

magic

For over a decade, I have devoted my life to the study of magic. What do I mean by magic? In a sense magic is both designing card tricks and designing space shuttles. Magic is both what drives ordinary conversation and planetary alignment. It propels technological advancement, rules nations over generations, and orders the natural state of our universe. Magic, in short, is *life*. It is the relationship between what you see and what you don't see. It is all of the puzzle pieces coming together to form a picture. When we look at the puzzle as it lays before us, completed in whatever state, we see an *image*. We do not look and see the parts, we look and see the whole. We see the *essence* of the bigger picture. We see the *soul*. That's magic.

In the 18th century, a limbless german artist named Matthias Buchinger produced these magnificent illustrations done in fine micrographic calligraphy. You'd look at a Buchinger portrait and see *hair* but after holding up a microscope what you'd actually see was *calligraphy* — the seven psalms and the Lord's Prayer spelled out in such finite microscopic script that it deceives you into thinking that it's hair. That's magic. That's art. And that's what I'm interested in talking about.

In a Ted Talk, Chris Milk, CEO of Vrse, describes the virtual reality camera as the ultimate empathy machine: a device that builds "real human experiences." That is to say, as we've seen with Buchinger's calligraphy, this magical device *deceives us* into seeing a "real human experience." What is more, is that what we just designated as a magical device is more often designated a scientific device.

In the summer of 2015, I worked in NYU's Media Research Lab alongside renowned scientists developing groundbreaking technologies in the field of computer graphics and virtual/augmented reality. Inducing spacial geometry is a weird experience: the walls around you vanish as you appear to plunge into an entire new spacial location— you literally teleport from being in one place, to being in another. Feeding your sensory input an entirely new induced set of data, makes you begin to question what reality actually is. What is reality made of? How is it obtained, processed, and determined? Can it be engineered? Is it engineered already?

In March of 1960, an artist named M. C. Escher printed *Ascending and Descending* — a lithograph print depicting a never-ending staircase. While drawings on a page are only two-dimensional symbolic representations, when viewing the picture an audience member actually sees a three-dimensional staircase, an object which could never exist in reality. Yet somehow, it does. It exists in our mind. Our experience of the object is real.

In *The Artificial & the Natural*, Bernadette Bensaude-Vincent and William R. Newman tackle this “evolving polarity” between what is (1) man-made, conjured, or contrived, and what is (2) organic, or a natural product of science. To do this, they chronicle the origins of the relationship — this evolving separation between concepts since antiquity — by first asking, What does it mean for something to be ‘artificial’ in the first place? Interestingly, you can trace the concept back to the ancient Greeks who had no such word for the distinction between ‘art’ and ‘engineering’. In both cases, the concept was referred to as ‘*techne*,’ or what we would appropriate as the entire spectrum between technique and technology. To them, ‘art’ just meant *creation*. If someone builds a chair, they have employed some kind of *techne*, and if someone constructs a painting, or creates an epic poem, they too fall victim to engaging some kind of *techne*. Whether

the craft is deceptively microscopic calligraphy, masterfully invisible rhetoric, or subatomic/genetic engineering, “Any sufficiently advanced technology is indistinguishable from magic.”

The magician is hereby concealing his *techne* deliberately to deceive the viewer into thinking the product is somehow organic or natural. This is essentially the entire field of intuitive design and graphic user interfacing. How can we make all the technical engineering completely disappear from the user’s experience so that they can simply see our product as its own thing? The product. If you watch the early Steve Jobs keynote speeches introducing the iPod, you’d be surprised at how closely they resemble a David Copperfield show. According to the intended definitions of the words, the painting is in equal part *techne* as the iPod is *art*.

In all of the above scenarios, the craft, or method, is a hidden trick. An unseen ‘*techne*’ at play by the designer to engineer the product. It is technology concealed sufficiently enough from the observable eye to be considered art. The unknown. Magic.

In the *Poetics* Aristotle suggests that actions make the best metaphors, for they are linguistic conveyers of energy — variables with a temporal/spacial attribute, and therefore the most accurate depictions of our reality. Applying this understanding, I shall propose that craft, technology, and technique, can all be defined as the act of *applying knowledge*. Depiction is interesting because it allows us to create experiences in the perceiver’s mind which resemble as close to or as distant from reality as imaginable. Through craft, we create experiences which the viewer discerns for recognizable objects. Language itself is a form of depiction, and life a chain of experiences, and so our whole notion of reality is in-part contrived by the stories we tell and those we hear. In fact, Galileo is often credited with actually transforming one real object into another via his *Sidereus nuncius*. This object was the Moon.

Historically, when others looked at the moon through their telescopes, they were still seeing a two-dimensional flat surface, because they hadn't been primed in perspective theory to interpret the image. They saw one thing: a flat moon. However, Galileo, because of his prior experience with drawing three-dimensional orbs with hills and valleys, looked at the same picture, and saw more parts, more objects, that made up the whole. He saw the contrast and shading, identified craters and mountains, which were unknown to the others. When he explained this "theoretical framework," essentially educating the world on art theory, it became inevitably obvious to the rest of the world that the moon was a round spherical object. He supplied the rest of the world with some knowledge, told them a story which had previously been concealed sufficiently from their fathomable reality, and allowed them to fathom some new interpretations of the visual depictions. He lifted the curtain, handed them the manual, and revealed to them the magic trick.

