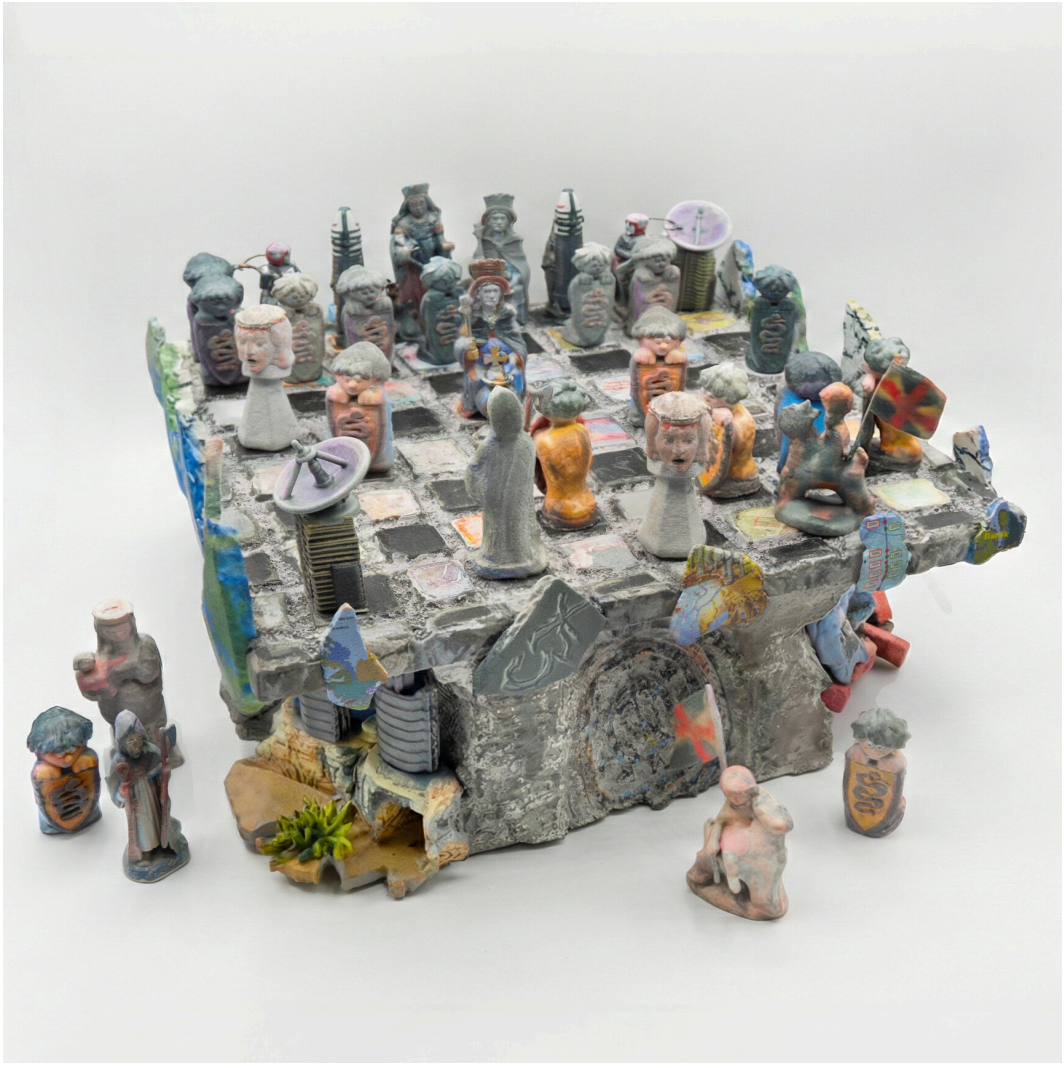


Amema Chess Set, 2026

This book arose from my struggle to create artwork that felt meaningful under the looming specter of automation. More specifically, my encounters with tools for the automation of object fabrication (3D printers), object recording (3D scanners), and object cognition (artificial intelligence) made my continued drawing and oil painting feel quaint, but my attempts to establish an authentic practice with these novel technologies led only to artworks which felt dead.

Langdon Winner calls the condition of our technological age "somnambulism", the way we sleepwalk into political and social commitments through choices framed as purely technical.[1] We adopt a technology for its efficiency, its convenience, its marginal improvement over what came before, and only later discover that we have unknowingly committed ourselves to arrangements we never consciously chose. The somnambulism is precisely an *absence* of awareness: we do not feel ourselves choosing because the choice presents itself as an obvious necessity, as what everyone else is already doing. The sleepwalker moves through the world without waking; the technological somnambulist moves through paradigm-shattering decisions without deciding. There is something almost peaceful in this condition.

But there is another condition, less familiar, that haunts the artist or craftsman who works with technical means: instead of the unconsciousness of the sleepwalker, something more like the hyperawareness of the insomniac. This is what Vasari diagnosed when he warned that the artist who labors to keep pace with geometric perfection "exhausts his powers, fills his mind with difficulties, and often transforms its fertility and readiness into sterility and constraint... not to mention that very often he becomes solitary, eccentric, melancholy, and poor."[2] This melancholic does

1. Langdon Winner, "Technologies as Forms of Life," in *Epistemology, Methodology, and the Social Sciences*, ed. Robert S. Cohen and Marx W. Wartofsky (Dordrecht: Kluwer Academic Publishers, 1983), 249–263.

