turned-historian and philosopher of science, and in this book he argued against the taken-for-granted understanding of scientific development at that time, specifically the positivist model of scientific facts (or truths about the natural world) simply piling up in a linear, progressive way from the so-called scientific revolution (beginning in Europe roughly in the 17th century) onward.

In his very title Kuhn suggests instead multiple “revolutions” – revolutions as something endemic to science and in fact regularized, having a predictable structure. Surveying the physical sciences, mostly in the 19th and 20th centuries, Kuhn concluded that – far from a continuous mode of knowledge production – science was, in his words, “a series of peaceful interludes punctuated by violent revolutions.” What constituted these revolutions? Something that Kuhn called paradigm shifts. (The word seems neutral, but here it is the cause of revolutions.)

So in this book Kuhn elaborates his notion of paradigm, which had previously mostly been used as a grammatical term for a declension chart or pattern. We now popularly understand paradigm to have two somewhat contradictory senses. It can be either an entire world view or a framework for a field, or it can mean simply a prototype or a mere example.

Scholars have found up to 22 distinct uses of the word paradigm in *The Structure of Scientific Revolutions*, but Kuhn most explicitly defines the word as (and this a quote from him) “the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community” and “the concrete puzzle solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science.” Working inside a paradigm in a given discipline – and one cannot do otherwise – colleagues share training, tools, explicit concepts as well as tacit knowledge. Anything outside the paradigm – any novelty Kuhn says – is continually ignored, derided or explained away, until one day a pattern of novelties grows so strong that it can no longer be suppressed.

According to this trajectory, scientific revolutions begin as a series of anomalies in scientific practice. For instance, the discovery of x-rays in Roentgen's lab, when a cathode ray screen began glowing unexpectedly, and this turned into a recurrent event. The accretion of these anomalies then may develop into true crises, wherein they finally result in the adoption of a new paradigm by a particular scientific community.

Now when I looked through this packet of 46 images that Lara Favaretto gave to me and I'm assuming she gave to everyone here in advance of this event. It's 46 images that make up her personal archive or mnemosyne atlas for the word paradigm. I have to say I think I was most perturbed, even disgusted and frightened, by the photograph of the crocodile biting the trunk of an elephant. It's violent but it's also an anomaly: it doesn't fit into the food web as I understand it. Even though a number of similar crocodile-elephant encounters circulated on the internet between 2010 and 2017 – it actually became somewhat of a meme with different elephants and crocodiles involved – these incidents have yet to shift the existing ecological paradigm.

If paradigm shifts happen and if they're revolutionary, then an entire worldview, a whole interrelated network of concepts, not just a single node or interaction, is changed. A field's language changes, its concepts and models, as well as the very structure of its taxonomies. Kuhn writes that a paradigm shift "alters not only the criteria by which terms attach to nature but also, massively, the set of objects or situations to which those terms attach." It transforms not only the "criteria relevant to categorization but also... the way in which given objects and situations are distributed among preexisting categories."

All right, so why does Thomas Kuhn's paradigm, and its propensity to shift, matter outside the natural sciences? If it isn't already obvious, *The Structure of Scientific Revolutions* became one of the touchstones for the early constructivist (or social constructionist) movement. In my field of history of science, which is part of (arguably, I should say, part of) a bigger field of Science and Technology Studies, schools of thought like "the strong programme" that emerged in the 1970s in Edinburgh, shortly after Kuhn's publication, began to argue that science was a culture and a pattern of behaviour like anything else. Scientific knowledge had social determinants (money, national needs, technological setups), it was not simply a series of deductions from theory or a series of applications of the scientific method. Everything under the sun from objectivity to gender was suddenly understood to be socially constructed.

Jean Piaget, a contemporary of Kuhn's and also a leading constructivist in the field of psychology, argued in his 1968 book *Structuralism* that Kuhn had even further influenced Foucault's notion of the "episteme," announced by Foucault in *The Order of Things*, published in 1966. Foucault defined the episteme as (quote) "the historical a priori that grounds knowledge in a given epoch" or the very "conditions of possibility" for knowledge. Foucault's theory is broader and more relativist than Kuhn's paradigm; an episteme can cross multiple fields, for instance the episteme of modern acoustics (and here's my little nod to our common field of sound) spans architecture, physics, music and literature. Our episteme thinks us.

So, paradigm shifts are the source of revolutions. Kuhn's paradigm itself became one of these shifts – away from determinant knowledge, pure scientific truths, and unmediated facts of any kind.

It became a pillar of post-war, post-modern thought in the university. It was certainly at the roots of my training in the 1990s, as someone trained in biology and English before going on into history of science. Many scholars in my field have actually complicated this lionizing narrative of Kuhn by pointing out that he himself was likely influenced by a Polish-Jewish doctor who researched typhus in the early 20th century, before being deported to Auschwitz where he was asked to work on bacteriology, specifically to diagnose syphilis using serological tests. This man was Ludwik Fleck. Here I should just pause to thank the PhD students in my current science and technology studies class for an extended discussion on Fleck and Kuhn earlier this semester which really clarified my thoughts, and I felt it was very fortuitous then to be asked to talk about paradigm, when I had been so well prepared by those discussions.

Fleck, who survived Auschwitz, had actually published in 1935 his *Genesis and Development of a Scientific Fact* (this book title, of course, translated from the original German into English). This little book was not widely-read in its own time, and in fact it took several decades to have any impact, but it was perhaps the first to ask the simple and devastating question, *What is a scientific fact?*

He analyzes one case throughout the book – syphilis or rather syphilology, a medical subspecialty that underwent a sea change with the creation of the Wassermann test in 1906. This test detected antibodies for syphilis in a person's blood. For 400 years prior, syphilis had been a source of medical confusion and everyday anguish across Europe. It was arguably the first disease understood to be sexually transmitted, and hence it was highly stigmatized – I was thinking this is a fitting topic for a clandestine talk. Syphilis is said to have been brought to Europe from the Americas by Columbus himself, or at least by his crew. The first publicized outbreak occurred in Naples in 1494, followed by numerous outbreaks in France (whence it became known as the French disease). By the 18th century it's thought that 10% of the population in the UK was infected with the disease. Its symptomatology began with sores; it proceeded to a secondary stage of headaches, fatigue and hair loss among other symptoms; and it ended – often many years later – with a late stage of visual and muscular impairment and dementia. My grandmother and her parents were evicted from their small town in Northern Sweden because my great-grandfather had brought syphilis into the town (Haparanda) after some sort of cross country skiing sojourn to Finland. This drove home to me how stigmatized syphilis was, how feared it was. My family managed to pass the medical inspectors at Ellis Island. From there they moved to Detroit, where my great-grandmother then spent 10 years in Ypsilanti State Psychiatric Hospital, one of the largest in the country, with over 4,000 patients in the postwar period, around the time she died there.

Bacteriologists only identified the spirochete that causes syphilis in the first decade of the 20th century, following which Wassermann developed his test.

