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### Objectivity: the Scientific Panopticon

Modern biology is inseparable from the concept of mortality. Cells divide for a finite amount of time, and then, they stop. There are no healthy exceptions--this is just the way nature works. But as intuitive as life's limits seem today, there was a time when biologists had no such concept of mortality. In the 1950's, it was thought that people aged and died because of errors in what was then known as 'infinite cell division'. This deeply embedded principle in biology stated that under proper conditions, a cell would divide forever. Infinite division allowed for immortal cells, and so scientists seriously believed that healthy cells would live forever. Today, of course, this is considered absolutely ludicrous, but for many years it was taken as cold, hard, objective truth. That is, until Leonard Hayflick stepped onto the scene.

Hayflick was an ordinary biologist conducting research, when he encountered a not-so ordinary problem. While monitoring multiple cell samples under identical conditions, he noticed that some cells grew perfectly fine, while others were dying off. This was odd to Hayflick, of course, because it contradicted the principle of infinite division, which he had been taught and assured of by experts his entire life. As a result, Hayflick attributed this finding to technical error. But after a period of denial, he realized a trend; after 50 divisions, the cells were consistently dying off.

Although he had broken ground, Hayflick could not fathom his own results. It made no sense that he would be the only one to notice something so blatantly obvious. To ensure he was not just misinterpreting an anomaly, Hayflick attended a lecture at the annual biology conference given by one of the field's giants, Ted Puck. At the end of Puck's talk, Hayflick asked if the cells Puck was studying ever stopped dividing--to test if his own observation was just a fluke. In a rather condescending and dismissive tone, Puck told Hayflick that, of course, *sometimes* his cells died--no one conducts research perfectly. When the cells stopped dividing, said Puck, he knew he must have made a mistake, went to the freezer, and replenished the cells.

Only after this response did Hayflick realize; his data wasn't obscure, in fact, his data was painfully common. For decades, biologists all over the world had been happening upon the exact same results, and yet, because they did not mesh with the agreed upon facts, others had been *dismissing* them. Rather than even considering the illegitimacy of infinite cell division--since models must be infallible--scientists automatically assumed they were the ones at fault, and so they ignored one of science's most important discoveries, despite it crawling right into their hands. (Krulwich)

Hayflick's story is a perfect example of one of the deepest and most pervasive paradoxes in science. By definition, scientific research is concerned with bodies of 'objective' knowledge, however, in seeking such knowledge, it becomes faced with the schizophrenic task of correcting the very principles used to found it. Just as the statement "cells divide infinitely" seemed objectively true for a time, it now seems just as objectively false. Objectivity cannot possibly be pure truth. It is in fact a mere image--an agreed upon norm by which science is able to function on a common wavelength. This wavelength, however, by excluding all others, can become

manipulative, and tend science towards a false homogeneity. By examining this ‘image of objectivity’ especially as it relates to atlas makers in the late 19th century, I will demonstrate the ways in which objectivity functions as a scientific panopticon; and the effects this has on the way science is conducted, consumed, and taught.

The panopticon, originally proposed by Jeremy Bentham, was the plan for a prison that would invert the conventional power structure. Instead of many people looking in from the outskirts of an arena, there would be one person looking out upon all. Rather than many ruling one, it was one ruling many. But instead of ruling with might or coercion, the Panopticon would rule forcelessly, without ever lifting its proverbial hand. Architecturally, this system would merely require a circular watchtower, surrounded by cells also arranged in a circle. In each cell, the wall facing the watchtower would be clear, so each inmate would have the constant knowledge of their visibility. (Foucault, 200)

When Foucault came across this layout years later, he refined Bentham’s proposal by noting that the Panopticon did not need to be a physical structure. The key components of the system could be created without a building at all. In fact, they could be even more easily implemented and exploited for social control in the modern age without any towers or cells, exerting behavior altering power with hardly any investment from a leader, or even a leader at all.

Such homogeneous behavior is the precise subject of Daston’s text, “The Image of Objectivity”. In this text, Daston discusses the ways a standard of objectivity pushed atlas makers in the late 19th century towards a certain end, a story which mimics Hayflick's more

modern tale of biological dogma. When Daston's text is put in conversation with Foucault's panopticon, it becomes clear that objectivity itself is a metaphorical panopticon.

The immediate power of this panopticon comes from the visibility it enforces on its inhabitants. The power is effective because every gear in the machine has a sense that they are being individually observed. As Foucault puts it, "each actor is alone, perfectly individualized and constantly visible" (Foucault, 200). Placing people under ceaseless searchlight that knows their every move, gives them no space to ever *make* a wrong move. This tireless stare is what triggers the change in behavior, because for whatever flaw (or feature) in psychology, humans act differently when they think they are being watched.