2. Giorgio Vasari, *Lives of the Most Eminent Painters, Sculptors, and Architects*, trans. Gaston du C. De Vere, vol. 2 (London: Macmillan and the Medici Society, 1912–1915), 131.

not sleepwalk into purposelessness; they watch themselves, fully awake, perfecting techniques whose justification is evaporating.

I've often found the experience of using software to create art to be alienating, but the experience of doing something by hand that could easily be automated – copying a picture with exact accuracy, for example – can be even worse. Frustration towards software typically stems from lack of cooperation, but the nagging fear that what you are doing could be done automatically is more of a hopeless alienation. As a young person studying both painting and computation, the apparent ability of the latter to usurp aspects of the former was ominous.

Photography automated representation, but today's technology may transcend that capacity through wholesale automation of synthetic experience. 3D printing, 3D scanning, augmented reality, virtual reality, and artificial intelligence can work together as an assemblage, delivering a near-infinite possibility of inputs to the human senses. The total consequences of this novel capacity are perhaps too large to grasp at this moment. However, it is possible to draw some modest conclusions about the changing status of art and artistry in this time.

The valuation of objects has always shifted with social-technological trends, but the movement towards mass customization is unique in its synthesis of industrial production with artisanal specificity. We have yet to witness this phenomenon take shape fully within the realm of consumer goods and the everyday, but our media now arrives as a memetic fervor, so instantaneously and easily that it is now strange to think of an image as something that was once as singular, material, and individual as an apple.

[...]

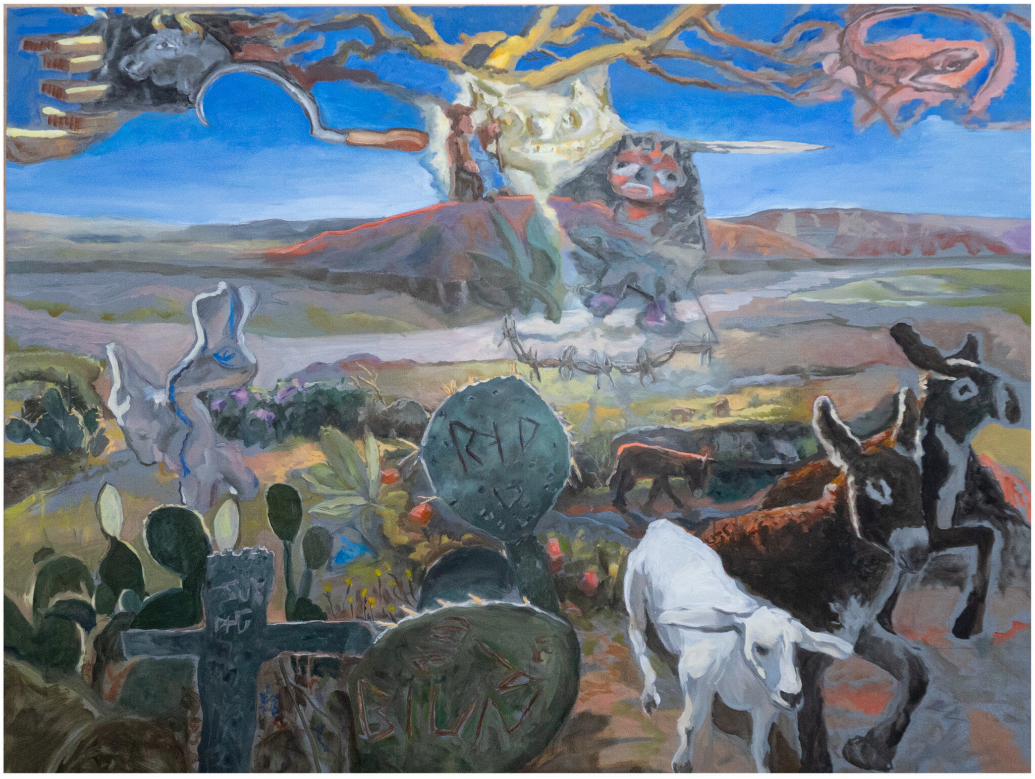
This book is focused on aesthetic or "non-functional" printed objects, like gypsum prints, because their conjunction with the type of specificity 3D printing excels at creates a strange problem. A 3D printer can print a good replacement cap for my water bottle because it can print the exact one that fits. But how can it make a good piece of jewelry? Is the value of that jewelry imbued in its form by the precision print-head nozzle in the same manner as the bottle cap? Obviously not, in the sense that the precise measurements of the jewelry are relatively unimportant. At the same time, a piece of jewelry's value to a customer – beyond the market value of its raw materials – lies in a relationship between object and person which is essentially specific: my grandmother's earring, my old charm necklace from summer camp, or my parents' wedding bands. But what is the relationship between that specificity and mathematically represented precision? A completely accurate replica of my grandmother's earring would no longer be hers because it would lack the history that makes it genuine. But the genuine earring is genuine in-part because of its consistent, precise form. If it lost that form – if it was twisted, or melted down – and kept only the history, it would also lose its value.

