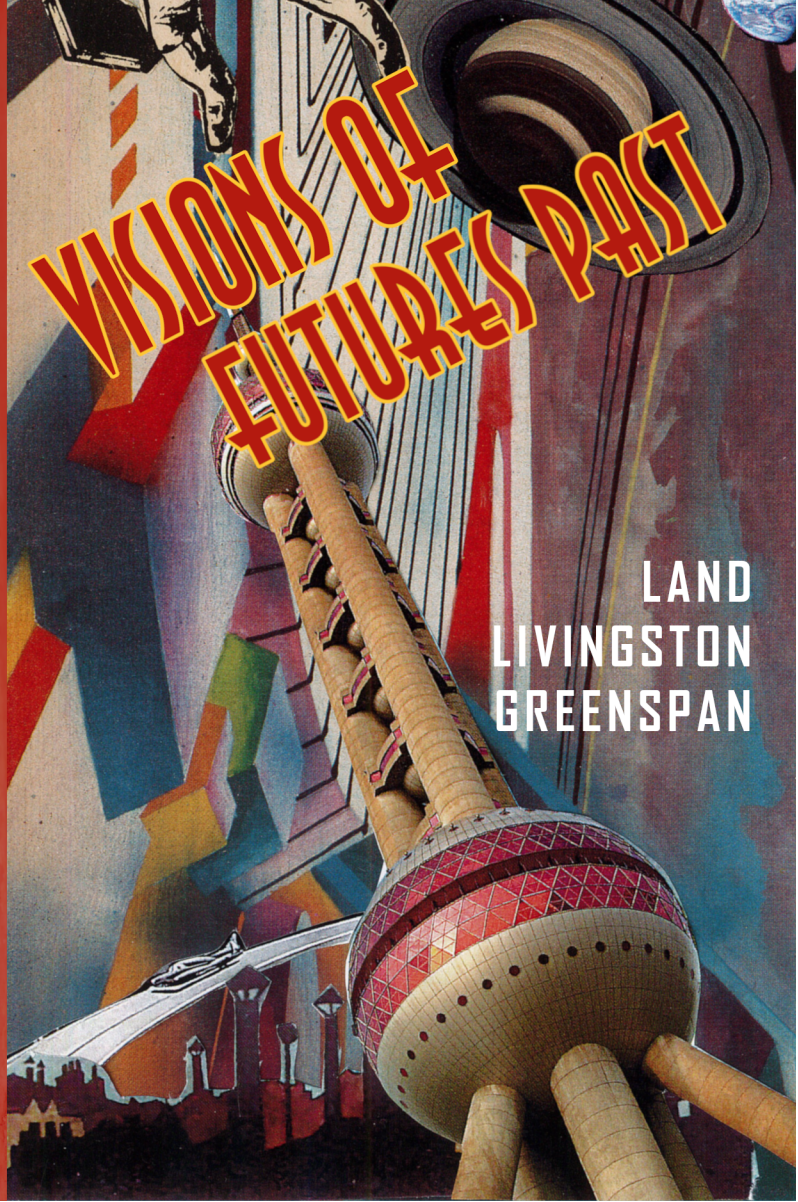
Loops and *Looper* ... Shanghai and Art Deco ... DIY 3D Printers ... Drones

In virtual collaboration with TIME SPIRAL PRESS, we bring you VISIONS OF FUTURES PAST, a book with TWO exciting essays in ONE! Simultaneously indexing forgotten futures and futures yet to be, *Templexity* and *Future Mutation* are gripping essays that will leave you on the edge of your seat!

ISBN 978-1-7781549-3-5
90000
9 781778 154935

Miskatonic Virtual University Press



VISIONS OF FUTURES PAST

LAND
LIVINGSTON
GREENSPAN

Visions of Futures Past

Visions of Futures Past:
Templexity and *Future Mutation*

Texts by Nick Land, Suzanne Livingston, and Anna Greenspan

Edited by Peter Heft

Miskatonic Virtual University Press

Arkham • London

A virtual collaboration between Time Spiral Press
+ Miskatonic Virtual University Press.

Templexity: Disordered Loops through Shanghai Time, originally published in 2014 and *Future Mutation: Technology, Shanzai, and the Evolution of Species*, originally published in 2015.

