

Tyler Coburn  
**Ergonomic  
Futures**

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### Great Chain

In the beginning, there's a model – specifically, there's the tree. Sometimes it grows upwards from root to tip; sometimes the branches get longer with each generation, like the neck of a giraffe; sometimes they sprout leaves of as many kinds as there are beaks of a finch; sometimes the tree is cut, and on its stump are the intricate veins that I'm told are us; and sometimes it's allowed to grow in the most novel ways, the branches feeding back into other parts of tree, building you, me, and every eukaryote we know.

Sometimes the tree isn't a tree but a chain, which once hung all the way from heaven to hell – which was intimately known by our ancestors, for it held them in perfect harmony. Everything was linked in the chain, even the ugly stone, the treacherous snake, and the louse. Nothing was an error of creation, because everything had a place.

The trouble came with the human, who occupied a sensitive link between heaven and earth. Here was a creature whose wit and will distinguished him from his fellow animals, yet a creature substantially less perfect than even the stupidest angel.<sup>1</sup> Surely God hadn't erred in designing the chain. Surely everything had a place. Surely, the scholars of the Enlightenment reasoned, it was the Elizabethans who had drawn the chain wrong – who left out links between humans and angels, to be filled *not* by the creatures of the known world, but by those from other planets: supra-human, sub-angelic beings.

Unlike the extraterrestrials of the present age, those of the Enlightenment weren't foreign to humankind. They fit hand in glove with its logics.

### Shara

A few years ago, a group of alien “believers” approached Shara Bailey, an NYU anthropologist working on the dental morphology of early humans. They claimed to have found an ancient jaw, and they were pretty certain that it belonged to an extraterrestrial ...

Shara agreed to talk with the television reporter covering the story. She said something to the effect of: “In my professional opinion, this jaw is a fake. There's nothing on earth that looks like this.” Well, Shara's first sentence was cut from the segment, so she'll forever be remembered by the “believer” community as the scientist who said, on broadcast television: “There's nothing on earth that looks like this.”

Shara told me this story a while back, when I visited her office. I had originally contacted Shara because I wanted her to imagine a scenario, at some point between now and the bitter end of the universe, when our bodies

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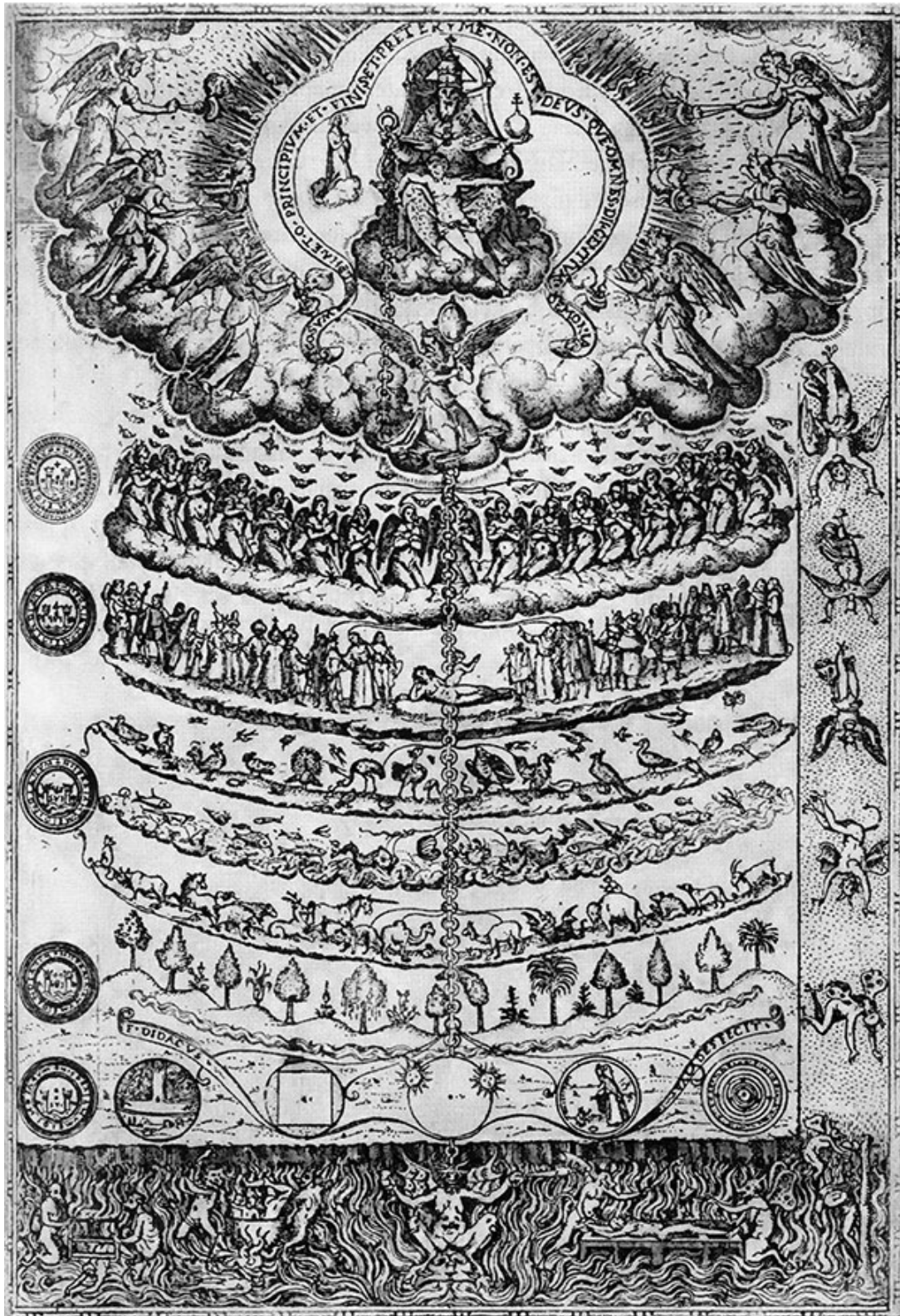