In short, 3D printing is valuable because it can make precisely specific objects. For practical and mechanical pursuits, this value manifests itself in obvious ways. But when it is applied to aesthetic and non-functional ends, the value of 3D printing is not so obvious.

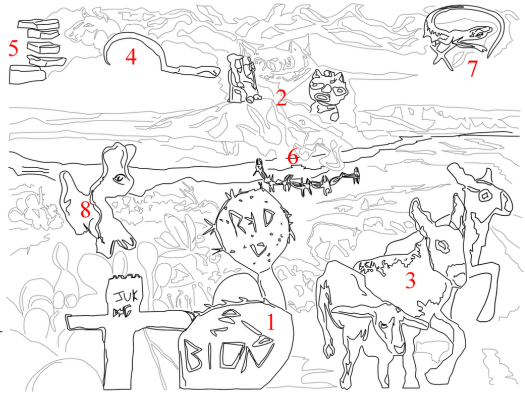
Is there something we could call "aesthetic precision" that 3D printing can use to make things of aesthetic value? If this aesthetic precision exists, can it be expressed in the same mathematically defined forms used by mechanical precision? Or is aesthetic precision actually a kind of

sentimental precision – emotional specificity – that is distinct from the realm of surfaces and angles? But if that is the case, are the two forms of precision completely unrelated, or could they share some kind of relationship? Could aesthetic precision supervene upon mathematical precision? Or might aesthetics set the rules which mathematical precision makes manifest?

[...]



1. Cactus with Writing On It When praising the detail of creation, Browne pictures a "needle of nature" writing out the finest aspects of organic forms. He offers an original translation of Psalm 139 employing this metaphor: "Thou hast curiously embroydered me, thou hast wrought me up after the finest way of texture, and as it were with a Needle." The end result of this embroidery is precise, but the manner in which it is fastened is poetic. While elsewhere Browne's needle weaves geometric forms in space, here it is literally writing letters. The "great Volume of nature" is written in a script composed of decussations, nature as symbolic writing, a book in which every creature, however insignificant, is a metaphor expressing a divine Idea. As his contemporary Francis Quarles put it: _"The world's a book in folio, printed all / With God's great works in letters capital: / Each creature is a page; and each effect / A fair character, void of all defect."_ According to Singer (1987), Browne had hieroglyphic script in mind—specifically a quincunxical interpretation of the Egyptian cross as analyzed by Athanasius Kircher. This symbol was sacred because its geometry could encapsulate the abstract essence of nature's creative force inside every specific detail. It's not a coincidence that the decussation looks like the Vitruvian Man. As Kepler summarized: "Those laws of nature are within the grasp of the human mind; God wanted us to recognize them by creating us after his own image so that we could share in his own thoughts."



2. Cyrus and His Subjects What did Browne have in mind when he said that Cyrus brought the treasures of the field into rule and circumscription? Was it the literal seizure of land, the annexation of stretches of ancient Western and Central Asia through military conquest and resettlement? Or did he mean the harnessing of energy from that land through agriculture, husbandry, cultivation? Or was he just talking about the creation of a garden, a place of leisure and reflection? In Sardis, the ancient Anatolian city converted by Cyrus into the most important satrap of the empire's Western frontier, one could find rule and circumscription in all three senses. One of his finest *paradeisoi* was there, at the end node of the Persian royal road—a perfect, walled park. Inside were gridded quadrilateral water channels composed islands of perfectly

[...]

Browne mixes this strain of Renaissance humanism with Enlightenment empiricism to propose a profoundly different idea of *what craft is* that is echoed in his own pattern-seeking methodology. While it might appear occultic, the purpose of the essay is not to initiate the reader towards understanding a secret formula for unleashing a mystical power. Instead, the countless examples of the quincunx serve as an empirical demonstration of a recurrent structure that is already there, operating

consciously and unconsciously across all acts of creation. For the reader, the quincunx is not a guideline for summoning creativity, but a key for perceiving an existing pattern.

The aforementioned "needle of nature" is depicted at work in the most microscopic of nature's details, delighting to weave minutiae.[3] In one seemingly minor example of the needle's work (among the countless others in his text), Browne visualizes the quincunxes as a "Net-work" of seaweed covering a piece of driftwood, expressing the three dimensional form of the wood through a latticed grid.

Browne was known for coining lasting words and concepts; here, he drafts a striking illustration of the pattern of edges and vertices which make up polygon meshes in computer graphics.

However, in this case, Browne was not the first to see the significance of the idea. A century before Browne published his works, René Descartes wrote a formula in his famed "Secret Notebook" which could define the number of faces, vertices, and edges on a given three-dimensional polyhedron.[4] In fear that the Inquisition would construe his interest in the Platonic solids as support of the astronomical models of Kepler and Copernicus, Descartes had to encode this theory in a secret manuscript. It remained undiscovered until after his death, when Gottfried Leibniz found the notebook in Paris and was able to solve the encryption on the spot.