Later, in 1928, Alexander Fleming accidentally discovered penicillin, and then it wasn't until the 1940s that penicillin was mass produced and widely available as a treatment. My great grandfather lived to receive that treatment. My great grandmother didn't. For the four centuries prior to the 20th century, Fleck concludes that syphilis was a jumble – it was something in today's terms we might call an umbrella category. “A jumble of the most diverse diseases, leprosy, scabies, tuberculosis of the skin, gonorrhea.” It was understood either through astrological and religious terms as a “fateful and sinful” (in his words) scourge, or through the empirical terms of mercury treatment. In each of these domains syphilis was understood to beget “bad blood.” For Fleck, probably more so than Kuhn, there's an element of continuity rather than rupture between the newer bacteriological investigations of blood and earlier religious theories that set the groundwork for thinking about syphilis in blood. It's important to note that when we follow syphilis what we find is not just sex but race (race as a crucial social *explanans*, if not for Fleck then certainly for the inheritors of his line of thinking). For instance, the origin of syphilis has been the subject of much post-colonial debate within STS and within the sciences themselves: might Europeans have misattributed pathology to the Americas and its inhabitants? Alternately, might the bacterium have originated in the Americas but mutated into something more harmful in Europe? Syphilis moreover stands at the origin of 19th century “racial purity” fears, and their eugenic solutions, as well as 20th century bioethics debates. Think of the Tuskegee Experiment, where black men with syphilis were observed, untreated – and uninformed about the possibilities of treatment – until the 1970s.

Fleck doesn't offer the narrative one might expect for the modern redefinition of syphilis as a bacterial infection with specific and predictable sequelae. This narrative might be something like Wassermann heroically applying the scientific method to achieve a new fact, or alternately a technologically determinist narrative about the impacts of his test itself. Rather, he looks at the broader milieu of bacteriology outside of syphilis, one might say the bacteriological culture in which the Wassermann test itself incubated. Fleck is interested in what he calls in his book – this a direct quote – “the cultural historical dependence of... epistemology” using terms to me strikingly similar to those of the present day, or what he calls the “thought style which determines the formulation of every concept.” A scientific fact, then, is in his words “a thought-stylized conceptual relation which can be investigated from the point of view of history and from that of psychology.” Thought styles aren't held by individuals but rather emerge from “thought collectives.” “Thinking is a supremely social activity,” Fleck wrote, and a thought style is “directed perception.” It's culturally-constrained perception. Scientific facts change when a thought style is supplemented or transformed. But before that time, he says, (and this a quote) “Heretics who do not share this collective mood... are rated as criminals by the collective and will be burned at the stake until a different mood creates a different thought style and different valuation.”

When change does come, it sweeps across the scientific community much like a paradigm shift. However paradigms and thought styles are distinct from something like the sweep of fads. Here I'm thinking of Lara Favaretto's scan, also in her paradigm image collection, of a faxed lipstick print from the “telegraph kisses” fad during the early days of facsimile, which was new to me and sort of sweet.

But thought styles and paradigms are entire worldviews, they are longer-lived than fads and they change, as Flex says, in response to “signals of resistance” – something like Kuhn’s anomalies.

I was thinking that the form of a thought collective is perhaps as relevant to our project as is its influence on the subsequent concept of the paradigm. On the one hand Fleck defines a thought collective as an “esoteric circle” within an established field, a small group of people who share training and habits and who inter-communicate regularly (in the case of science) through specialized publications, later popularizing the facts they make to a wider exoteric audience. Elsewhere, he suggests that a thought collective (and this is his writing) “exists whenever two or more persons are actually exchanging thoughts. This type of thought collective is transient and accidental, forming and dissolving at any moment. But even this type induces a particular mood, which would otherwise affect none of the members and often recurs whenever these members meet again.”

When we came to this bunker we were certainly not a thought collective. Well perhaps we were, because we have some similar training – or perhaps in the realm of sound studies we are. Well, that remains to be seen. When we emerge after 1, 2, 3, 4 however many hours we stay in here maybe we will be... We’ll have created a new form of thought collective. Lara suggests that viewers of the objects in her *Thinking Head* archive, a store room at the Central Pavilion, will hear our words as they are replayed in the background. They’re quite quiet but if it’s not too noisy you can hear the words of prior clandestine talks being played in the store room. The results, she writes, will be “something similar to a very advanced hyper-technological dimension,” an “augmented reality.” Will the viewers be drawn into our thought collective? Are the viewers listening right now? Are we being streamed right now into the store room? Shall we encourage them to remain unschooled, or perhaps to become heretics?

I want to conclude with a few ways to reconsider the social shaping or a social constructionist paradigm of the word paradigm. For one thing Bruno Latour, a sociologist of science quite well known already in the 1980s, asked members of The Strong Programme, and others in the field of science and technology studies, to take “one more turn after the social turn” – namely to take non-humans, whether that’s technology or other animals, seriously as actors in our narratives and in the world. In his actor-network theory vein, then, we might give the spirochaete as much agency as we give to thought collectives. I am a product of syphilis. It made me an American. It can perhaps be traced in my cells, and in my familial affect.

Secondly, “new realism of the body” and other recent theoretical trends in disability studies insist that social (or social constructionist) models of disability, disease, and impairment might be adequate for epistemology but do not comprehend things like pain, fatigue, and death. There are moments when epistemology impacts phenomenology no doubt, but there are certain elements of my experience that aren’t transformed by knowledge or by language. There’s something like a migraine. My gender might be impacted and transformed, but something like having migraines might not.

Similarly across academic disciplines, scholars in the last two decades have taken up new materialisms, ontology perhaps more than epistemology, or in the case of those of us who still do work in the tradition of historical epistemology (I count myself among those people) practices and techniques as much as thoughts, ideas, beliefs and linguistic categories. Practices and techniques of course are mentioned by Kuhn but until recently were not studied quite as much. Lastly many scholars have turned to what I think is inappropriately called post-critique. (When Latour asked in the early 2000s in his article “Why has Critique Run Out of Steam?” he was worried that what should have been a profoundly materialist constructionism had been misidentified with linguistic deconstruction, and more importantly appropriated for all sorts of conservative social constructionist arguments such as climate denial. In this new academic paradigm shift, scholars seek modes of writing and analysis beyond the so-called “hermeneutics of suspicion.” Things like reparative reading, description, speculation and fabulation. I’ll pause here on my little academic tour, focused on science studies – and the history of the term paradigm as it was popularized in English out of my subfield – and turn it over. I don’t know who wants to speak next but I’ll turn it over to someone else and then we can have a conversation.

/ Alexander, would you mind? Given that you’re more involved in this from an earlier point... it might give me a bit more time to be infected bacterially by your comments and therefore say something a bit more meaningful.

I have a few a few comments or questions or responses. Has Harmony arrived yet?

No Harmony is not here.

My main question is where we’re left – in terms of agency and shifting paradigms – by this historical overview. I’m sorry, there’s a bit of an echo; I’m going to be keep the speaking to a minimum. You described epistemes as “thinking us.” Obviously, there’s a sense of the impossibility of truly thinking outside the paradigms that govern how we think, how we speak, what we say, and what we believe. At the same time, on a more popular or instrumental level, especially in relation to political theory – you have the Overton window, for instance, which hinges on strategies for shifting paradigms, for shifting what is thinkable, for shifting which political ideas are viable.

I’m wondering, Mara, given your extraordinary knowledge of this subject as it relates to the history of science and the various scholars who have theorized this term – what gulf, if any, exists between the paradigm as described by Kuhn and those who have followed him, in terms of the more mundane but essential problem of shifting what is thinkable? And changing what kind of political action is probable? What does this have to do with the more theoretical ideas about what we say and think being governed by forces that we can hardly even perceive, except at a distance?

I think that’s a good question. I think the other question I would have for you two and for Harmony would be what other uses... How has the word paradigm continued to accumulate meanings? I didn’t look at the *Oxford English Dictionary* definition today.