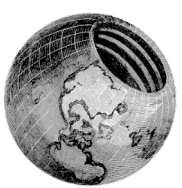
Visions of Futures Past: Templexity and Future Mutation
published by
Miskatonic Virtual University Press, 2024
Arkham, Massachusetts and London, Ontario

mvupress.net

ISBN: 978-1-7781549-3-5

Cover art: Peter Heft
Formatting: Peter Heft

&



Contents:

[To stave off insanity—if only temporarily—flip to page i (Editor's Introduction).]

Wiener, Norbert. *Cybernetics: Or Control and Communication in the Animal and the Machine*. Cambridge, MA: MIT Press, 1985.

Wasserstrom, Jeffrey. *Global Shanghai, 1850–2010*. Abingdon-on-Thames, UK: Routledge, 2009.

Thorne, Kip. "Closed Timelike Curves." In *Proceedings of the 13th International Conference on General Relativity and Gravitation: Cordoba, Argentina, June 28–July 4, 1992*. Edited by Reinaldo J. Gleiser, Carlos Kozameh, and Osvaldo Moreschi, 295–315. Bristol, UK: Bristol Institute of Physics, 1993.

Vol. 5, No. 2 (1963): 164–179.
Lussier, Germain. "Ten Mysteries in 'Looper' Explained by Director Rian Johnson." On *SlashFilm*. Published September 28, 2012. https://www.slashfilm.com/ten-mysteries-in-looper-explained-by-director-rian-johnson/
Lu, Hanchao. *Beyond the Neon Lights: Everyday Shanghai in the Early Twentieth Century*. Oakland, CA: University of California Press, 2004.
Lovecraft, H.P. "#440 To Clark Ashton Smith." In *Selected Letters III: 1929–1931*. Edited by August Derleth and Donald Wandrei, 216–217. Sauk City, WI: Arkham House Publishers Inc., 1971.
Lloyd, Seth, Lorenzo Maccone, Raul Garcia-Patron, Vittorio Giovannetti, and Yutaka Shikano. "The quantum mechanics of time travel through post-selected teleportation." *Physical Review D*, Vol. 84, No. 2 (July 2011): 1–11.
Kit, Borys. "'Looper' Director Rian Johnson on Reuniting With Joseph Gordon-Levitt, Tackling Time Travel and His Love of 'Inception' (Q&A)." On *The Hollywood Reporter*. Published September 28, 2012. https://www.hollywoodreporter.com/heat-vision/looper-rian-johnson-joseph-gordon-levitt-bruce-willis-368902
Kanagaratnam, Tina. "Tess Johnston & Deke Erh: Shanghai's Art Deco Pioneers." On *Shanghai Art Deco*. Published June 25, 2014. http://www.shanghaiartdeco.net/deke-erh-tess-johnston-shanghais-art-deco-pioneers/
Hitchcock, Henry-Russell and Philip Johnson. *The International Style*. New York, NY: W. W. Norton & Co., 1997.
Hanson, Robin. "Tag Archives: Ems." On *Overcoming Bias*. n.d. (http://www.overcomingbias.com/tag/ems)
Gray, Richard. "Lecture Notes: Freud, 'The Uncanny' (1919)." On *University of Washington*. n.d. http://courses.washington.edu/freudlit/Uncanny.Notes.html
Friedman, John, Michael S. Morris, Igor D. Novikov, Fernando Echeverria, Gunnar Klinkhammer, Kip S.