Given that Leibniz's notes are all we have of the notebook, it's unlikely that Browne would have ever been aware of the formula. It wasn't well known until Euler, who is credited with fathering the field of topology, rediscovered it in the 1700s; today, the "Euler Polyhedral Formula" is one of the low-level fundamentals of a 3D graphics engine.

Regardless of the original source, the ideas behind "proto topology" were part of the intellectual ferment of the era, alongside notions like "the

3. Thomas Browne, *The Garden of Cyrus* (London, 1658); see also Robert Hooke, *Micrographia* (London, 1665).
4. Amir D. Aczel, *Descartes's Secret Notebook: A True Tale of Mathematics, Mysticism, and the Quest to Understand the Universe* (New York: Back Bay Books, 2006).

book of nature".[5] Like Browne, Galileo famously references the latter concept in his *The Assayer* (1623) writing:

> *"Philosophy is written in this grand book – I mean the universe – ... It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a single word of it."*

But unlike Browne, Galileo invokes the book of nature sarcastically so that he can finally shelve the concept altogether. The above oft-quoted passage crystallizes this epistemological break attributed to Galileo: that the true "language" of natural phenomena is mathematics, and that there is no book of nature written in mystical symbols, but a world composed of numeric laws and constants.

In contrast, the "topological" style of reasoning that surfaced in Browne and Descartes is concerned not with measurement but with relational structure, or properties that persist through transformation rather than those tied to exact dimensions. The distinction between these two styles is not between intuition and measurement, or quality and quantity. The kind of precision that Browne depicts in the Garden of Cyrus is also mathematical; he describes God as a "skillfull Geometrician" and nature as a force which "Geometrizeth ... all things". Nor is the distinction about incorporating dynamic change – after all, calculus emerged from the tradition of Galileo.

Browne is working at the genesis of a tradition that would prefigure later developments like category theory, homotopy theory, and the high-dimensional semantic topologies of deep learning. In this orientation, precision is measured not by correspondence to fixed quantities but by structural invariance, or what doesn't change across transformations.[6]

5. Galileo Galilei, *The Assayer* (1623); see also Albrecht Dürer, Johannes Kepler, and Athanasius Kircher on related themes of mathematics as the language of nature.

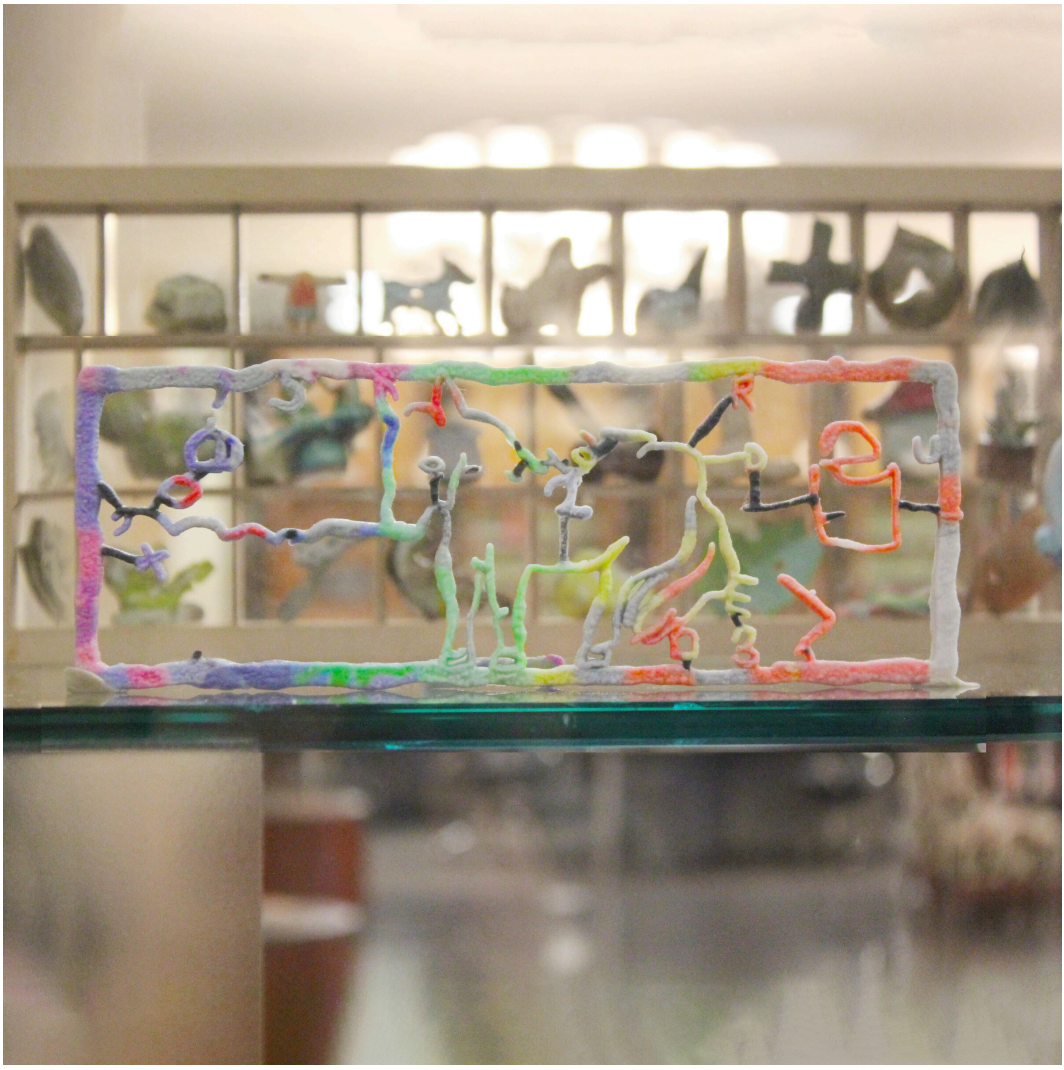
6. On the development of topological thinking, see Imre Lakatos, *Proofs and Refutations* (Cambridge: Cambridge University Press, 1976).