Speaking of depiction, examine Plato's way-early take on knowledge representation. Before the invent of computer programming, Plato introduced a concept of the *form*. An abstract *thing* which exists in the mind, or "intelligible realm," that contains all the attributes that make up something's essence. When a person looks at a tree, they are seeing a specific instance of this abstract form called Tree-ness. Over time, after seeing multiple trees in comparison with all the other objects around us, we put together an *idea* of what a tree is. What all those various instances, or examples, share in common. That resemblance is a Form, it exists in imagination, and it is continually refined based on all the examples of objects we observe.

Computers work the same way. The programmer outlines a class, which is a set of attributes that makes up the template for an object. During run time, an object is created based on this

abstract finite template. Essentially, the *class* is a *form*, and the specific object made during run time is a specific example or an instance of this class. Like Plato said. However, this confines the program's realm of knowledge specifically to what the programmer gives it. In life, we don't work like that.

In life, we are bombarded with various objects which we learn to identify and differentiate from one another to develop our classes. No one gives us the forms. Instead we look at reality and intuit them. We see the wine, and then the ocean, and the sky, and we extract a form for the object called, "blue." We learn over time. So experiencing objects formulates our classes, but through depiction we can artificially expose others to imagined experiences, thus depicting artificial objects. As seen with Galileo, however, the same imaginative process depicts both falsities and realities. In fact, one could argue any notion of our current reality is essentially an artificial reality. When one experiences a reality which is directly opposed to what they believe reality to be, one experiences an *illusion*. Perhaps then, if truth and fiction are depicted in the same ways, all of life can be said to be *illusion*.

Obviously reading a story is different than living through it, and words alone are not exactly the same as truly experiencing narratives, but they are a start, and are good enough for explaining laws of physics, dramatizing organic chemistry, and visualizing historical accounts. Images and sculptures are even closer to what we'd consider a realistic manifestation of a contrived experience. When the narrative moves from the page into embodying a spacial-temporal presence, the distinction begins to blur and increasingly relies on cognitive perception. As the technique becomes increasingly sophisticated, the line grows more and more indistinguishable until essentially we are left with a complete and utter virtual reality.

In Philosophy of Physics with Tim Maudlin, we chronicled the development of the concept of space as it developed throughout history. In a famous correspondence between Leibniz and Clarke regarding the ontology of space and time as it was realistically depicted up until 1716, Leibniz took the opportunity to conveniently plug for his *principal of indiscernibles* — the idea that if two things appear to be exactly the same, just under two different names, they are essentially the same exact thing. Perhaps then, if “any *sufficiently advanced technology* is indistinguishable from *magic*,” then the two are actually the same object in the mind.

In discussing the relationship between scientific advancement and magic, let us consider the field of Artificial Intelligence. In 1950, Alan Turing invented the Imitation Game. Basically he proposed we test a machine to see if it can sufficiently exhibit intelligent behavior entirely indistinguishable from that of a human, and if it can, he said, we would have created true artificial intelligence. Since the goal here is to produce something completely indiscernible from that which we call intelligence, the goal is in actuality to produce intelligence itself. The fact that it may be considered “artificial” relies only on the person experiencing it being aware, or knowledgeable, of the fact that a human created it.

Artificial intelligence, therefore, when done well, should create something that, when we look at it, just looks like intelligence. We shouldn't see the nuts and bolts, we should just see the contrived product as a single entity. In this way, the craft is sufficiently concealed enough to be magic.

In ancient times, priests used sufficiently advanced machinery to create religious experiences for those wishing to speak to the dead in the form called Deus Ex Machina. With the rise of the technological revolution in modernity, Steve Jobs put a sufficiently advanced device in the

palms of hundreds of millions of people worldwide to magically connect them digitally in the form of the iPhone. How do we value this ability to bring magical effects into our reality? In October 2014, Google gave Magic Leap \$542 million to make digital objects appear in real 3D space around us. A feat that will virtually close the gap between augmented and actual reality. For good?

Book List

Ancient, Medieval, and Renaissance Classics (before mid-1600s)

1. *Zohar* — selection: “How to Look at Torah” (pseudo-epigraphic 13th century claiming to be 2nd century)
2. *Meno* by Plato
3. *The Guide of the Perplexed* by Moses Maimonides
4. *The Iliad* by Homer
5. *Sidereus Nuncius* by Galileo Galilei
6. *The Poetics* by Aristotle
7. *A Midsummer Night’s Dream & Hamlet* by Shakespeare

Modernity — The Humanities (after mid-1600s)

1. *True and False: Heresy and Common Sense for the Actor* by David Mamet 1997
2. *Matthias Buchinger: The Greatest German Living* by Ricky Jay
3. *Metaphor as Rhetoric: The Problem of Evaluation* by Wayne C. Booth
4. *Hazards of Prophecy: The Failure of Imagination* by Arthur C. Clarke 1973

Modernity — The Social and Natural Sciences (after mid-1600s)

1. *The Artificial & the Natural: An Evolving Polarity* by Bernadette Bensaude-Vincent and William R. Newman 2007
2. *Philosophy of Physics: Space and Time* by Tim Maudlin 2012
3. Leibniz-Clarke Correspondance (1715-1716)
4. *Civilization and its Discontents* by Sigmund Freud 1930

Area of Concentration

1. *Blink* and *David and Goliath* by Malcolm Gladwell
2. *Masters of Deception* by Al Seckel
3. *General Theory of Knowledge* by Moritz Schlick (1918)
4. *Cosmic Religion* by Albert Einstein
5. *The Making of the Atomic Bomb* by Richard Rhodes
6. *Micrographia* by Robert Hooke