Illustration "The Great Chain of Being" from the book *Rhetorica Christiana* (1579) by Didacus Valades.

experience such a degree of evolutionary change that the biological, ontological, and legal criteria of the human come undone – when we undergo speciation.

In Shara’s opinion, outside of genetic engineering, the only way we’ll see drastic change is if humankind fragments into groups, isolated by geography, culture, or ideology. Owing to their limited scale, each group would experience low genetic variation, meaning that over generations, recessive traits would have the possibility of becoming prominent.

This phenomenon is often known as the “founder effect,” suggesting that the founders of a given community can have a huge influence on its gene pool.

There are a few famous cases of the “founder effect”:

There’s the Amish, who suffer Ellis–van Creveld Syndrome. This syndrome wreaks havoc on the skeletal system, causing dwarfism and cleft palates, growing extra fingers and toes.

There’s a famous community in the Dominican Republic, where most of the children are born female. Around the age of twelve, some develop penises and become – biologically and culturally – boys.

There are the Blue Fugates, a family that’s

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lived in Kentucky since the 1820s, near the towns of Hazard and Troublesome Creek Times. The founders of the Fugates were Martin and Elizabeth, who shared a rare genetic disorder. Their blood produced a surplus of hemoglobin that couldn’t release oxygen into the body, thus turning their skin blue. As Martin and Elizabeth lived in geographical isolation, their condition spread over generations ... The human equivalent of the Smurf clan was born.

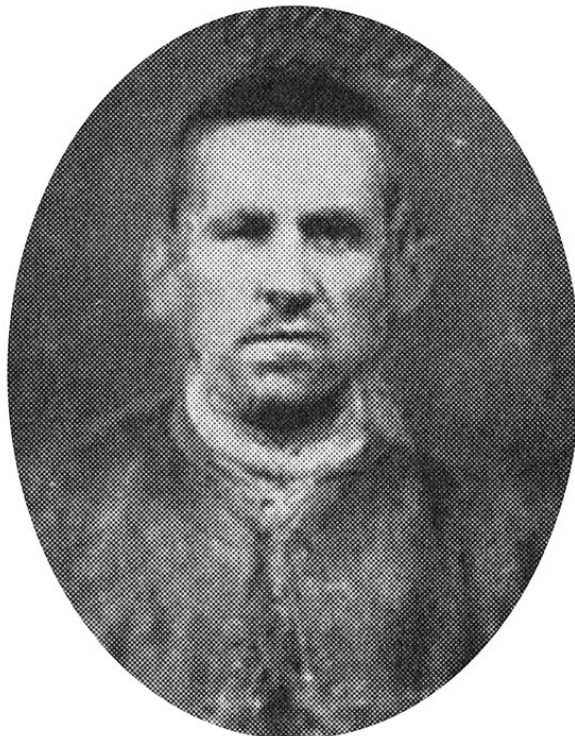
One of the Blue Fugates showed his family tree to a reporter. “You’ll notice,” he remarked, that “I’m kin to myself.”