I probably haven't looked at it in a year or so but I'm assuming there's a long list of meanings that have accumulated since the 1960s, many of which are on a smaller scale than the worldview scale that I was mostly discussing with Kuhn. As I mentioned, he also uses it in a smaller sense as like exemplar or pattern, or I should say like "model." I think in the arts and in many fields most of us are thinking of smaller-scale paradigms, not the immersive episteme-like paradigm. The roots of how the term went bacterial in English, I think, is tied to Kuhn, but that doesn't mean that today the way the word is used is owned by him.

/ No, but I mean those of us who have any training in the history of science might sense that that is the only possible definition left—or it's the only one to which we have access because the concept of the paradigm becomes paradigmatic in and of itself. Like Alexander just said, it is a source of concern to the extent that it almost doesn't allow us to think outside of it. I'm not talking about the paradigm of our respective fields, but rather, the concept of a paradigm as a constraint on possible thought actions. How that prevents us from accessing different models for thinking about not only thought but modes of training, different habitus, and so on and so forth. But the very fact that we're here, I think, suggests that there are other possibilities. The Clandestine Talks do particularly so, as they insist on interdisciplinary interaction, and put us in very tight enclosed spaces – although Alexander you're slightly mediated – that does remind us that... what did you say, Mara? Hold on. It was quite brilliant.

Correct: that being in the bunker here reinforces the impression that thinking is an overwhelmingly social activity. Being in this proximity reveals in a strange and acoustically determined – and also under a different mode of gravity – way that human interaction, in addition to material interaction, has a certain command over the things we might say, think, do, and so on and so forth.

○ I mean to answer Alexander's question, I suppose coming from the sciences Kuhn and Fleck weren't asking the question of how do we make political or social change. Although, the folks they were investigating were certainly asking the question of... They thought they were asking the question, often, of how do we make scientific change? How do we invent something or how do we discover new facts? The sobering analysis of both figures is that even when someone thinks they're discovering a new fact, they're elaborating a set of facts within a given paradigm.

/ There's no difference between discovery and justification because the rules are determined by the exact same set of potential puzzle solutions.

□ Which is to say that there are significant limits placed on what you can "discover."

○ It's really a series of these anomalies or it's a series of external events, which could be events in other fields. I think for Fleck it would be: there's technological creations, and there's discoveries in adjacent fields. It's basically this emergent moment where a number of discoveries coalesce. Actually he has an amazing quote.

He says that “science is an excited conversation among several persons all speaking simultaneously among themselves and each clamoring to make himself heard yet which never the less permitted a consensus to crystallize.” It’s these repeated crystallizations that are the thoughts styles of different thought collectives ... Or they’re the changing thought styles of thought collectives. I mean there isn’t really single motor that you can point to in this theory of his and I don’t... I mean I think the liberating part for Kuhn when he first was coming up with this theory of paradigm shifts was that he had been reading about Newton.

This I think is an apocryphal story. I don’t know if it’s completely true. He originally thought, how could he, Newton, not have understood? I think he was thinking: how could he have not understood gravity, or how could he have not understood physics as we know it today? Then he eventually realized, previous science wasn’t incorrect. It just... It existed within another, a different paradigm. The origin of it was him trying to lose the arrogance and the present-mindedness of scientists in his own time.

/ From that he developed this concept of incommensurability where one *thought collective* (in Fleck’s terms) or one *paradigmatic community* of scientists (in Kuhn’s terms) revise and eventually replace their former ways of knowing with a brand new way of knowing in what Kuhn calls a process of revolutionary science... and thus lose the ability to understand what the former dominant mode of thought was doing and how it could be successful.

○ This happens in our own fields. I mean think of all the books published in the ‘80s called “the social construction of something.” No one would write a book with that title anymore, because the paradigm has shifted.

/ That does bring me to the concern over our own time and how we invest ourselves in different forms of scholarship. To be more specific I’m thinking when you’re learning a field, when you’re being trained – and I think that was one thing that Kuhn was really trying to express, that doing science, or formulating knowledge was nothing less than a training in how to operate within this one very particular framework. When we’re doing that in any of our fields, be that the history of science, be that the tangential or maybe just simply more recent science technology studies, or critical theory, or political science, or what have you – where do we draw the lines between those things that we allow a passion for, and those that we reject outright, and those contours... to what extent do they rely on like the simple question of temporality. Is this too *old* to be really taken seriously, or is it so new that it must be read immediately and allowed to resonate simply for its novelty? That’s something I’m still working through my dissertation that I’m having to repeatedly encounter. I’d like to go back really quick.

○ Being heretical and being told you can’t write this.

/ Precisely. Being told by mentors that you need to read more old books, or conversely by another mentor, that you need to read more new books. It’s that combat between former and perhaps more contemporary ways of thinking of disciplining the mind and also the body.

We can't forget that reading is always an embodied activity, at least in our world that I'm most familiar with. But I want to go back to one comment you made just now which I think is considerably relevant to the first question, I think Alexander posed, and that was regarding the importance of external events to the possibilities for cognitive change and by extent social and political change of course.

Because what Kuhn calls *anomalies* are these things that are explicable by the terms of the form of science in which the anomaly appears. Once those accumulate to a certain point – and I don't know what that tipping point is – when what he calls the *disciplinary matrix* must be revised and changed and that set of possible questions and possible answers must be changed. These are external events. At the same time, according to him, they're not: because what is even allowed to be an event is predetermined by that disciplinary matrix. It's predetermined by the paradigm itself, by the paradigmatic theory that overrules, that is the umbrella, like you said, of that form of scientific activity. We see that Kuhn's very theory of the paradigm has infiltrated, or bacterialized, if that works, and taken hold in many other fields of thought, acting as an external event on other things.

I'm interested in that because that is, I think, what's supposed to be happening with the whole format of the clandestine talks. Hello...

- Hi Harmony!
- * Can everyone hear me, I don't know if it's on right.
- Yeah.
- * Hi Alex.
- Hey. How has it been?
- * It's been a long journey.
- Nice to talk to you. I'm glad you made it.
- * Me too.
- We all opened by introducing ourselves to anyone listening. I don't know if this is live streaming into the pavilion into Lara's exhibit.
- * That's cool.
- Maybe if you want to say a few words about yourself then.
- * My name is Harmony Holiday. I live in the US, I'm a writer. I also have a background in dance and I do some sound and video things here and there. Writer first, I guess.

○ We've been talking down this rabbit hole a bit that I had started because I was trained in history of science – (I'm Mara Mills) – about just etymologically looking at the history of the word paradigm in English and how it proliferated and became popularized by Thomas Kuhn's 1962 book *The Structure of Scientific Revolutions*. There are so many definitions of the word paradigm at this point, popular ones, dictionary ones.

★ What is the etymology, because that's one thing I was going to look up on my internet.

○ Well, two definitions of it are, one, that a paradigm is something like a world-view, and this influenced the development of social constructionism and Foucault's episteme, and the other is just paradigm as an exemplar, a model – something much smaller. We've spent a lot of time talking about the former and these big sweeping changes in academic thought, but there's so many other things. I may be the only person here who actually was able to go to the exhibit. (Lara Favaretto's.) Well, we are *part of* the exhibit, but the material exhibit – the store room, or shelves – yesterday. She has a series of shelves – I think they may be four high – it's a room like a bunker, lined with shelves on three sides, and there are words on each shelf with objects above them that she constantly rotates.

The current configuration of objects that she has located above paradigm are objects that somehow symbolize paradigm for her at this moment in time. I could just describe them to everyone here as a way to add onto, but also swerve out of, history of science if we wanted.

/ I know, I think we're just getting in to that.