But *how* does the mere act of observation specifically alter the behavior of the observed? Foucault provides an answer,

"He who is subjected to a field of visibility, and knows it, assumes responsibility for the constraints of power; he makes them play spontaneously upon himself; he inscribes himself to a power relation in which he simultaneously plays both roles; he becomes the principle of his own subjection" (203).

Foucault is arguing that knowledge of another's sight alters behavior by making the watched watch themselves, as to not upset the ultimate watcher. Individuals take responsibility for their actions in real time, at all times, before they can make mistakes. Without the looming eye, people would only have to behave when they knew they were being watched, and would be free to make mistakes when they were unseen. The novelty of panoptic power is that one can never be sure if the eye is closed, opened, or even there at all. The panopticon creates constant

paranoia, with no opportunity for mistakes behind closed doors. The result is that each person proactively regulates themselves, and the mistakes are never made.

This is completely synonymous with the way atlas makers in the late 19th century conducted their work, as they quite literally became “the principles of their own subjection”. Daston provides a plethora of examples of how such regulation became an internalized function, motivated by cognizance of a hyper-critical observer. For one, she discusses an atlas maker named Sabotta who, while designing his atlas, “defensively, perhaps anticipating criticism...reassured his readers that the combination was not made arbitrarily, but with the careful repositioning of the camera to eliminate variation in perspective” (Daston, 101). Sabotta’s bothering to justify his work’s objectivity within the work itself feels rather strange. To write a defense before anyone has even offered criticism signifies a deep internalized fear. Fear not of anything concrete, but rather of some unnamed, nonspecific observer considering his work subjective. Notice how Sabotta is acting as both the regulator and the regulated--he is exerting the power of discipline on himself.

Another example of self regulation lies in the meticulous actions of anatomy professor Gottlieb Gluge, who, “inveighing against the errors of estimation by eye, set about weighing organs to the hundredth of a gram” (Daston 95). For Gluge, there was no practical purpose in doing this; no part of his research that required such precise data. Instead, his actions were motivated by the same preemptive fear of being labeled subjective. Gluge too was a snake eating his own tail; he simultaneously conducted research and screened it for objectivity. Hence, he was “taking responsibility for the constraints of power” and enforcing them on himself. The reason this is a demonstration of panoptic observance, then, is because the existence of such fear

necessitates the mental conception of some ever present observer to pass judgement. It is an internalization of authority.

But for an internal officer to tell you when you have broken the laws, there must be some laws to begin with. An internalized set of rules is the next panoptic condition, or as Foucault put it, “Panopticism is the general principle of a new ‘political anatomy’ whose object and end are not the relations of sovereignty but the relations of discipline” (Foucault, 201). In other words, panopticism is about the behavior of the ruled, not the act of ruling. What then, are the objects and ends of objectivity? What were the unspoken rules governing the process of atlas making?

Under a close reading of Daston’s text, many such rules are evident. One of the most important rules was emotional detachment from functional modelling, because, “The all-too-human scientists must, as a matter of duty, restrain themselves from imposing their hopes, expectations, generalizations, aesthetics, and even ordinary language onto the image of nature” (Daston, 81). Notice the language she uses--duty, restraint, all-too human. There is a clear denial of what is natural for people--imposing emotion onto objects--and an effort to suppress it. Any human touch was a gateway to subjectivity, the demonized antithesis of true science. There was also a deeply protestant glorification of droning work, of a human ability to act as a machine. “In its positive sense, mechanical objectivity requires painstaking care and exactitude, infinite patience, unflagging perseverance, preternatural sensory acuity, and an insatiable appetite for work” (Daston, 83). Notice again the predilection towards what is inhuman and machine-like. Humans are finite, humans are natural, but what is praised by this system is just the opposite--impossible amounts of patience, detail, and focus with as much mechanical

detachment as possible--actions which all became beacons of this era's objectivity; they became the rules which the panoptic actors were constantly subjecting themselves to.

But science, especially at this time, is no perfectly codified institution. The correct level of precision for atlas makers was amorphous. This is key; for if the rules were clearly stated in this manner, presented as unbreakable laws, enforced by a police, the psychological factor of constant uncertainty would not be present. No one would need to worry about whether or not their work was objective, because they would instantly know. Warranted in this observation is another essential aspect of panopticons; that their rules be unclear. The lack of clarity is directly derived from the lack of accountability; because one does not know who is watching then, or if anyone is watching at all, they cannot properly know what is expected of them. This is exactly the way in which objectivity interacted with the atlas makers. As Daston asks, "Without knowing what we mean and why we mean it in asking such questions as 'Is scientific knowledge objective?', it is hard to imagine what a sensible answer would look like" (Daston, 82). We are still questioning whether scientific objectivity is possible today in the philosophical sense, and yet, somehow, atlas makers one hundred and fifty years ago were expected to have it mastered. Objectivity is not so easy to define, which is a huge source of the panopticon's power; by avoiding pure definition, the source of the power becomes impossible to point to, hence impossible to refute.