### Baby

Sometimes a tree isn’t a tree but a chain. And sometimes a chain is a chart, its links compressed into tiny statistical points where the beggar, the dumb, and the deaf mute – where every human has a place.

The stone, the louse, and the snake can live on the charts of a different field; for the social statisticians of the nineteenth century, like Adolphe Quetelet, the chain is a human chain, the coil a human coil, its length stretched not from heaven to earth but curved around an invisible bell and centered on “the average man.”

Who is “the average man”? His figure, his



Galton’s composite portraits of criminals. Plate XXVII from Karl Pearson, *The Life, Letters and Labours of Francis Galton*, vol. 2, 1924.

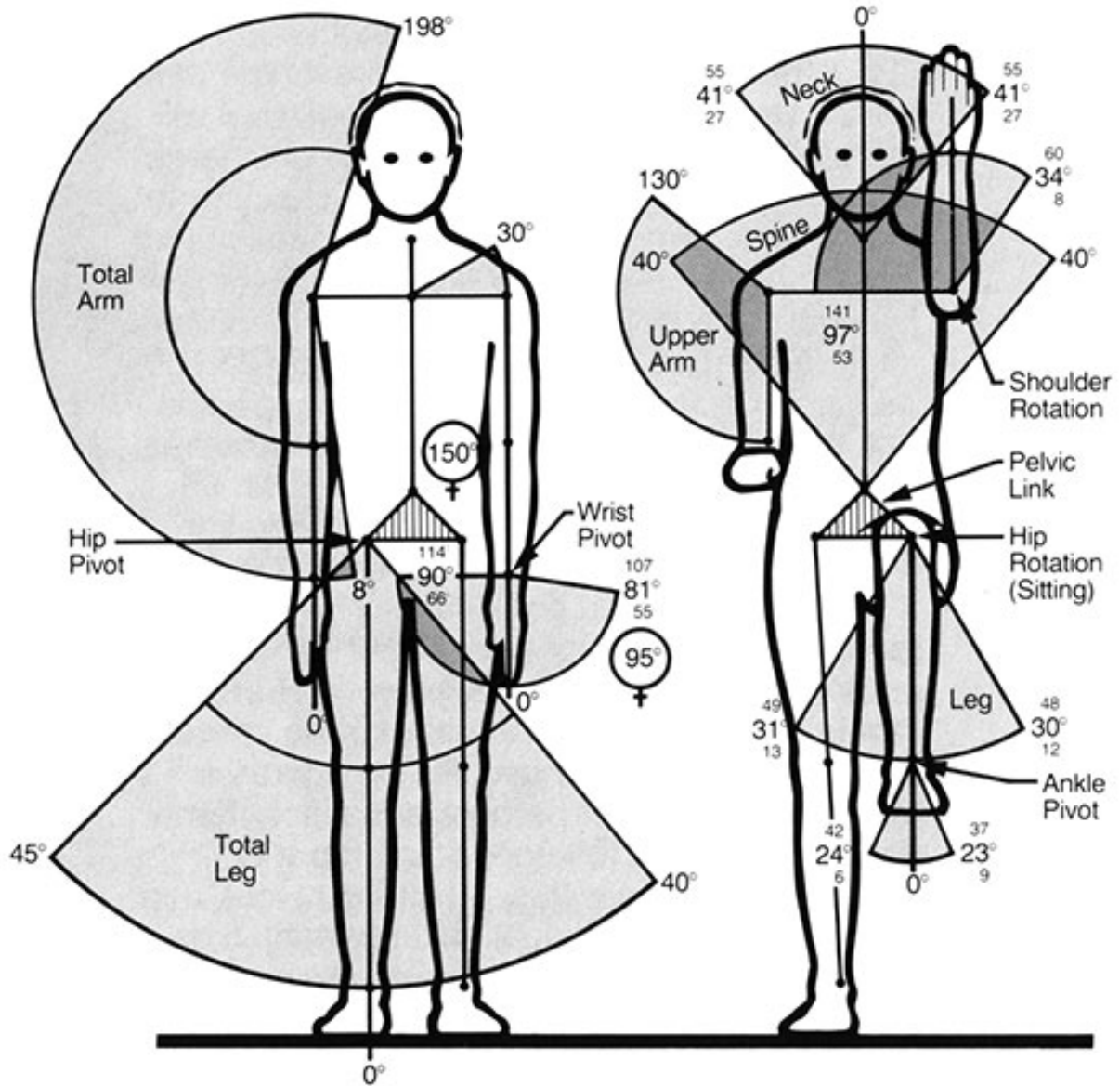


Diagram from the book *Humanscale 1/2/3* (1974) by Niels Diffrient and Alvin R. Tilley.

face? How is life lived on the fiftieth percentile? It's strange to speak of an empirical fiction, but this human surely was one. Every time Quetelet added data to the chart, his "average man" grew less lifelike and less precise.

There were other problems with Quetelet's model, particularly for members of the nascent eugenics movement. For one, the bell curve made "the average man" the norm. The scope of deviation thus included both the shorter and the taller, the dumber and the smarter, the browner and the whiter. To remedy this spread, the eugenicist Francis Galton reimagined the norm to be less a statistical "reality" than an aspiration, a hope, a want for social betterment, for selective breeding, for a kingdom of the taller, the smarter, and the whiter ...

"The average man" was one of the nineteenth century's many hallucinations; Galton's composite portraits were among the most notorious. In these images, a different empirical fiction is on display: three, five, sometimes nine portraits of criminals have been merged to reveal their common facial traits – to expose the fundamental likeness of "the criminal type."