In Galileo's mode, the parabola is reached by abstraction *from* particulars: the thrown stone exemplifies the law but adds nothing to it. Once grasped, the law is fully intelligible in thought alone; matter is merely where it applies. Topological abstraction works differently: the universal is grasped *through* material transformation.

For the clearest example from this era, we can look again towards Dürer's *Underweysung der Messung* manual for artisans. There, Dürer presents the Platonic solids not as static ideals but as nets, or patterns of connected polygons that can be cut from paper, folded into solids, and unfolded again. This wasn't a concession to unlettered craftsmen needing physical aids, but an enactment of what it means to grasp a form topologically. What the solid truly *is*, is the invariant across its foldings and unfoldings. What persists through transformation – the relational structure of faces, edges, vertices captured in Euler's formula – is the form itself. To understand the cube is to understand it *as* foldable, not to observe a static shape and then discover it can also be flattened.[7]

Brassier's account of creative agency turns on the moment a pattern becomes recognizable as a rule, or as contingent, and therefore modifiable. But a pattern only discloses itself as rule through transformation: you cannot see what persists in a knot by measuring it, only by pulling, tightening, loosening and testing what holds. Topological precision demands material transformation not as practical aid but as condition of perception.

7. Albrecht Dürer, *Underweysung der Messung* (Nuremberg, 1525).



Colored Gypsum positive print of brick drawing relief.

Browne's needle of nature, then, represents a type of use case—analogous to Wiener's alternative to Shannon—revealing a non-hylomorphic approach to mathematical precision in nature. Used like this, the needle is a universal tool, equally at home in the hand of God, the spider, or the craftsman. The patterns it weaves ride along the sinewy nets that have already been cast over the flotsam and jetsam of creation. The thread is tightened or loosened and the underlying structures warp and transform along with it; the lines are severed or connected and some pieces drift off while others are reeled in. The drawing created from this method is formally precise but loosely articulated – in this way, the user can articulate finery of the utmost detail with the raw intuitive gesture of an expressionist painter. What Browne proposes is a style of craft that can operate through mathematical precision without being alienated by the self-consciousness of measure.

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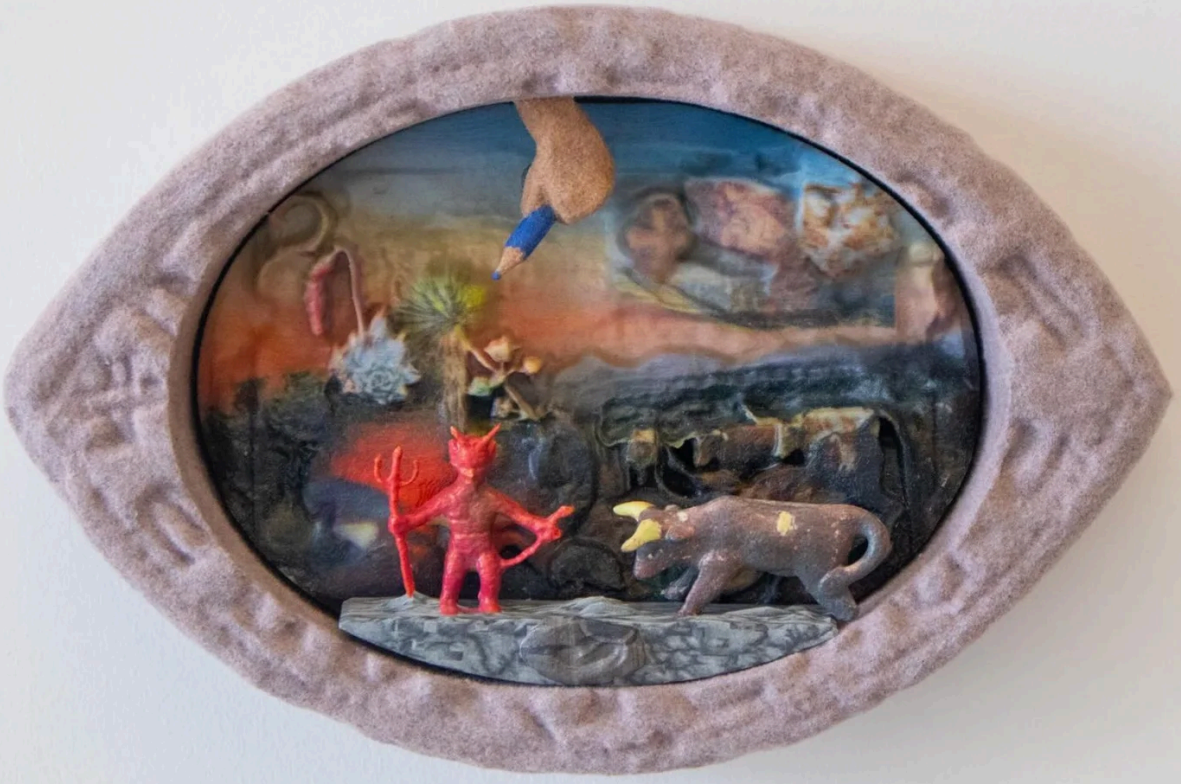