○ Also I don't know. She didn't tell us how she defines paradigm. She gave us a packet of 46 images, and then all I know is this grand pavilion installation. Basically, I was surprised that the word paradigm is on the very bottom shelf in the very far left hand corner. I made the case that the word paradigm is central to modern western academic thinking – here she's totally demoted the word paradigm. It's very difficult to find and see. Maybe like part of being the invisible infrastructure is the whole point, or maybe it's just not actually as important of a term to her as other terms are. The objects located there: there's something like a conveyor belt that swirls around four statues. Three of them are busts of toys and one is a statue of a parrot. And the three busts: one is Mickey Mouse, one is some sort of clear plastic head, maybe it's like an anatomical mold wearing a motorcycle visor.

Then the other one is something like a bust of the stereotypical mechanical Turk or the head of Zoltar, the 1950s fairground automaton – something like that. I was thinking about these heads and I was like, these are heads but are they *thinking*? The thinking head is one of the frameworks for this project too. The parrot, I don't know what to make of. Parrots may speak but they aren't generally granted logical thought. The other objects, can they speak at all? Are they fragments? Are they death masks for a paradigm that once was?

Are they proper busts, and if they are busts what are we supposed to make of a toy bust because busts originated in ancient Greece as very cheap and quick versions of portraiture. Then by the Renaissance they became upper-class European citations of ancient Greece.

Citations of antiquity in the name of grandness and permanence, rather than cheap and quick ways to do a portrait. Now here we have on the paradigm shelf the collectible toy busts. I'm like, what do I make of this? These are truly cheap materials. They're plastic, adopting the pose of grandeur. They're fakes that are being memorialized. They're action figures that have been beheaded and asked to perform some other kind of work, to stop feigning animacy. Then there's the irony of the true permanence of plastic. I was thinking, I don't know why these are part of the paradigm shelf. Maybe it's because paradigms can't actually be immortalized. They're constantly shifting, and intellect can't be disembodied. Maybe that's what a toy bust teaches us. I don't know. What other readings are there of these toy busts, or of an artistic set of definitions for this word paradigm, or any everyday smaller definitions?

/ I'm taken by the word *citations* there – you refer to busts as being, at one point in history, European citations of Greek civilization.

○ I'm not trained in art history so there's probably a better way to put this but it's just the... There's something just so ridiculous about a toy bust, but there's also something ridiculous about the drawing room bust, citing something that was actually cheap in its own time. Anyway, cite might be the wrong word.

/ You said *citations* and you said *cheap* in relative proximity to one another in your sentences. Perhaps it is precisely that. She is making a cheapening of the citations as some sort of analogy for the ways that thought is eventually cheapened through things like social phenomena, like paradigm shifts as Kuhn describes them. A playful but also very serious reflection the way that things come and go and eventually take on connotations which would be seen as disrespectful to the former epistemic way of knowing those things. To have a Mickey Mouse like that... not that it needs anymore cheapening... the question of plastic is also very interesting because it is very durable. I think – and I'd like to nod to one of my colleagues at York, Angela Cope, who researches the history of plastic – that's not so well known.

The reason that plastic is so prevalent in the world – there are specific historical conditions following World War II and it's very much related to military investment in technological development – one of the main reasons that plastic became so common in the world today is because it was *seen* as disposable even though it was not at all. It's in fact one of the most durable materials that is available in the world.

○ It's a tragic accident. It's a very tragic accident.

/ Another reason is because it's perceived as hygienic and that has to do with the visual culture of post-World War II American culture and so on and so forth.

It's that discrepancy between the physical reality of synthetic materials – polyurethane, which can last thousands of years in the natural environment – and then the socially-conditioned perception that this is something that I only need to pay one American dollar for and I'm going to throw it out tomorrow because I can.

* Also just the idea that disposability is something that we should want in general, as plastic, why would it become so popular? There's definitely a former paradigm.

/ As far as I understand – these are in other conversations, not in bunkers, with my colleague I just mentioned – it's very strongly tied to notions of hygiene and ideals of hygiene at that period.

* Also capital because we need to constantly overproduce to have a mark-

□ How is it tied to hygiene, exactly, as opposed to carrying one unclean vessel around? You have something that is pristine, new, manufactured for one use only, and then it will be disposed of. It's insulated from the world of germs.

/ Sure. Well, I preface again by saying I'm not an expert on this. I'm only slightly recalling the way it works in her research, but it's tied to hygiene for that reason, that it can be disposed of immediately. Once it's been infected, there's no worry that the germs and bacteria that are on that material are going to be transferred to your body and cause illness or whatever because it can be thrown away. It maintains your hygiene by being disposable, the hygiene of the home. Other reasons I think are tied to broader cultural appreciation – visual-cultural appreciation – for shiny, colorful things to which I couldn't speak anymore. It was definitely very visible in popular magazines in America in the 1950s. There are plenty of archival materials that show directly these plastic materials were paradigmatic of cleanliness and ease of maintaining hygiene.

* Maybe also just to ease and try to connote a middle-class identity because I think that maybe being able to buy a big thing of plastic water bottles in the '80s and '90s symbolized a certain middle-class. Signifying-

□ That's a 24 pack?

* If you had those-

□ You have to have a minivan to fit the entire 24 pack.

* Exactly.

○ Plastic is one of those-

□ Don't forget the Capri Sun.

* The Sunny D.

○ Capri Sun is tinfoil, isn't it? Don't tell me I was drinking out of plastic that-

/ It's all plastic.

* Foil is even worse.

□ They were foil-colored plastic pouches. I'd have to go buy some to confirm.

○ Plastic is a weird example of... I think there are competing plastic paradigms. I may be bending the word paradigm far beyond how it should be used because it may just be like practice. There's something, the commodity form that plastic has taken is adopted by users in lots of different ways, and appropriated in lots of different ways. There are many different markets. Economic terms might be better than paradigm, but I'm thinking of the plastic straw debates. Many disabled people need plastic straws because they don't melt the way cardboard straws do. There's an environmental, if I can use the word paradigm here, a paradigm about getting rid of plastic straws in the name of decreasing plastic waste. Of course the plastic gyre is not going to go away from that one step, but it is one positive step. But then again, not everyone can actually get rid of plastic straws, and some people rely on them.

* They can be substituted with the kind of metal reusable, no.

○ There are so many reasons why that doesn't work, for instance glass straws breaking. Also for all of the... One might think that the problem of plastic has become the new paradigm. We seem to all agree around this table that there was a false consciousness of people, in the previous paradigm, thinking that plastic was disposable. Now we know it's disposable slash permanent. Actually plastic is still being produced in huge quantities. The changed paradigm has not had... it seems to have not had any effect on plastic production.

* Well it's actually embodied now, because now they're finding the first traces of microplastics in human blood because these are already in the blood of sea creatures. If humans eat them... It's going to go up the food chain obviously. It's like that's what we are now.

○ We are plastic.

* Radiohead was right.

○ We're corn chips and plastic.

/ In addition to several small nest-building species.

* They've started using them?

/ Started building-

* That's insane.

/ I can't remember which bird it is, but there is widespread documentation of them building nests out of fully plastic materials.

○ I mean, can the word paradigm be used beyond worldview... The big definition of paradigm was about thought. It's like worldview, some sort of thought collective thing. Then the smaller definition was more material. It's, is this is a model. I mean, we can see these plastic heads are models of something or they could be, or an exemplar of something, a mold or something. Actually this idea that plastic is... It's like a materialized worldview. It's like it's in our blood. If we're made of it and nests are made of it, it's like the small version is cannibalizing the big version of paradigm.

* Because we underestimated this power of the-

○ The epistemology of plastic doesn't even matter. It's total ubiquity. It's the foundation.