Digital technology could intensify this technique – pixel by pixel, layer upon infinite

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layer – but alas, composite photography is a thing of the past: another tombstone in the graveyard of pseudoscience. The norm no longer lives on the surface of images but deep in the grain of the self.

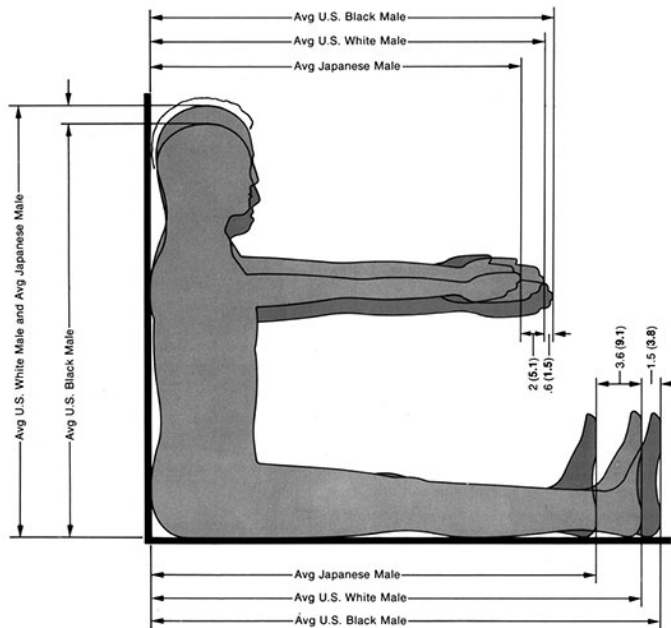
The Human Genome Project, according to David Serlin, is *also* a composite: an empirical fiction that invents norms from a genome in constant change. Donna Haraway has called it a "standard reference work" that purports to tame the unruly diversity of our species by the sheer power of exhaustive code.

By sequencing our genes, we follow in the footsteps of Adolphe Quetelet. We add data to "the average man." We observe the scope of deviation. But to engineer the perfect human, we have to move in Francis Galton's direction. Galton had to rework Quetelet's bell curve in justifying eugenic practices. Genetics, in turn, must strive to do more than plot and measure our genome. To engineer the perfect human – to incubate a designer baby – it must rid our genome of its every last fault.

### Dreyfuss

Over the past three years, I approached a number of people, like I approached Shara, and I posed the same question: Is it possible, somewhere

Diagram from the book *Humanscale 1/2/3* (1974) by Niels Diffrient and Alvin R. Tilley.



between now and the suspension of everything, that our bodies experience such a degree of evolutionary change that the biological, ontological, and legal criteria of the human come undone – when the human, as we know it, fragments or even ceases to exist?