In a series of short stories titled "Tailors' Dummies," Bruno Schulz tells of Jacob, a failing textile merchant in a provincial Galician city who delivers a series of manic lectures to his family on the nature of creation. Jacob proposes a heretical Gnostic cosmology in which the Demiurge's perfection is the problem, and humans must create flawed, imperfect things – using trash, in dark and dingy spaces – to rebel against it. Two readings of this story are relevant here.

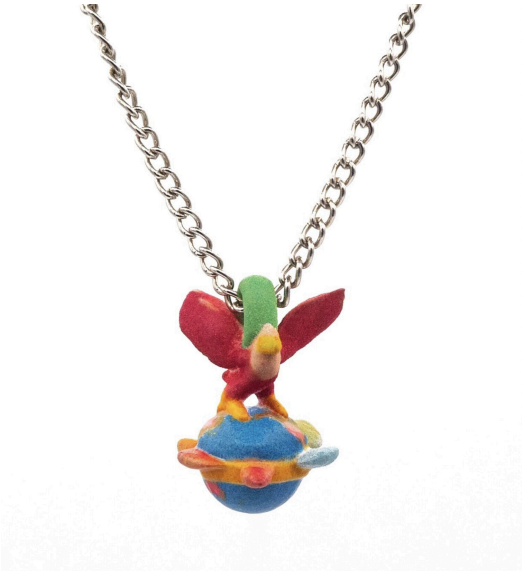
The first is that Schulz implicitly reframes the problem of alienated creative ennui as a *sentimental* problem – that is, the desire to mimic the demiurge is not about the creations themselves but rather about experiencing the *feeling* of creating – i.e. "creative delights". But in Schulz's fable, the "joy in labour" which William Morris saw as a noble self-affirmation of human potential is recast as an indulgent "imitative tendency" to be performed quietly and rebelliously in the dark. This begs us to reconsider the issue posed in the introduction of this book: is the problem of technological creative alienation a matter to be solved via reconfiguring one's relationship to technology, or is it merely a matter of regaining the elusive *feeling* of creative freedom? If so, is that an impulse worthy of being indulged in? In Schulz's story, it leads Jacob towards compulsively constructing, in dark and dingy settings, "suffering, crippled, fragmentary forms of life...nailed together" as "...silent martyrs to cruel human inventiveness". Is, then, the desire to create despite all circumstances and regardless of any result an inherently cretinous, selfish tendency?

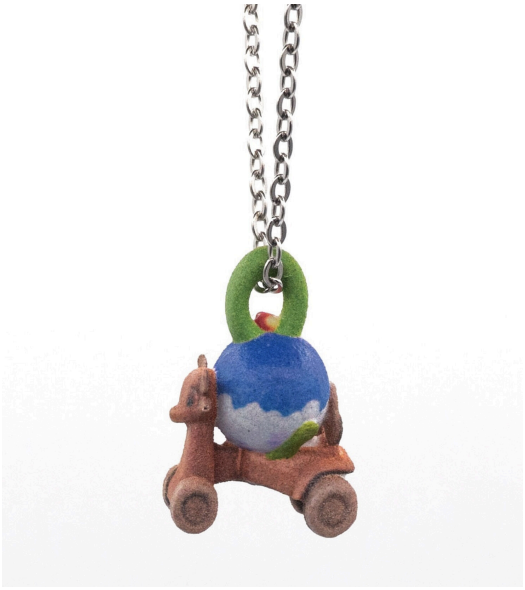
These questions lead us to the second, theological reading. Schulz engages the ancient debate between Gnostic and Orthodox Christianity over the nature of creation: is it mere demiurgy (the flawed work of a lesser god) or *kenosis* (God's humble self-emptying in the act of incarnation)? Yet Jacob's ravings ingeniously invert this problem. He imagines a Gnostic universe where the question of material creation is already settled, but with a crucial twist: the world is not corrupt but *too perfect*. In this inverted

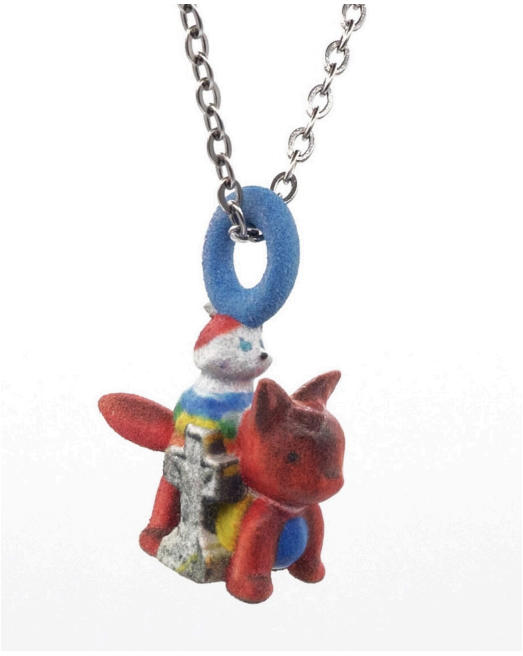
cosmology, humans must take on the very role that classical Gnosticism condemned – creating fallible and imperfect things to corrupt the stifling perfection of the original creation.