"Sphinx." On *Wikipedia*. n.d. https://en.wikipedia.org/wiki/Sphinx
Science Fiction Studies Vol. 40, No. 1 (March 2013). https://www.depauw.edu/sfs/covers/cov119.html
Rye, Justin B. "A Guide to SF Chronophysics." http://jbr.me.uk/chrono.html
Rimbaud, Arthur. "Rimbaud to Georges Izambard – Charleville May 13, 1871." In *Arthur Rimbaud: Complete Works*. Translated by Paul Schmidt, 113–114. New York, NY: Harper Perennial, 2008.
Powers, Tim. *The Anubis Gates*. New York, NY: Ace Books, 1983.
Popnik, Barry. "History doesn't repeat itself, but it does rhyme." On *The Big Apple*. Published June 5, 2010. https://www.barrypopik.com/index.php/new_york_city/entry/history_doesnt_repeat_itself_but_it_does_rhyme
Obias, Rudie. "Time Travel Movie Looper Will Be Longer In China." On *Giant Freakin Robot*. Published June 25, 2012. http://www.giantfreakinrobot.com/scifi/time-travel-movie-looper-longer-china.html
Newitz, Annalee. "Why *Looper* Could be the Most Well Thought-Out Time Travel Movie in Years." On *io9*. Published July 18, 2012. https://io9.gizmodo.com/why-looper-could-be-the-most-well-thought-out-time-trav-5926757
Musser, George. "Time Machines Would Run Afoul of the Second Law of Thermodynamics." On *Scientific American*. Published May 23, 2014. https://blogs.scientificamerican.com/critical-opalescence/time-machines-would-run-afoul-of-the-second-law-of-thermodynamics/
Moravec, Hans. "Time Travel and Computing." On *Carnegie Mellon University*. Published 1991. https://web.archive.org/web/20110717195721/https://frc.ri.cmu.edu/users/hpm/project.archive/general.articles/1991/TempComp.html
Maruyama, Magoroh. "The Second Cybernetics: Deviation-Amplifying Mutual Causal Processes." *American Scientist*

and forwards, until even blatant anomaly seems familiar, and natural. The city is *unquestionably*—or (to say what is in reality exactly the same, but this time with greater caution) *vividly*—a time machine. It cannot be made without time reversal, and everything we know about historical geography tells us that it is coming to a screen near you.

None of our clumped hydrogen atoms began fusing into helium upon reaching a density crisis. In a real city they would, as new types of social grouping and inter-linkage arise, driving innovation. Yet even without the appearance of conspicuous *emergent properties*, the basic lesson of our toy history is unmistakable. Played back, in reverse, it displays a perfectly normal statistical-mechanical process, as disequilibrium concentrations smoke-off in diffusive, divergent waves. Civilization—in its strict, urbanistic sense—evaporates into fizzing homogeneity. Upon reaching entropy maximum, it wanders randomly through micro-states, while preserving an unchanging macro-state, without time gradient. Video segments sampled from the entropic epoch can be freely shuffled, played forward or backward, without detectable consequence. The manipulations remain lost in undifferentiated hiss.

Be careful with this gas tank, by the way. Hydrogen is highly inflammable, and could explode.

Gradually, as social order emerges, the atoms clump together into small 'settlements,' then into 'towns,' then into 'cities.' Once the quantitative

Such cinema-format time-reversal 'thought' experiments involve no special effects that history has not already demonstrably produced, no trick that isn't already manifested in the modernist core phenomenon (and abundantly elsewhere). Run the recordings as many times as you like, backwards

Bibliography

Thorne, and Ulvi Yurtsever. "Cauchy problem in spacetimes with closed timelike curves." *Physical Review D*, Vol. 42, No. 6 (September 1990): 1915–1930.

Dickison, Mike. "Nine Problems with Looper (that Aren't Brain-Melting Time Paradoxes)." On *Giant Flightless Bird*. Published October 14, 2012. https://web.archive.org/web/20201127052324/http://www.giantflightlessbirds.com/2012/10/nine-problems-with-looper-that-arent-brain-melting-time-paradoxes/

Brevet, Brad. "Got a Problem with 'Looper's Time Traveling Plot Holes? Let's Talk about That…" On *Coming Soon*. Published October 1, 2012. https://www.comingsoon.net/movies/news/570460-can-you-overlook-loopers-time-traveling-plot-holes-and-one-question-i-have-about-the-film

"Bootstrap Paradox." On *Academic*. n.d. https://en-academic.com/dic.nsf/enwiki/11857105

Billings, Lee. "Time Travel Simulation Resolves 'Grandfather Paradox.'" On *Scientific American*. Published September 2, 2014. https://www.scientificamerican.com/article/time-travel simulation-resolves-grandfather-paradox/