I wanted to know how a designer would answer this question, so I called Jonathan Olivares, who wrote the 2011 book *A Taxonomy of Office Chairs*. Jonathan remarked that evolutionary change can't be envisaged in a vacuum. We need to consider the geographical, cultural, and ideological qualities of a community, as Shara had said. We need to study the broader environment. We also need to look to design – and particularly, to ergonomics. These are fields that can respond to the practical needs of the human. Moreover, they can prescribe and evolve those needs.

Ergonomics is a young discipline – a child of the Taylorist years, when its main task was to increase the efficiency of the working body: to minimize wasteful movements; to keep the eye trained on its machine; to quicken the pace of materials as they raced towards the market. We know ergonomics better in its modern sense, popularized in Henry Dreyfuss's 1955 book *Designing for People*. Dreyfuss's ergonomics

focuses on enhancing the comfort of the human body in the workplace and beyond. The more comfortable a worker feels – at his seat, within his machine – the more productive he will be.

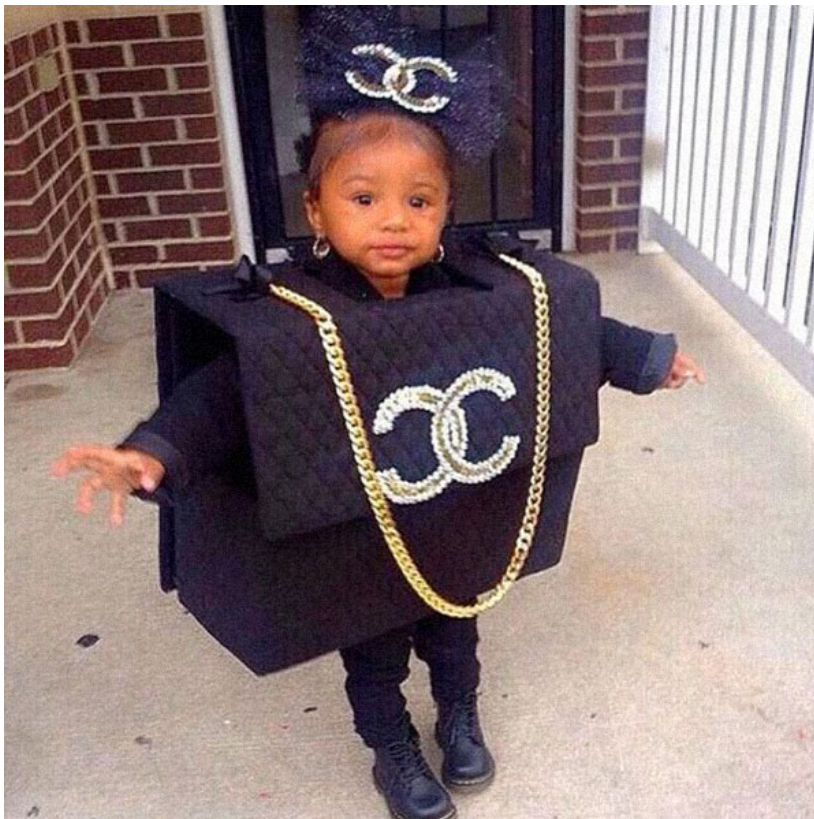
Dreyfuss was an interesting figure. In his early career, he designed theater sets in New York, which led to a commission for the 1939 World's Fair to create *Democracy*: a diorama in the round that scaled democracy to the size of a future city. This was a Greenfield City par excellence, where each and every resident could enjoy a garden apartment, a bucolic view, the landscaped highway to his job downtown, the landscaped highway for a swift retreat. *Democracy* claimed to depict the world in a hundred year's time, though suburbia arrived much sooner.

In the sixteen years between *Democracy* and *Designing for People*, Dreyfuss zoomed in from his Greenfield City to the intimate lives of its users – from utopian theater to the intricacies of ergonomics.

The protagonists of *Designing for People* are "Joe and Josephine": paragons of mid-century American gender. Joe can be found working on a linotype or in a tank, and Josephine over an ironing table, or at the switchboard.