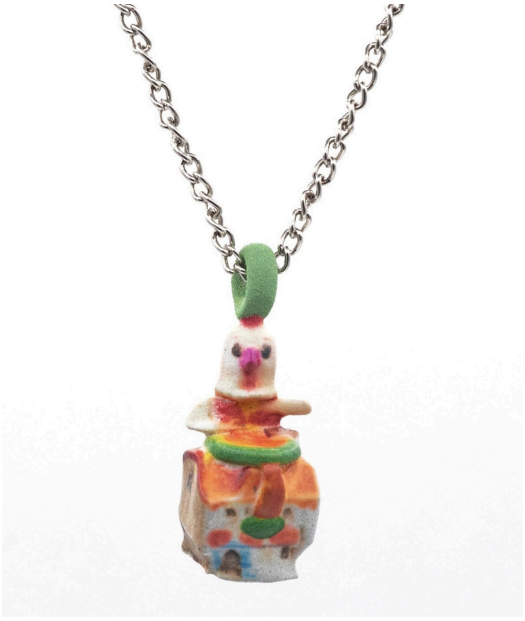
The reversal shows that Jacob is engaged in a sort of corrupted *kenosis*. In a world defined by the Demiurge's stifling perfection, any act of humble, self-emptying creation will inevitably be scarred. His creations are "martyrs" not to his cruelty, but to the conditions of their very birth. They are the result of a divine impulse (kenosis) forced through the filter of a fallen, alienated reality. He creates with "trash" because it is the only substance not yet colonized by perfection. Jacob's quiet, rebellious work in the darkened margins of his apartment building is not a constraint on his creative freedom but rather its very condition, the thing that makes creation possible at all in his world.

Through this theological reading, Schulz's story becomes a parable of creation itself. What distinguishes living creation from empty fabrication is love, understood not as sentiment but as vulnerable commitment, the normative gesture of making one thing matter more than all things. The humanist argument proves true not as an empirical claim about the uniqueness of our human potential, but as an image of what the hands represent: kenotic choice, the deliberate acceptance of limitation in our means of creation.

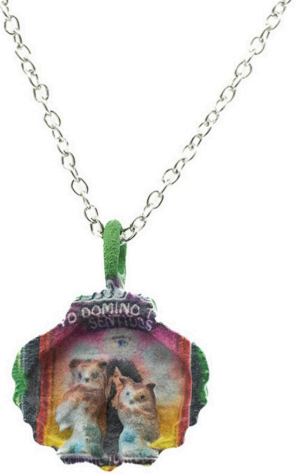


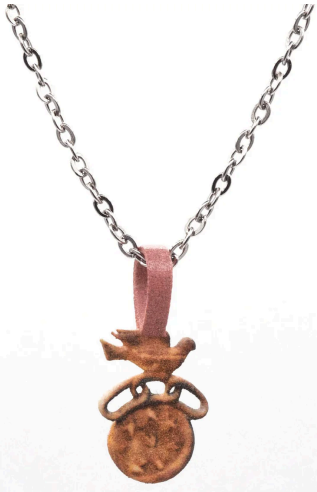


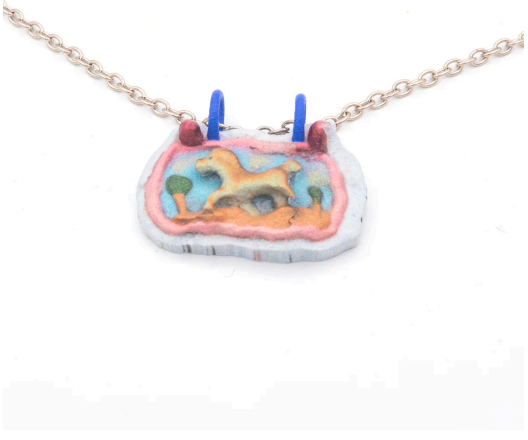


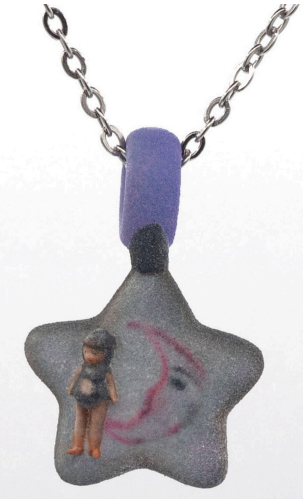


Amema Charms, various, 2021-2025.