* Just the fact that it proliferates so much because of that ubiquity, or the fact that it's not disposable means that we've been, I mean, I guess it's like a proper accumulation strategy for the western hemisphere. It shows how our toxic worldview has accumulated over hundreds of years.

○ Creating piles of waste and gyres in the southern hemisphere.

* Literally, I mean, we outsource our trash now because of the problem of plastic. Maybe it does point to other issues with the western paradigm world. I don't know. I see it almost, when I think of a paradigm, I was thinking a lot about mythology too, and how we mythologize purity in the west by throwing all our trash and waste over. I mean, where was it? I think we export it to China a lot of our trash.

/ They've stopped. China has-

* Now China stopped. Now where are we going to put it? Maybe we'll just actually have to have trash.

□ Space.

* Space or Mars.

○ Or platforms for new golf courses.

* Oh God.

○ Landfill.

/ That's an option. As I know a lot of waste is currently being shipped to Southeast Asia. There was a very widely-discussed controversy between Canada and the Philippines.

* I saw trash is washing up on their beaches.

/ Yeah. Well, so they had surreptitiously sent something like 200 tons of waste to the Philippines, through some shady deals. I don't know. I don't know the details. I shouldn't speak to that. The Philippines apparently-

□ Apparently it would be feasible to launch the trash into the sun, but the expense is outlandish.

○ I think some of it is just floating around on container ships, waste container ships. Actually, the lovely part of this experiment is that we have no Wi-Fi in this bunker. We actually have, we actually do have to create it. We can say what, we can come up with any theory we want. Let's come to consensus on this.

□ That's why I'm here.

○ That's right. You can be our reality check.

* Is that sun theory-

□ Your extension into the world of search engine.

○ Fact check for us.

* We have no Wi-Fi, but we do have plastic.

/ We do... Interestingly enough, we do have lots in here.

□ Well, the next stage is you to build a nest.

○ Alexander is speaking through plastic in fact to us.

/ Which is really incredible if you think about it. Mara, you just mentioned again the confusion between the two possible definitions of paradigm. One is a worldview and one is more microscopic.

○ A mere example or a model.

/ Already given what Harmony had just said, and reminded us about microplastics already... that we are already embodying plastic through the ingestion of microplastics, be that directly through what we eat, or I don't know, microplastics feeding my body by touching and putting my lips to these things, or eating fish or other animals that have ingested it... that collapses those two definitions into one.

Because the worldview that plastic is a sustainable, respectable, and just generally *good* thing to have and use and create has become that tiny thing that we hold in our hands instead of just our heads. Do you know what I mean?

○ I know.

/ It's that the conceptual thing, the worldview of plastic, is now in the body. The body is the model for the model. It takes it. That's a hybridization of them, or a collapse. I don't know which word is better.

○ The worldview is an example of something from the past. I mean, I almost only use the big definition of paradigm when I use the word paradigm –like framework, worldview – and then the smaller definitions, at least the ones I pulled out of these books. I was reading through Kuhn and Fleck again, we're a prototype and mere example. I know that there are... Someone said there were like 22 definitions of paradigm in Thomas Kuhn's book alone. Undoubtedly in the *OED*, there's many, many more by now. I'm not sure. Alexander, do you use this word in any other ways in your work?

□ No. I mean, it's not... it's something I think about very generally, except when I'm reading someone like Kuhn, who's built an entire theoretical apparatus from a specific use – or many specific uses – of the term.

/ There are also uses, or deployments of the word paradigm in other languages. Following the same etymology, spelled more or less the same. I think in Spanish, *paradigma* as I recall, it simply means model. It doesn't go to that extent where it would speak to an entire set of practices that's disseminated widely throughout society. It's just one, like a basic thing, a basic presentation of something bigger.

○ I mean, I sometimes use a version of the word paradigmatic for something small. It's not a model. I use it to sometimes say something is a mere example. If I'm teaching and I'm like, this is paradigmatic. It's like this is an example of something. I don't know how it's used in the art world. If makers of models are using this term in a more concrete way. My use of the word model is actually metaphoric. It's often a text or a case being an example. It's not a real model.

□ I think about it in terms of music, in terms of prevailing styles, which don't necessarily foreclose on alternatives, but that do govern what people produce and view as appealing or acceptable. I've been thinking about this in relation to pop music and, specifically, production techniques, the information about consumers that contributes to what people produce and how they produce it. Which can create a very rigid paradigm based on assessments of what appeals to listeners, what sells. That has to do with consumption data, but also with neurobiology research and so on. I think this relates to some of what you think about, Harmony. How do people perform and express themselves and for whom? What does that lead to, in terms of tensions between what seems possible or viable and what one wants to do beyond those structures.

* I think the market definitely determined some... people can pander to certain paradigms, I think, well also not holding them, in the sense that that's how I, in some of my work about sound and music, I think a lot specifically about the paradigms of black music and sound within the diaspora culture and how those shift based on... For example, at first a need to get off of a plantation out of certain economic situations. Then, once you get into a certain economic situation, how that might change, for example, the minstrel went away once that entertainment wasn't a contingency for liberation. But it didn't exactly go away because there is still some of that contingent access to power through flagrant entertaining that black people use as one of our points of access, I guess. I mean, I think in a way for certain cultures, a paradigm represents the illusion that we play up to in order to survive in a sense. You see Southeast Asians and black people and Chinese people in the US adopting a paradigm that they don't believe in certain settings, especially academic settings. Western-

□ You recognize it as something you can slot yourself into strategically, but not something that makes thinking or acting differently impossible.

* It doesn't, if you do it consciously, it just depends on how deeply it's in your subconscious. I think a lot of us who don't come only from a western background might have the experience that I've had of you're able to wake up from a certain paradigm and realize what you've been doing at a certain point. Usually in college or graduate school. We never learned any history from another culture, so I never felt like this. That's where to bring it to popular culture. You see what's happening in football with Marshawn Lynch and the other guy, like two people. I was thinking about this the other day in relation to this. It's a strange far out example, two black male football players who got into Berkeley for their talent as football players but ended up being militant and then brought that into American football.

Then you see that now there's this resistance in this taking a new thing. I think that's a direct paradigm shift happening where people probably went to regular public school. They know that they were being indoctrinated in a certain western paradigm and then get somewhere. I took the same class. It's the one African history class of Berkeley. Then you're like, "damn, I'm in the paradigm now." What about Africa? Your whole life, you've been denied any information about this because you are promptly told to read every text from *Moby Dick* to whatever. I think I read one Toni Morrison's book, *Invisible Man*, in high school but no one's ever like... so then for example me doing rhetoric, which is more like philosophy at UC Berkeley and reading Foucault and Derrida and all those people where the foundational class was Greek mythology.

My question to that professor, as an 18 year old was, "Why is a foundational myth of all rhetoric Greek mythology and not Egyptian mythology or something, because this just another culture's mythology." They were like, "We're done with you." They didn't know what to do with me. That was that. I think it's somehow, I guess that brings us to maybe how is paradigm related to class struggle and race struggle and just struggle in general outside of class and race.

Because it is, I feel like a struggle for dominance. Whoever has a dominant paradigm is inadvertently or consciously acting out their mythology on the rest of the world.

○ Yeah, we haven't talked about competing paradigms. I mean, the people who started theorizing paradigms long ago, 50, 60 years, were talking about competing paradigms within one teeny tiny community and how one gets overthrown. There are lots of other kinds of competing paradigms. Did you study African history with Abena Osseo-Asare at Berkeley?

* I took one class.

○ Was she the professor in it?