Barboza, David. "Making TV Safer: Chinese Censors Crack Down on Time Travel." On *The New York Times*. Published April 12, 2011. https://archive.nytimes.com/artsbeat.blogs.nytimes.com/2011/04/12/making-tv-safer-chinese-censors-crack-down-on-time-travel/

Aristotle. *Poetics*. Translated by S. H. Butcher. Cambridge, MA: MIT Classics, n.d.

threshold for city status has been decided and reached, urbanization begins. The distribution of the gas becomes increasingly heterogeneous, as particles are attracted into larger and larger clumps. The entropy of the system steadily falls. Eventually, most of the particles will belong to 'city-sized' clumps, and the population will be predominantly urbanized. If all the particles agglomerate into large clumps, total urbanization is reached (or, more probably, closely approximated).

If every hydrogen atom is made to represent a (proportional) demographic unit, within an open system (capable of exporting disorder into a wider environment), it is necessary to subtract the assumption of normal physical behavior, and time signature. To run a modernist-historical model is to reverse the natural trend or divergent wave (as complex systems do), which is best illustrated by beginning with a fully entropic distribution of homogeneous density. The tank now describes a completely non-urbanized population (0% urbanization).

Our analogy works best if the gas tank consists of two chambers, one filled with gaseous hydrogen and the other a hard vacuum. When the divider is removed, the gas diffuses explosively into the empty space, tending to its equilibrium distribution (entropy maximum) of homogeneous density.

There is a simple analogy that captures every immediately pertinent aspect of the topic. During

the late-19th century (from 1870) statistical mechanics sought to establish probabilistic laws that would predict the behavior of large populations (of particles). Its model experiments involved compartmentalized tanks, in which different gases could be combined, and their approach to a homogeneous or fully-mixed distribution studied. Completely homogeneous intermixture and diffusion was defined as the entropy maximum of the system, its equilibrium state, with the departure from this limit measurable as its 'negative entropy' (or disequilibrium).

Cities are time machines in *exactly* the same way they are anomalous distributions. Population concentration—thematized with extraordinary theoretical and terminological inadequacy as 'urbanization'—is a key to the disorder of time which remains almost completely unused.

4: Distribution

As cybernetics has eaten the world, it has retreated into invisibility, rendered inconspicuous by the absence of significant contrast. Nonlinear dynamics, as the old saw goes, is roughly as specific as non-giraffe animals. If it is today more convenient to speak, for example, of 'the Anthropocene' it is because something other is still available for recall, or—at least—is imagined to be. Yet tangles remain tangles, even for those inextricably tangled within them, and the greatest tangles of all are still only very partially seen.

Civilization is an accelerating process, not a steady state. As its name suggests, it is channeled primarily through cities (which explode). The incandescent intensity of a hypergrowth- dominated urban future consumes our historical horizon, and an exceptionally impressive perspective on this developing spectacle is to be found in 21st century Shanghai—a fact Hollywood has no real choice but to relay.

The universe is a continuing explosion. So is terrestrial life. The development of multicellular animals (with brains) is explicitly attributed to the Cambrian Explosion. With the emergence of *homo sapiens*, culture explodes too, through the successive detonations of literate civilization, industrial revolution, and electronic intelligence production. For any sufficiently panoramic realism, it is accelerating growth, rather than system stability, that defines normality.

As cybernetics matured and expanded to encompass ever-larger and more intricate 'objects'—typically under alternative names, such as 'general systems theory'—it increasingly encountered very-long-range trends to continuous acceleration, bound only by weak and transient limits. Through application to the core dynamics of cosmological, biological, social, and technological evolution, cybernetics shifted its emphasis. Runaway, self-reinforcing processes became the central object of attention, and a 'second cybernetics,' emphasizing the role of positive feedback phenomena, adopted

the principal piloting role. Self-sustaining explosions, rather than dampening mechanisms, were now the primary cybernetic theme.

Wiener's attention was almost entirely devoted to negative feedback mechanisms, and thus to self-stabilizing systems. From his practical, engineering-oriented perspective, positive feedback, or 'runaway,' was best interpreted as control malfunction: an excessive amplification that would be inevitably corrected when it reached the limits of its expansion. There were (to anticipate a later term) strict 'limits to growth' that would eventually cage and drastically reverse any self-reinforcing or accelerating trend. A well-designed cybernetic mechanism would pre-empt the collision with hard external limits by restraining itself, through negative feedback, to a stable and moderate behavioral range.