In addition to facing the slippery slope of defining objectivity, atlas makers were also forced to define nature, for "in order to decide whether an atlas picture is an accurate rendering of nature, the atlas maker must first decide what nature is" (Daston, 86). All these loosely defined standards created a sense of never ending double-consciousness within science. A

constant evaluation of one's own work from the perspective of another fueled a panopticon of uncertainty.

Perhaps what is most relevant, however, is not the method of objectivity as a panopticon, but rather, its tangible effects. The tangible effects come in the form of a mass hysteria--a pervasive anxiety which tended people towards an end, a "constant pressure that acts even before the offences, mistakes, or crimes have been committed" (Foucault, 206). Such anxiety is ridden all throughout Daston's texts, and is the most physically realized effect of the objectivity. Not only is there omnipresent language used to describe atlas makers as paranoid, and anxious, on a quest for protection, but subjectivity itself begins to be seen as a literal threat. "Instead of freedom of will, machines (mechanization) offered freedom from will--from the willful interventions that had come to be seen as the most dangerous aspects of subjectivity" (Daston, 83). Exemplified in this quote is a strange reversal of human nature. Political systems have always fought for and glorified freedom and the human will. Here, however, free will is characterized as evil. Being will-less becomes the new ideal because being will-less meant being objective.

Objectivity is peculiarly framed as freedom from the disease of subjectivity, which became so actualized as a danger that the atlas makers actually began seeking ways of curing themselves. They did so by forcing the viewer to be responsible for interpretation. "Mistrusting themselves, they assuaged their fear of subjectivity by transferring the necessity of judgement to the audience" (Daston, 107). This meant that scientists dutifully reported everything and forced students and readers to take on the burden of subjectivity. Instead of showing the data's trends,



they would merely provide a hodgepodge of points, forcing others to be responsible for ridelling them with meaning.

As the last quotation demonstrates, this anxiety was not some wispy and inconsequential feeling; it was the means by which the panopticon of objectivity created its monotony. As Foucault puts it, “The Panopticon is a marvellous machine which, whatever use one may wish to put it to, produces homogeneous effects of power” (Foucault, 202). This homogeneous effect of power was the style of objectivity which became scientific obsession. The panopticon created a certain mode of thought--standards and rules--and by its looming power--it pushed its inhabitants towards standardization. “No science can do without such standardized working objects, for unrefined natural objects are too quirkily particular to cooperate in generalizations and comparisons” (Daston, 85). Eliminating quirks and the uniqueness of models while claiming to precisely represent nature is a slippery slope towards scientific dogma. In fact, it is exactly what happened when biologists ignored their dying cells. During this time, cells were too vague and imperfect, and so visual representations started to tend towards homogenous models, which created a standard idea of what scientific phenomena themselves were.

This standard so to speak is what masquerades as objectivity. It is the same false idol which prevented thousands of biologists from noticing apoptosis, and which allowed Hayflick to discover it. And this panoptic model is not dead and gone--some relic of the past which we can simply brush away. As students in the modern world, we are still just as accustomed to taking lessons. We sit, we observe. We take notes, we read, all in an attempt to absorb some *pre-existing* body of knowledge. This is the model for nearly all academic disciplines, there is a “tradition”, a “language”, a “syntax”, a “standard”, and to communicate within the discipline

effectively, proficiency becomes a must. Most of the time, in our dazed and abject states, facts presented without thorough justification, do not appear to us as the deceptive tools they are. We take for granted that someone else has “worked it out” properly so long as the information appears correct, and if there are any flaws, they seem minor, inconsequential. But on rare occasions, as in Hayflick’s case, what we have been taught and what we experience do not collapse into one cohesive image. This is where the question of objectivity intersects with procedural science. This is where the panopticon of objectivity becomes damaging.

Hayflick broke the mold by thinking through his specific problem not as his teachers would have, or as a gear in the biological panopticon, but as an individual. Where hundreds--perhaps even thousands--of other trained scientists observed exactly the same phenomena, Hayflick was the only one who could see beyond the penumbra of dogma. The land which lies behind such dogma is by no means a desert, in this space Hayflick provided the hardware for the vaccines which saved millions of lives, won him countless awards, and made him one of the most well known biologists of his time. But what’s important for our purposes is not so much the details, but rather, the vehicle of such universally beneficial action; Hayflick was not awarded millions of dollars to conduct his research. He did not lock himself in a basement until he could perfectly represent every cell that passed under his microscope. All this groundbreaking information was accessed by a mere questioning of the simple, but locked-in scientific commandment of the time that cells divide forever. All Hayflick did was re-open a book where the tradition said the book was already closed, freeing himself from the masquerade of objectivity.

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