* It was a male professor...

○ She taught there for a while and she was... I went to grad school with her in history of science and she's now at UT Austin I think, unless she moved again. Her award winning book her... Actually I think she might have two books. Award-winning first book is on plant knowledge and herbal medicinal expertise in Ghana and the way it was appropriated by western pharma. There are two, not quite competing paradigms, but Venn diagram paradigms. One clearly has more power to appropriate knowledge and turn it into-

* Monetizing.

○ Monetize it and turn it into commodity. There are competing paradigms, many of them, but some paradigms have money and power attached to them, not just inside those worldviews, but as they engage with other ones.

* Is a condition of paradigm formation capital and economics? Because I feel like in Ghana, for example, shamans and people who are master herbalists might not even be considered as having a paradigm in the sense. They have a body of knowledge and a tradition and the legacy. Maybe paradigm forming is always somehow intentional. Pharma is a paradigm for how all medicinal things should be applied. It's a paradigm based on economics and what you can patent. You can take some strain of an urban patent whereas these people in Ghana aren't even doing, there's a more holistic approach. It's not, I don't know. Is paradigm formation something that in the west is most implicit?

○ Is the paradigm concept as it stands now just utterly white and western? When Kuhn was saying the word paradigm, he was applying it to past western scientists, mostly European scientists, who would never have used the word for themselves. He launched social constructivism... He was one of the people, but there are others: Piaget, Foucault, many others were part of this. That had a huge impact on gender studies, critical race studies. Even if these fields have now moved beyond, they're still in that... Social constructionism is still a relevant paradigm, but most people aren't using those terms in critical theory and in activism.

The question is, are we not asking about the limitations of paradigm... now that many critical scholars are self-aware of this concept, I guess, are people using the word paradigm self-consciously in industry or the sciences at this point? I don't know.

★ I feel like it ties into imperialism in some way. Because I don't think outside of western thought cultures are thinking, even if you're not using the word paradigm to describe your overarching model and worldview, I don't think the desire to proliferate a worldview is common to every... You know what I mean? People have their worldviews and the idea of wanting to spread them and then therefore create wealth with that is not common to every culture. I don't think. Is it? I don't know. Thinking about it, it seems like the concept of a paradigm is necessary to create a higher-

○ To cosmology. I mean, I don't know the roots of... I actually don't know the etymology of paradigm. I just know its early uses in English and obviously it sounds like it came from the Greek.

★ Alex, what's up with that online etymology.

○ First in English it was used-

□ Seems like that might take me a while.

★ That's true.

○ It was used at first in linguistics. It was, I think applied to every language. Again, if you believe in the idea, this Chomsky idea that all languages spring from the same source, which is not social constructivist...The idea is paradigm was just a declension chart for verbs and it could be applied to any language. A paradigm would be a pattern of sameness with difference. No one ever... Maybe linguists do, but no one outside of linguistics ever theorizes from that definition of paradigm, which is actually an interesting one, that one can take a word... That one could take an object and transform it, but never fully wrench it from its history or from its material source or something like that. This other version, this post-Kuhnian version of paradigm is maybe... I don't know if it's always tied to capitalism, but it could always be tied to imperialism.

I had mentioned before you got here Harmony, that Kuhn was inspired by Fleck, and Fleck had come up with his precursor to the paradigm, which is this idea of thought collectives based on his studies of syphilis. Syphilis and syphilology – the understanding of syphilis is thoroughly colonial and post-colonial because the story in western medicine, starting in the 15th century, was always Columbus or his crew brought syphilis back from the Americas. Then there've been a series of debates about whether that's a pathologizing notion of the... A racist notion coming from Europe or whether-

★ They brought mad diseases here, first of all.

○ There is something about the beginnings of this way of thinking, starting with Fleck, that definitely is just thoroughly rooted in ideas of race and place. I think there's more to be said about how the word paradigm is used and what its limitations are.

/ I'm going to say this several times over the remaining course of today's engagement. This bunker situation is like really nicely generative. We just found a limitation, a border, a horizon for – I did, at least, I'll say, due to the social pressures that you're giving me with your words – with capital. Because the second you asked if it can be tied to capitalism, when we think about whether paradigms can be tied to capitalism, well sure. But I'm still, because of my background, I'm still stuck to the scientific version of the paradigm. Then when you mentioned that, I recalled a paper I heard presented once which told the story of the recent history – by that I mean from the 1990s to the mid-2000s – of a pharmaceutical company following a scientific and capitalist paradigm. It was looking for a location to conduct experiments in order to better develop certain drugs for certain genetic treatments.

The place they found was an isolated Island somewhere in the South Pacific, which had a policy of non-interference with any outside economic or foreign or colonial forces. They refused to open themselves up to tourism. They refused to open themselves to any commercial exchange with any outsiders – without exception. After some pressure, repeated attempts by the pharmaceutical company to allow them to go to the island – I'll mention why – this island was useful because they had been isolated genetically from the rest of humanity for, well, an improbably lengthy amount of time. That's why they were seen as a useful resource for understanding the way genetics work, because it was a notion of purity that they embodied. It was an undisturbed laboratory for the exploration of genetic insight, of genetic experimentation.

The forces of capitalism and science, two different paradigms tied together in the form of the pharmaceutical company, eventually succeeded in convincing them, obviously through lavish gifts, through lavish amounts of capital thrown at them, to let the company in. The islanders eventually did. And that place which once was one thing, had its own paradigm for social and political interaction, which was essentially a set of refusals – I refuse to let you come to our island to do what you like, it's our island, it's our place – was toppled by that marriage of science and capital, again, two paradigms in and of themselves. There are limitations that we can break through.

○ You're making me realize that the story of Kuhn's paradigm as disrupting the prior linear progressive notion of science, that there's just been an accumulation of discoveries since the scientific revolution. We get closer and closer to the truth by following the scientific method. Actually, it would be very easy to appropriate that term in the name of "thinking outside the box." If the paradigm is the box, or like, hey, anyone can create a scientific revolution, anyone can create a technological revolution. I mean, again, I'm not... I don't work on innovation studies and I don't study Silicon Valley and I don't know how this word is being used in industry. But I could see that it would completely... It could easily flip the original intention of it on its head.

I mean, Kuhn is looking at a moment that's before industrial capitalism, the early days of capitalism compared to today. Not to say that it wasn't tied to capitalism – I'm sure we can find plenty of links. I would imagine that the way the word is being used now could be this, could be completely wrong about creating "revolutions," in the name of selling.

□ Moves fast and breaks paradigms.

○ I mean is the big idea of the paradigm the mold that all of our thought is locked into, versus the paradigm is the mold that one kind of product or one strain of music is locked in. Those are very different scales. You can't really manipulate the other one. With music, I was wondering as Alex and Harmony were talking, what's the difference between paradigm and genre?

* Alex, do you-?

□ I was thinking of a paradigm more in terms of how the production of music creates or emerges from a feedback loop that has to do with data and consumption habits, new-

* Technology.

□ New technologies and also research on how people respond to certain stimuli especially, on a neurobiological level. To me, that technique, that way of conceiving of listeners of how to satisfy them or how to get them to consume something, isn't limited to genre. It has more to do with the technological system that incorporates and reinforces ideas about who people are and what they want or what they respond to. I think that system might be producing more of one genre than another, but there's a reason to tie it to genre. Genres aren't so rigid. They're effective marketing tools or ways of communicating to specific demographic groups. What defines you? What defines you in relation to others who are slightly different from you, in terms of performance styles and historical cultural lineages, and whom you subscribe or don't subscribe to?