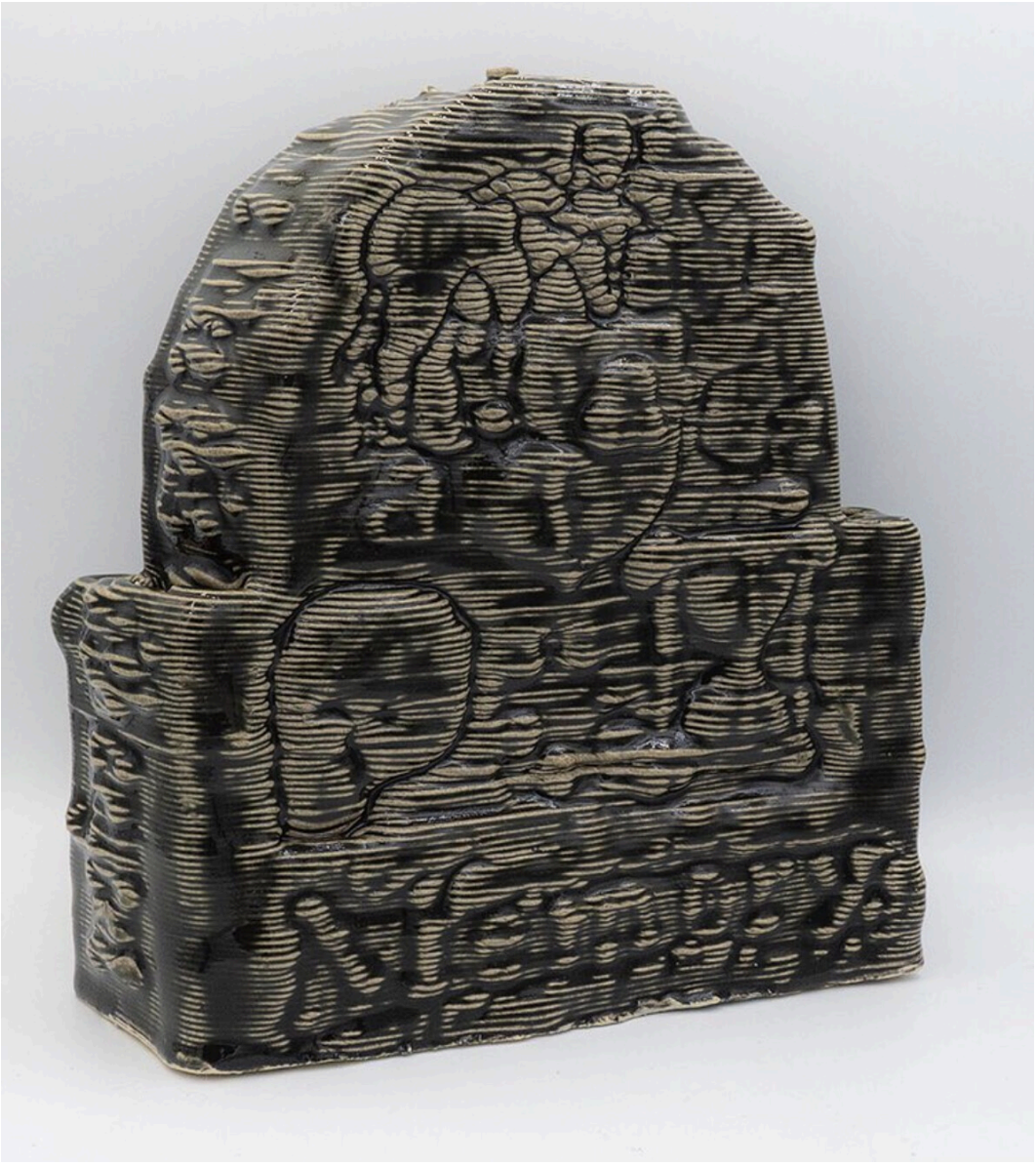




[...]

This dilemma first confronted me in the mountains of West Texas, where I was hiking with my friend Walker. We found an alluring specimen: a toad, mummified in the dry air, with an abdomen that was a beautifully pearlescent indigo, framed by brilliant orange toes that had gnarled into claws. I moved to place it in my backpack, wanting to take it back with me to the swampy Northeast where we were living. But Walker intervened, asking why I would take it from the place it died in to somewhere it didn't belong. He had a point – something felt deeply wrong about that. I proposed a compromise: why not scan the toad and color 3D print a replica back at home? But somehow that didn't feel right either. After debating for a while, we ended up leaving it behind as we continued down the trail.

In the years since, I haven't questioned that we made the right choice, but I've wondered why scanning and printing the toad felt as amoral as taking the corpse. Were we stealing its soul in the way folk superstitions believed a photograph could? If a single photograph might capture a soul, surely a photogrammetric scan would completely eviscerate it. In that case, would the 3D print be a cursed object corrupted by a stolen essence? Were we renewing its life, like Benjamin with his old books, into a library that was alien and hostile? Or were we making a mockery of its life by turning it into an empty replica, like Baudelaire's toy, and disgracing its death by distilling its corpse into something even more dead than natural death?



3D Printed Ceramic Headstone, 2021