Ergonomics didn't limit itself to templates

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A stand-in image for a designer baby. See <https://i.pinimg.com/originals/e1/5c/4c/e15c4c58ee34>

like Joe and Josephine. Books from that era include design for the elderly and disabled, for children and the obese, for the standard US male body of black, white, and Japanese descent – for the standard US female body of the same provenance. Their diagrams appear to be more complicated than the charts of Adolphe Quetelet, but don't mistake what they share. The norm has gone granular, yet "the average man" persists. The visuals change. The tendency to typologize remains the same.

### Church

I approached Shara and Jonathan. And still, the question remained: Is it possible, at some point between now and oblivion, that our bodies experience such a degree of evolutionary change that the biological, ontological, and legal criteria of the human come undone – that the kernel of anthropocentric egotism is ground down beyond repair?

I took my question to Seth Shipman, a fellow in geneticist George Church's lab. Seth and I discussed a 2014 symposium on "Genetics and Society," where Church claimed to have identified the genes that should be modified to make the human body survive better in "extraterrestrial environments": modifications to give us extra-strong bones, lean muscles, and lower cancer risk.

Taking Church's human to its historical precedent, we arrive at a 1960 NASA research proposal that imagines a human perfectly adapted to space – who can live in "space *qua natura*." This human, according to the authors, could breath without lungs and spacewalk without suits.

What this required were exogenous devices: fuel cells to replace the lungs, intravenous feeding tubes to save the labor of mastication. Pressure pumps would be injected beneath the skin, triggering drug infusions to stave off the ravaging effects of radiation. When these mechanisms functioned effectively, they'd be so integrated into their user as to operate "unconsciously."

When they didn't function effectively, the human was presumed to be the problem. In such cases, drug infusions could be triggered remotely from Houston or by a fellow crew member. For nearly every conceivable problem, drugs were the obvious solution.

NASA's model astronaut was a human freed from biological limitations yet bound by imperfect devices and doped to ease the pain of those imperfections – doped to palliate the anxieties of being haplessly invaded by the future. To describe this new human, the authors invented a term: "cyborg."

### Chimera

Sometimes a tree isn't a tree but a chain. And sometimes a chain is a chart, left outside for so long that when found again, it's yellowed and tattered: pieces missing, pieces torn. The perfect model is beyond our reach, and what's left are oddities, embarrassments, and chimeric monstrosities.

The chimeras of lore had lions for heads, goats for bodies, and snakes for tails. Sometimes, they had the claws of dragons; sometimes, glorious manes; always, mouths filled with fire that imperiled any who stood too near.

Chimeras are still among us, though we can scarcely distinguish them from the rest. Chimeras can even live in human guise, unaware of their fearsome gifts.

Consider Lydia Fairchild. By chance, two of her mother's eggs fused before insemination, causing Fairchild to be born with forty-six chromosomes, or two DNA signatures. Unbeknownst to her, Fairchild was multiple people.

This fact finally came to light in the early 2000s. Fairchild applied for public assistance, which required her and her children to take DNA tests. The results revealed that Fairchild was not the mother of her children, leading the state to suspect that she was attempting welfare fraud.

Eventually, an additional DNA test was given to a baby that Fairchild *had just birthed* – again, with the same results. And so, the odd but correct conclusion was finally reached: that Fairchild was both the mother and the aunt of her children.

Fairchild's case illuminates a larger trend, as personal testimony is losing credibility against genetic evidence. Genetic evidence, according to Aaron T. Norton and Ozzie Zehner, amounts to a "technological confession" for someone like Fairchild "through a privileged objectification of her biological attributes."

Though genetics is usually privileged for this supposed objectivity, there are some telling exceptions. Recent years have seen cases of transgender parents who have a genetic relationship to their children yet find their parental rights nullified for not matching their original sex.

What this example reveals is that, far from being an objective force in contemporary jurisprudence, genetics is *selectively* deemed to be objective when it's aiding and abetting social norms – when it's affirming traditionalist thinking about identity and parenthood.

Sometimes you judge a book by its content, through usually you just glance at the cover.