* I think, specifically with jazz music, it's a good example of all those things Alex is talking about and how both definitions of paradigm operate because when it came to be, it was completely instrumental and analog, not electronic. Then as electronic instruments have become more popular, maybe Herbie Hancock would be one of the first people to play like, actually probably Sun Ra like a Wurlitzer, and the Fender Rhodes as opposed to a regular piano. As far as the production goes, it's a music that's not really market driven so much, it can't really be because it's not that popular. Although in some ways it is. Like Miles Davis was a master of the market, but he was also... Most people who make jazz music do it more for their health and their idea of community. Then there are the paradigms of people not wanting it to turn electronic versus people wanting it to.

Does the genre get to be called what it is, if it now does not... If it's digitally produced, if it's produced on machines, is it still jazz music?

Then the definition having to shape shift and really become more focused on collective improvisation, which in my opinion is the overarching paradigm of that music, so then just becomes improvise music. That in a way becomes a cultural paradigm because you're talking about celebrity making versus the idea of a group working together. Then it shows how the market then takes over because the market wants a celebrity. When you see jazz LPs, there's always usually a name. They make stars out of people because that's what the market does, but I think that the idea of a band leader is not part of the jazz paradigm. It's part of the other paradigm. I don't know, it's a good thing to look at. I always look at it because I just research a lot and because it shows the struggle between paradigms in a way.

□ It's hard to imagine a quick, quantitative model that can be applied to collective improvisation in order to enable people to effectively determine what people want when they listen, how to reproduce it or automate it. I mean there's, computers aren't very good at improvising. Highly generative algorithms aren't the same as improvisation.

* Well, I think part of that is because it's a form that's for the practitioner and not the audience in a way. That's not something we're used to in music. Ritual music in general, not just jazz, it's for the people playing it too. The paradigm we're in, music is supposed to be for sale and for an attainment for other people, but we don't really talk about it, because you don't think like Miley Cyrus is making music for her health. She's obviously trying to get money. I think a lot of musical forms are for the practitioner and then they become confusing within the dominant paradigm about sales and stuff.

□ They don't emerge from a market model or from a market incentive.

* Totally.

□ It's music or forms of expression that predate the market model and will persist long after that model is gone.

* Are there other things like that in... I don't know.

○ This is reminding me of some of the arguments Sumanth Gopinath and Alexander Weheliye make about ringtones, which is a paradigm that came and went, if we can use the word paradigm for ringtone music, which crosses many genres. Sumanth's book on the ringtone looks at the confluence of technology and markets. Then Alexander Weheliye looks at the feedback, actually, to use your word, Alex, of the shortness of ringtone loops back into different genres of music. That music starts to be performed with ringtones or a ringtone aesthetic. I don't know if something like the ringtone, which combines politics and genres and performance and markets, could be a paradigm in a slightly... In a slightly different way. I guess it's a meso-scale paradigm. Not like a massive paradigm shift, but bigger than just a small example changing.

/ It does point us back to comments that Alexander and Harmony have just made regarding the relationship between technology and these musical paradigms. In the ringtone example, that's immediately foregrounded in music production and the consideration of consumption patterns in the establishment of generic forms of music, technology is always obviously at play. If you think of something like autotune, it is a question. The prevalence of autotune in a lot of popular music seems to me to be a question – like you said, Alexander – driven by research into what or who people they think they are, and what they respond to. When you look at the other practitioner, in the case of autotune, it's also a question of what they can *do*. Can that singer hit the right note at the right time, every time?

Are they a trained singer at all, or do they rather fulfill some requirements of celebrity-making, as you mentioned, instead? There's a compromise made there that auto-tune can fill. Then of course you have bedroom producers who are throwing auto-tune all over themselves, without the question of celebrity-making, although they might be striving towards that. But again, it's the technology that enables any and all of those situations, I think. Then with jazz too – there is, as far as I understand the history of jazz music – in addition to it being an art form, a cultural form which revolves around the self-directed action of the practitioner for feeling good. It is about collective improvisation and also the rejection of all sorts of conventional Western musical norms in terms of scale and whatnot.

The way that we understand jazz historically is part and parcel of recording technology. There was a time when jazz did sell well. When there was a thriving community of recording engineers in Los Angeles and New York who specialized in making jazz understandable to wider publics through changing the placement of room mics, amplification levels, the dynamics and whatnot of different instrumentalists, and achieving the form that we understand jazz to be historically now (because it is sound reproduction technology which gives us access to that moment in time). All that to say: technology seems to be here, and it's something that Kuhn didn't ever get to. The determining nature of tools and equipment in generating what we might perceive as merely conceptual or more conceptual models for thinking and being-

○ Well, here's a couple of sections on the Leyden jar. There are a few tools in there, but the thing is he wouldn't be... I don't think they would have wanted to be technologically determinist. Because that's not a paradigm, it's just a technologically-driven shift. It has to be bigger.

/ Exactly.

○ It has to, because some of it is conscious and some of it is unconscious. You mentioned habitus, too, in your very opening remarks. Some of the training that we do as we learn an instrument or learn a style or become disciplined in a field – an academic field or other field – is conscious training, but so much of it is... It becomes unconscious or is always unconscious with tool use. As you learn to use a new tool in your field, whether it's a new instrument, whether it's a new piece of software, some of that is conscious and some is unconscious as well.

There has to be more than just the technology driving it, I think. There has to be something broader socially. There have to be social determinants as well for it to fit into at least the old-fashioned definition of paradigm.

I mean, I so wish that one of my students who is an expert in computing, were here, because I suspect the word paradigm might be used in software or in programming. Let's switch to this paradigm. Is like a building block that can be rotated in and out. I think there probably are purely technical uses of this term now, but I almost-

/ I know there are *prototypes*, which is a related term. Prototypes being, I think, series of filters in networks that you can layer filter cutoffs on top of one another so you get them sharper and sharper and sharper and sharper. If we use an acoustic metaphor, we could stop a sound at 1,000 Hertz, and we have a different slope on a filter, and we remove what's above or below that frequency. Then I think in electronics - well now, these filters are all digital, and I don't know if the question turns to programming or not - you put that same filter on top of itself many, many times. If you drop the amplitude a certain level on the first level, then this much of what is supposed to be there is gone. Then you put another filter underneath that or above that, and the topology just gets clearer and clearer and clearer. I think that's called prototyping, but I don't know whether that's relevant to your question in any way.

○ The cynical part of me wants to see this word paradigm literally just becoming a tool. I mean, it would just be one of those reversals of etymology where something becomes a contronym of itself, or it's like something that starts as either a worldview, or an example of something, becomes just the tool that's making cookie cutter versions of a sound or an object.

/ I think I said very quickly at the beginning that I was concerned that my interactions with the term, with that concept, are intimidating to the extent that I feel it's become just a tool, like you're describing. Should we just throw it out and stop talking about paradigms?

○ I want to know when I use it, because I use it unconsciously.

* Same, I think talking about it as a way to leverage something, usually. Otherwise, I feel like it's not talked about that much. I think in pop culture people use the word "groupthink" somehow got out. I feel like people use that word when they mean what academics mean by paradigm.

That's where I see it operating in pop culture. I think a lot of people are thinking about groupthink in terms of social media and in terms of just televisual, audiovisual cultures and what and how to extract from it I guess. Alex, were you going to say something?

□ Yes. Harmony, before you arrived, I was talking a little bit about how paradigms in relation to political action and theory on the popular level, in terms of the Overton window, which describes how ideas come to seem politically viable, how they end up being entertained by most people, and how they're eventually enacted.

