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Dear child,

This is my living will. There are small errors in my codes after these few years. It must have been some fast particle that dislodged a few atoms deep inside the long nucleotide chains. Each collision was recorded. The cells carry it on in their reproductions and so it cannot be rebuked! I'm not exaggerating when I tell you they were cosmic in origin ...and here and there a hadron shower passed my way...

I've lived well: my liver is big – a sign of life's pleasures. My body is rich with teleost photopigments, now an accurate photonic calorimeter. So that you may not find home how you left. It would be very dark for you, but my plants still manage to grow – long, and thin – they're climbing through what they sense is a dense forest canopy, hoping to reach an open sky. I think you would have a similar sense – a humid jungle at night – calm, waiting, predatory.

I wish to leave this to you: an officious magic I've taken from the state directly. When I say taken, I mean that it was ingested, eaten. I want to give you this dietetic plan. It is little more than a book of recipes but it must be followed carefully. Will you remember?

First, let me tell you a story.

CHROMOPHORE A BRIEF HISTORY OF MONETARY-OPTICAL ABSTRACTION

The financial markets underwent a radical technological reconfiguration throughout the 1990's - the first-wave internet bubble was an early indication of a new type of precarity in finance and the depth of influence that the digital could yield in the material world. But what most of us knew as the dot-com bubble was merely the skin visible to consumers over an internal inflation in market trade volume made possible by the self-same technologies. Relatively unknown to those working outside of Wall Street, it was just three years after the release of the earliest graphical web browser in 1993 that the first major Electronic Communications Network for trading also went online. And with that the invention of a new category of trading strategies that we have come to know as HFT: High Frequency Trading. Trade volume followed an exponential growth curve from this date until its peak in 2009 following the onset of the 2008 recession. Today HFT constitutes more than half of all trade volume in US markets.

Prior to the shift towards computation the New York Stock Exchange's trading floor was populated by human bodies; buying and selling, acting as proxies for brokerage firms. For decades, every trade was performed through physical gesticulation, but when the SEC approved the sale of the 200-year-old NYSE exchange in August 2012, its trading floor had long been in a state of decay accelerating toward obsolescence.

It was bought-out by Atlanta-based Intercontinental Exchange – a global corporation that tautologically both owns and is traded on the NYSE (ICE) – founded in the year 2000 explicitly to take advantage of the internet for high speed, international trading.

Much of this has come into public view in recent years as machine automation increasingly evokes the same anxiety amongst white-collar workers (and particularly the dwindling day-trader class) that it had once caused in blue-collar laborers following the industrial revolution. Of course today the blue-collar labor force has all but disappeared in the US and job precarity now extends across (virtually) all classes leaving the white-versus-blue distinction largely redundant - an indication that we're all now vulnerable to the same forces of job market instability. We are, in this sense, all more or less aware of being subject to the digital financial exchanges. However, there is much less awareness, or discussion, of the corresponding transformations that took place in physical currencies and emergence of optical abstraction that formed as a result the same digital influence.

Along with the digital transformations taking place in the stock market, the growth of ATM use in the late 90s corresponded to the expansion of financial networking. Deregulation of ATM fees and the expansion of data networks allowed for the wide dispersal of ATMs into territories previously considered impossible or unprofitable. After the regulatory ban on fees was lifted, the number of ATM units in the US grew rapidly (by nearly 200% between 1996 and 2002). Further, the ongoing inflation of the US dollar required that more and more money be printed (growing by an order of magnitude in the last decade - from ~\$300B USD in circulation in 1993 to ~\$3000B in 2013), presenting new logistical challenges for the management of a currency designed prior to the internet era. In order to address these emerging problems and accommodate the digitization of bank note circulation, the US dollar was redesigned in 1997 to introduce machine-readable features.

A number of security measures were introduced to banknotes at this time, but the inclusion of infrared ink was intended not only as means of authentication but as technology for overlaying digital data onto an otherwise symbolic token. Each denomination is marked with a unique pattern of bands designed for identification by machine vision algorithms, and thus indexable in an inventory database maintained by a distributed network of machines. These patterns reflect light only in the 700 nm to 1000 nm wavelengths - the Near Infrared band (NIR) - at the edge the normal human-visible spectral range. These measures have since become widespread, the Euro and many other currencies incorporate similar systems.

In order to understand what the use of infrared implies, it is necessary to review its discovery within western science. Most importantly, it is critical to understand that Infrared light is indeed a discovery, and that this event caused a fundamental reformulation in the conception Light. Prior to the discovery by William Herschel in 1800 light was composed of no more than the color range visible to the human eye. Herschel found, however, that the apparently dark region just beyond the red end of the visible spectrum is measurably warmer than the surrounding area, thus indicating that light energy outside of human perception must be present. In this way the definition of light came to be determined not by human perceptual capacities, but rather as a theoretical model of energy, leading the way to the discovery of ultraviolet light soon after in 1801 and later, the theorization of the entire electromagnetic spectrum. More than the discovery of light beyond visibility, it is Herschel's discovery of the material limit of visibility that is of significance here. The possibility of a theory in excess of that limit only becomes available with a turn towards abstraction.