### Great Chain

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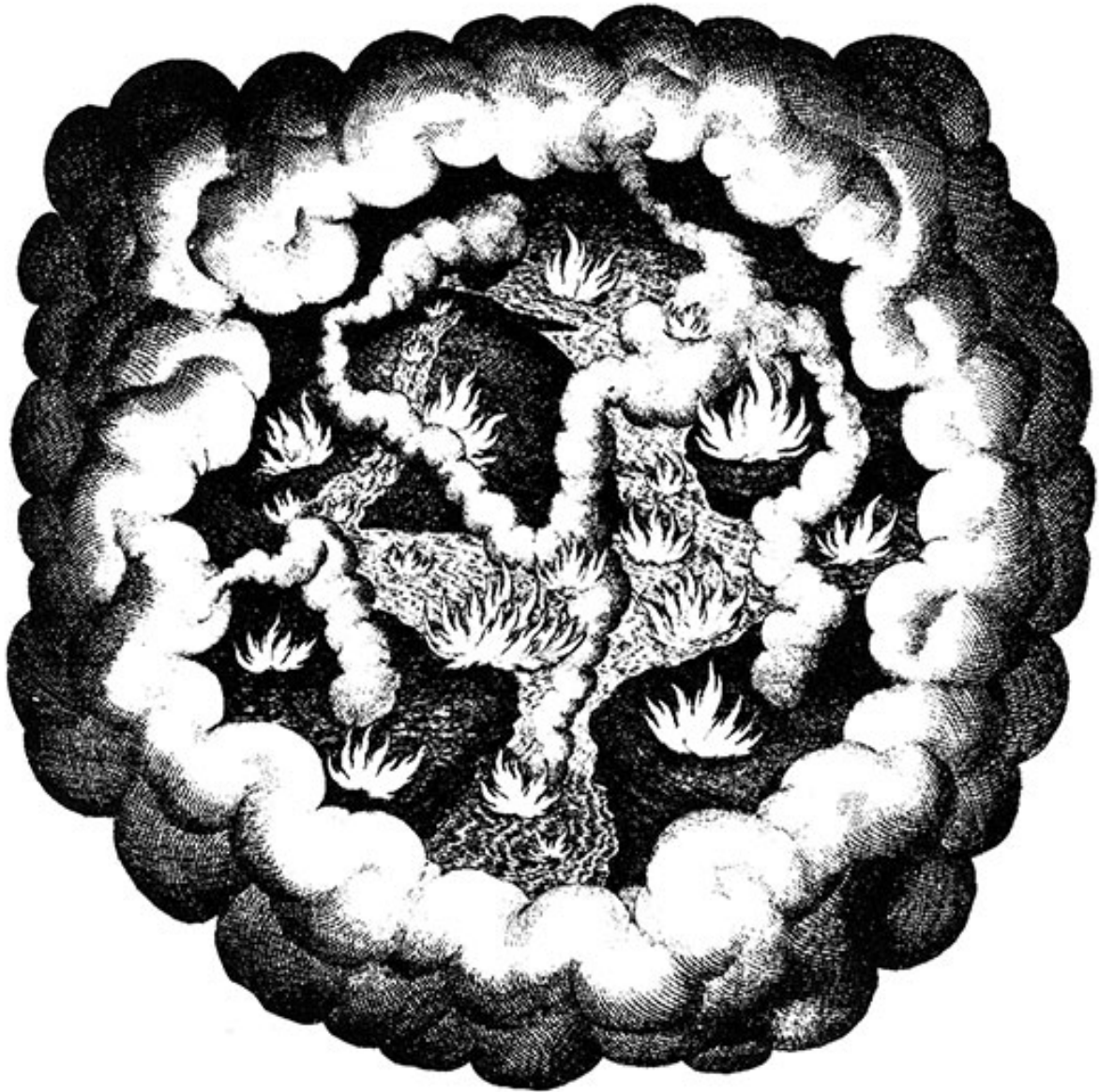


Image from the book *Utriusque cosmi maioris scilicet et minoris metaphysica, physica atque technica historia* (1617) by Robert Fludd.



The Great Chain wasn't the invention of the Elizabethans but the Greeks: less a chain at first than the product of paranoia, not a model of anything but the madness of Zeus. It dates back to the Trojan War, when the gods were vying to stack the decks – to be far more than bystanders to glorious war. Zeus responded with a warning: Any gods who played a role in the war would suffer no less a fate than exile. And any attempt to overthrow his authority would be tantamount to folly. He was too powerful to budge.