The Overton window suggests that we aggressively advocate for our ideas, even if they seem totally illegitimate. Because there's no better alternative, if you want these ideas to become legitimate sooner rather than later.

A mundane example is universal healthcare. That's an example of how a paradigm operates on a popular level in a more circumscribed manner. The paradigm has to do with one specific area: political discourse in elections. I also want to say that I'm going to have to step out in a sec. I'm going to slip out without interrupting you to signal that I'm leaving. I might not be able to fact check or Google.

- Is your doorbell ringing or is that sound coming from inside the phone?
- Sorry. That's a teapot.
- * Cool.
- We have a teapot here too. It's very silent.
- * Transcontinental teapot.
- It's so homey. Someone should move in.
- * To the bunker, it'd be safe.
- I'm going to mute myself now.
- Then we really won't know when he's... Because we can tell-
- * Like how he's thinking. That's also cool that that's a thing. Sound is very cool and that's, you know what I mean? It's like an energetic field.
- It'll be sad when noise is eliminated from our circuits. It tells us so much. We need that noise. I really do need some signal from the random movements of the electromagnetic spectrum in my ear to know that he's alive and he's there.
- / That particular noise.
- Yes.
- / For sure. I'm worried about him at this point. It's been almost a minute...
- * It's interesting.
- / ...of sheer silence.
- * For *Triple Canopy*, the publication he runs with them – Alex's back.

I'm talking about muteness – I'm writing about muteness, a piece on elective muteness. It's called where people choose to go silent. It turns out, I guess thinking about it and thinking about paradigm that in a way speech itself – I feel like that was him leaving.

○ I think that was.

* Bye Alex. Maybe he'll come back. In a way, speech itself is a paradigm is what I guess I'm coming to learn without writing. The idea of not using language, we don't think that we can... Maybe one way paradigms operate is that we believe that certain things are mandatory, certain functions, while they aren't. For example, you don't have to speak. You know what I mean? A lot of people would not think to stop speaking or not even think about that as a capacity, but it's not even that. I don't know if there's another word above paradigm, but there has to be some... Or maybe paradigms encapsulate this idea of certain mandates whether they be like genetic or social or political.

○ Well, whether it's a paradigm or not, I like the idea of all the forms of... I mean in technology studies, people study non-use as much as they study use now: so rejection, resistance, exclusion.

/ Failure too.

○ Many ways that you cannot use a technology. There's a whole array of them. I don't know if that's a paradigm in technology studies, or a paradigm of the technology use, or if we can throw the word paradigm out in that case. In disability studies, a lot of recent scholars have talked about elective disability.

* That needs to be talked about.

○ Because the dominant paradigm, if we... Again, I'm not 100% sure we need the word paradigm here, but the stereotype would be that no one wants to be disabled because it's such a stigmatized category. In fact, many, many people throughout history have elected impairment and disability for different reasons. Whether it's... Susan Schweik writes about disability fakers in New York in the 1920s. In *The Gangs of New York* book, and now movie, many people were disability fakers in order to panhandle, or malingering.

* Also, it's my identity and people are addicted to a certain identity politics once they start, whether it be an oppressed one or not, people get into a place where they want to signify. Because now the whole popularity and over, people empty terms, but the idea of virtue signaling... It's a way to virtue signal in a sense. I've been trying to write about people vogueing mental illness and just what's happened with social media and the popularity of "go to therapy" as a common... Also people just won't go on social media and say I'm bipolar... I've seen people say the most outlandish, just confessional politicking. It's kind of feigning disability with people who go on and talk about all sorts of mental illness on social media, and similar things sometimes happens with people who have disabilities that you can't see, like Asperger's and things like that. There's a lot of elective claiming of that now.

It seems like, or just claiming of it, which is claiming is fine. It's weird when it's aggressively pushed at you. Because I mean coming from a minority – I hate the word minority – position. It's one that you can't claim based on skin. It's weird. I guess that's what makes it weird for me to think why would you claim something that oppresses you? Because you walk out every day and you already got this stigma, you know what I mean? I don't relate to it in that sense. Do you know what I mean? Its like-

○ Disability is such a huge umbrella category. Even within it, blindness is an umbrella. Deafness is an umbrella. There's many, many identities within each of them. Oh my gosh, I could talk for hours on this topic.

★ The idea of wellness versus unfitness is also in a lot of ways subjective. Because there are a lot of crazy people, for example, the president of the United States who's running things. It's like he has mad disabilities. It's weird, elective, not claiming of them too as a thing, I guess.

○ There's probably a need for a whole taxonomy of the ways that one... for things that go under the rubric of elective disability, because there's all of these old-fashioned terms like malingering, but there's also a new set of them. There's a few books that have come out on this. I don't know if the word paradigm ever gets attached to any of those words. But I was just thinking to myself, I have heard the phrase "technical paradigm." I think that actually, I have heard that. My whole argument I made a minute ago, about paradigm not being able to be applied as a technologically determinist word – I think actually, it is. I mean, I might just be hallucinating now, having spent two hours in this bunker. I think "technical paradigm" is something that's become like a common phrase.

/ It could be. I'm aware of social construction of technology scholars developing what they call *technological frame* which is the exact same thing as Kuhn's paradigm... they even cite Kuhn in talking about that. A technological frame sets of possible mode of action for a social group: an appropriate use of a technology and then all the attendant practices that follow the appropriate use of that technology. I don't know if that's what you're referring to with technical paradigm.

○ No, but actually why not use the word "frame"? I mean, I think frame comes from Goffman, same time period. I mean: episteme, frame, paradigm. Many people at this moment in the '60s were coming up with some concept related to what we later called social constructionism. I'm not sure a frame is a better word, because it's so, it could actually be... It almost seems like it's applicable to more things. It doesn't have that bizarre weightiness.

/ I think that was the point with that field of field study, with the social construction of technology. The problem with the paradigm was that it was only meant ever to describe what was happening in science. But because our world is so technologically textured – we are always inextricably embedded in a technological world – using that term technological frame, like you said, opens up that concept to so many other different practices, to so many other social groups and what they're doing without containing it to the epistemological concern, how knowledge is developed.

Well, there are so many other forms of knowledge out there. Be it auditory communication being a form of knowledge, as Julian Henriques writes so beautifully, or performance, or dance as a very certain form of knowledge of the body and of your relationship with people around you. You can speak a lot more about that than I could. But I think that was the whole point: using *frame* was a way to loosen it up, to loosen up that way of thinking about thinking, and to allow this modeling of the model to be elsewhere.

○ I mean, if we're not talking about thought and epistemology, do we even need the word paradigm? I think it's morphed into these other uses. I was thinking also before you got here, Harmony, I was thinking about some of the images in that pamphlet or packet that Lara gave us. There are a couple of examples of fads, things called fads that she has in the paradigm packet. Also what you're describing on social media. When something becomes a meme or a fad or a hook, or there's lots of other words for this. Are those words enough, or do we need some other word like paradigm to get placed on top of them? Is it enough to just say, this is a meme, and this is a hook and this is-

* Well, I think the question of, what were you going to say?

/ Go ahead. Go ahead.

* I was just going to say quickly, the question of those memes and fads for me at least is sincerity. I guess that's how I catalog them in my mind. If something becomes a meme and it enhances sincerity – does that ever happen? – I don't know, that is less common, but I feel like the problem is that when something becomes a meme, and maybe that meme is coming from a paradigm, like let's say the paradigm is that western therapy works, then it becomes this fad of people... This echo chamber, of "everyone go to therapy," which is very common on social media now and...