In more complex, spontaneous, and diffuse systems, comparable negative feedback mechanisms can be identified wherever a process exhibits self-limiting behavior. Ecologies are replete with—and even defined by—many examples. For instance, in predator-prey relationships, excessive predator 'performance' decreases food supply (prey animals) which feeds back to reduce the predator population. Reciprocally, a population explosion of prey animals fosters growth of predator numbers, with similar self-limiting effect.

An elementary example of such a feedback or

cybernetic mechanism is provided by a simple thermostat. A heater (or cooler) is coupled to a temperature sensor, which returns information about its actual performance, *i.e.*, the external temperature produced. The behavior of the device is then automatically adjusted, guiding its performance towards the target temperature. A thermostat illustrates the phenomenon of negative feedback, or homeostatic control. A negative feedback loop is self-inhibiting. It works to restrain behavior that exceeds pre-set performance targets, stabilizing a system.

The word 'cybernetics' is derived from the Greek '*kubernetes*' (meaning 'steersman'). As a self-reflective theoretical discipline, cybernetics dates back to 1948, when it was formulated by Norbert Wiener as "the science of control and communication in animal and machine" (Wiener). It sought to combine the emerging science of information and new electronic computing technologies with a disciplined attention to feedback mechanisms, which provide the key to the self-regulation of behavior. By adjusting its activity in response to sensory feedback, a biological or technical machine was able to 'home' on a targeted state.

3: Cybernetics

> "Well, now you ask, I think—at least *I think that I think*—it's coming back…"
> "Really, after all of this, you still don't remember?"
> "So what happens next?"
> "It never stopped."

> "When did this stop being about business, and become an exercise in the topology of time?"
> "It's going to end?"
> "This is going to end raggedly, isn't it?" says the young Joe. (He has a contract to execute.)

§9.7 Which leaves us, for the moment, with Joe talking to himself in an American diner, his identity divided generationally, across a gulf of unprocessed Shanghai memories. A Wells-class private time-pod has been dramatically substituted for the city, but—because this is cinema—everyone is overlooking the stage effects for now.

§9.6 "What the hell did we just watch?" That's always the question.

§9.5 For over a century (but less than two) Shanghai Capitalism—despite dramatic interruption—has been building a real time machine, which Rian Johnson, among many others, stumbled into, and tangentially fictionalized. Although the detailed workings of this machine still escape public comprehension, its intrinsic self-reflexion ensures its promotion, as an object of complex natural science, of spectacular dramatization, and of multi-leveled commercialization. It enthralls East and West in an elaborate exploration of futuristic myth. At its most superficial, where it daubs the edges of the mind with its neon-streaked intoxication, it appears as a vague but indissoluble destiny. What it is becoming remains to be recalled.

§9.4 Even in its comparatively tame, fully

stroyed in a hydraulic press. Sarah Connor survives to give birth to the savior. (A decorously-displaced Oedipal loop casts John Connor's friend and generational-peer as his father.) These events are dated to 1984. In the second movie (*Terminator 2: Judgment Day*) it is revealed that the control chip from the crushed Terminator machine has been recovered, by Cyberdyne Systems, to supply the core technology from which it will be built (in 2029). The Skynet threat is not merely futuristic, but fully templex. It produces itself within a time-circuit, autonomized against extrinsic genesis. The abstract horror of the *Terminator* franchise is a matter of auto-production.

> **#9.2** *The Anubis Gates* is perhaps peerless in its adherence to rigorous time-travel fiction in accordance with the Lovecraftian law, Novikov Consistency Principle, or Austro-Templex hard money criterion.