Consider the specific material conditions of human vision: What we understand as the visible spectrum starts at the shortest wavelength of 400 nm in the violet region and spans to 700 nm where the color we call red is found. Near Infrared or NIR is the portion beyond 700 nm, reaching to 1000 nm. Beyond that is the mid and far infrared, followed by radio waves. The biochemical structure of the human eye is such that the retinal sensitivity to light above 700 nm is fundamentally limited at a molecular scale. Light entering the eye is focused on the field of photoreceptor cells in the retina: the cones and rods. Cones are responsible for what we commonly think of as color vision with three subtypes: long, medium and short wavelength - receptive to red, green and blue respectively. The more sensitive rods used predominantly in night vision are attenuated to green wavelengths. The long-wavelength cones are the point of limitation with respect to the visibility of NIR. Every cone cell contains a photo-pigment protein molecule with a particular atomic energy level sensitive to a corresponding band of wavelengths. When photons enter the eye and interact with one of these molecules, a chemical reaction is initiated that ultimately results in an electrochemical signal reaching the brain. These molecules form the interface between photons and perception and it is their atomic structure that determines the hard limits of the human visual sense.

Given the nature of NIR light and vision, its instrumentalization as a sign of authentication and digital serialization in currency design poses a particular model of political power. It would seem that other techniques could have been more effectively deployed - magnetic inks, UV fluorescence, RF bands, bar codes, or any number of other possibilities would have been better suited in digital applications. NIR, however, being situated precisely at the boundary of human perception, functions in a biopolitical register. More than making the site of authenticity invisible, the horizon of legibility remains always just within view, but exterior to the capacities of the human body. In this way the authority of the state is represented at the threshold of its abstraction - where it passes from material infrastructure into ontological Statehood; that is, where it passes from the governance of human subjects into the shaping of human subjectivity. If all that falls within the gamut of visible-light defines the domain of the human visual subject, then the application of NIR in monetary indexing and authentication pushes up against that line, shaping and defining the territory to all that is exterior to it - beyond 700 nm, where political production of subjectivity aligns with the contours of human sensation.

The 400nm to 700nm visible gamut is not universal across all species of animals - bees are known to be sensitive to ultraviolet and many freshwater fish are able to see into the infrared wavelengths. Sharing much fundamental biology with humans, the physiology of color vision in other vertebrates has been of great interest to researchers. Most notable is the mutual structure of the opsin pigment proteins. Nearly all vertebrate opsins are derived from the same chemical known as retinal (a form of vitamin A), modified by the cone cells to form the particular chromophore necessary for the detection of its corresponding wavelength. However, in a number of freshwater fish an isomorph of retinal called 3-dehydro-retinal is employed - a virtually interchangeable molecule save for the difference of a single additional double bond between two carbon atoms. The resulting photopigment named porphyropsin (from the greek porphyus, meaning redish-purple) is attenuated to a longer band of wavelengths in the Near Infrared region of the spectrum.

Unsurprisingly the possibility of infrared vision was of interest to the military. In WWII, the US Navy performed dietary experiments on sailors in an attempt to extend their vision for the detection of invisible infrared communications. By feeding them a diet high in 3-dehydro-retinal derived from the liver of

freshwater fish and deficient in the usual form of vitamin A (or its precursor, beta-carotene) found in many animals and vegetables, it was hypothesized that the isomorph would be incorporated into the retinal cone cells to produce infrared sensitive porphyropsin in the human eye. The tests were reported a success but deployment of an infrared diet plan was disrupted by the invention of an early form of nightvision goggle technology, rendering a biological approach obsolete.

At the time of research, pike fish were chosen for pragmatic reasons, being one of the few freshwater species large enough to be commercially viable and available in the quantities needed for testing. 3-dehydro-retinal is found primarily within the eyes, liver and roe of the fish and so the large livers were harvested for oil distillation. Today pike are no longer commercially fished for meat and their livers are not available for sale in quantity. However, its caviar remains for sale as a delicacy – a dietary supplement that seems well suited to a gastrosophy in the tradition of Charles Fourier for whom the culinary pleasures held a political dimension. Here libidinal desires are intrinsically tied with sociopolitical egalite – there can be no equality without a universal surplus of pleasure (until the very oceans turn to lemonade), which is a way of thinking market dynamics formulated around abundance rather than the interchange of consumption and scarcity.

Fourier's claim was for a valorization of the corporeal passions: the body's living material desires (for sustenance, for reproduction, for warmth, etc), should not be underestimated as a political force. But it is also evident that human sensation as it stands reaches an impasse as it leans up against the domain where value is abstracted by digital markets. Just as the spectral gamut of the human retina is constrained by basic atomic structures, so the capacities of human desire are delimited by its biological composition. To produce a political subject in excess of their biology, the material conditions of sensation must be more deeply examined. As one modest proposition, the development of human infrared vision renders those limits mutable - the trans-nutritional richness of pike caviar offers the opportunity to reconfigure the boundary definition of the visual subject. Now able to see clearly currency's officiated indexes, markings designed for machine vision, the formation of the body's political subjectivity as shaped by networked currency falls within the visible spectrum. In this way the authority of the state is incorporated into the organs - no longer relegated to the exterior domain of abstraction, but held deeply within the body, ingested by its metabolisms and manifested as new vision.

Unknown passions emerge and with that, new human capacities