Say the gods latched a chain to the heavens in an effort to yank him down. Well, Zeus would simply pick it up, give it a tug, and the rebel gods, their earthly minions, *the entire carnal world*, would be flung through the cosmos to an untimely end. With a mere twist of his finger, Zeus could take control of the chain: as a weapon, a keepsake, a necklace for the peak of Olympus.

Zeus never acted on this threat, but his gauntlet kept hanging. With each passing era, it grew ever more like a chain. The natural world took a liking to this object. Creatures began to clamber up and take shelter in its links. By all accounts, they loved the altitude and the elliptical life.

Gods come and go, and still the chain keeps hanging. Trees have sprung up around it, but if we look closely, we can see it: a weathered thing, more rust than metal; a testament to all we've forgotten to remember – to the worlds of old epistemologies, to the aliens of the Enlightenment.

At some point, the future may reclaim this chain:

For the ugly stone, the cyborg, the deaf mute, and the telepath to join together in lasting congress.

For designer babies to have a trinket that reminds them of the world before human perfection.

For mechanical overlords to ensnare the last vestiges of earthly life, pulling chain links around necks as a hangman would.

For the founders of space colonies to climb their way to the stars – to spread their genetic stock throughout this galaxy and the next.

For citizens to have a cautionary tale of what comes from living within empirical fictions written by models, charts, and norms.

Whatever purpose the chain will hold for those to come, it will keep hanging.

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This text is part of a larger project, including furniture designed with Bureau V and a website of stories designed with Luke Gould and Afonso Martins.

For more on the human (and the many other things referenced in this article), see: Aaron T. Norton and Ozzie Zehner, "Which Half Is Mommy? Tetragametic Chimerism and Trans-Subjectivity," *Women's Studies Quarterly* Vol. 36 (2008), 106-125.; Allan Sekula, "The Body and the Archive," *October* Vol. 29 (1986): 3-64.; A.R. Templeton, "The theory of speciation via the founder principle," *Genetics* 94 (1980), 1011-1038.; Cathy Trost, "The Blue People of Troublesome Creek," *Science* 82 (November 1982).; David Gelertner, 1939: *The Lost World of the Fair*. New York: Free Press, 1995.; David Serlin, "The Other Arms Race." In *The Disability Studies Reader: Second Edition*, edited by Lennard J. Davis, 67-75. New York: Routledge, 2006.; Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge, 1991.; Erica Fudge, "How a Man Differs from a Dog," *History Today* (June 2003), 38-44.; Eustace M. Tillyard, *The Elizabethan World Picture*. New York: Vintage, 1959.; Francis Galton, "Generic Images." In *Proceedings of the Royal Institution*, vol. 9. 1879.; Gabriel Egan, "Gaia and the Great Chain of Being," 2011, see <http://gabrielegan.com/publications/Egan2011a.htm>.; Genetic Engineering and Society Center, "George Church on the Future of Human Genomics and Synthetic Biology," *YouTube* video, 28:24, September 19, 2014, see <https://www.youtube.com/watch?v=0EOa5ZaE6Gk>; Henry Dreyfuss, *Designing for People*. New York: Simon and Schuster, 1955.; Kenneth Chang, "Beings Not Made for Space," *The New York Times*, January 27, 2014.; Lauren F. Friedman, "The Stranger-Than-Fiction Story Of A Woman Who Was Her Own Twin," *Business Insider*, February 2, 2014, see <http://www.businessinsider.com/lydia-fairchild-is-her-own-twin-2014-2>.; Lennard J. Davis, "The End of Identity Politics and the Beginning of Dismodernism: On Disability as an Unstable Category." In *The Disability Studies Reader: Second Edition*, edited by Lennard J. Davis, 231-242. New York: Routledge, 2006.; Manfred E. Clynes and Nathan S. Kline, "Cyborgs and Space," *Astronautics* (September 1960), 26-27, 74-76. Neal Stephenson, *Seveneves*. New York: William Morrow, 2015. National Space Biomedical Research Institute, "The Body in Space," see <http://nsbri.org/the-body-in-space/Sarah-Knapton>, "The astonishing village where little girls turn into boys aged 12," *The Telegraph*, September 20, 2015, see <http://www.telegraph.co.uk/science/2016/03/12/the-astonishing-village-where-little-girls-turn-into-boys-aged-1/>; W.B. Provine, "Ernst Mayr: Genetics and speciation," *Genetics* 167 (2004), 1041-1046.

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