§9.2 Tim Powers describes a literary version of the Bootstrap Paradox in his novel *The Anubis Gates*. In this telling, the death of the father becomes the death of the artist—in the guise of a fictional non-person, early 19th century poet William Ashbless, known only for his work 'The Twelve Hours of the Night.' Ashbless scholar Brendan Doyle travels back to the poet's time, seeking to meet him in the tavern where and when the work was thought to have been composed. There is no sign of Ashbless. Doyle wiles away the time writing out the poem which he has exactly memorized. This copy, we already suspect, was the

mathematico-scientifically respectable variants, feedback causality tends to auto-production, and thus to time-anomaly. Any nonlinear dynamic process, in direct proportion to its cybernetic intensity, provides the explanation for its own genesis. It appears, asymptotically, to make itself happen. Cybernetic technicity—epitomized by robotic robot-manufacture—includes a trend to autonomization essentially. Pure (or idealized) capitalistic inclination to exponential growth captures the same abstract nonlinear function. Capital, defined with maximum abstraction (in the work of Böhm-Bawerk), is *circuitous production*, in a double, interconnected sense. It takes an indirect, technologically-conducted path, routed through enhanced *means of production*, and it turns back upon itself, regeneratively. As it mechanizes, capital approximates ever more closely to an auto-productive circuit in which it appears—on the screen—as something like the 'father' of itself (M → C → M'). There's no political economy without templexity. (You'll have plenty of opportunities to catch this movie again.)

§9.3 *The Terminator* mythos is by far the most important dramatization of bootstrap mechanics, when gauged by cultural impact. Of the multiple movies belonging to the franchise, the first two are conceptually decisive. In the first, a robotic assassin is sent back in time by Skynet to kill the mother of human resistance leader John Connor, reprising the genealogical theme to which time-travel narratives are so often attracted. It is eventually de-

original. The poem had no author, but only a scribe, functioning within a closed-circuit of auto-genesis. (It would distract us unduly to investigate how a fictional non-existence is to be distinguished from a real one.)

> **#9.1** A creature of the Bootstrap Paradox, Oedipus mates with a matrilineal ancestor to give rise to himself. The even more thoroughly-popularized Grandfather Paradox tricks him into the killing of a patrilineal ancestor, to make himself impossible. The paternal contributor is not merely supplanted, but dramatically terminated. What the hell happens in Thebes? (That's the question the Sophoclean chorus asks.) Since we already know this is a horror story, we have a provisional answer: *Nothing good*. To step back from the answer into the question is to pose again the Riddle of the Sphinx, of which Wikipedia (very helpfully) remarks: "The Sphinx is said to have guarded the entrance to the Greek city of Thebes, and to have asked a riddle of travellers to allow them passage. The exact riddle asked by the Sphinx was not specified by early tellers of the stories, and was not standardized as the one given below until late in Greek history. It was said in late lore that Hera or Ares sent the Sphinx from her Ethiopian homeland (the Greeks always remembered the foreign origin of the Sphinx) to Thebes in Greece where she asks all passersby the most famous riddle in history: 'Which creature has one voice and yet becomes four-footed and two-footed and three-footed?' She strangled and devoured anyone unable to answer. […] Oedipus solved the riddle by answering: Man—who crawls on all fours as a baby, then walks on two feet as an adult, and then uses a walking stick in old age. […]

> By some accounts (but much more rarely), there was a second riddle: 'There are two sisters: one gives birth to the other and she, in turn, gives birth to the first. Who are the two sisters?' The answer is 'day and night' (both words are feminine in Greek). This riddle is also found in a Gascon version of the myth and could be very ancient. Bested at last, the tale continues, the Sphinx then threw herself from her high rock and died. An alternative version tells that she devoured herself. Thus Oedipus can be recognized as a 'liminal' or threshold figure, helping effect the transition between the old religious practices, represented by the death of the Sphinx, and the rise of the new, Olympian gods. […] Sigmund Freud describes 'the question of where babies come from' as a riddle of the Sphinx" ("Sphinx").

§9.1 The auto-productive potential of time-travel circuitry attains exact conceptual specification in the *Bootstrap Paradox*. Wikipedia provides a succinct illustration: "A man travels back in time and falls in love with and marries a woman, who he later learns was his own mother, who then gives birth to him. He is therefore his own father and, because of this, also his own grandfather, great-grandfather, great-great grandfather, great- great-great grandfather and so on, making his ancestry infinite, and also giving him no origin for his paternal genetic material" ("Bootstrap Paradox"). The Oedipus myth echoes this structure so closely it is tempting to consider it a model of the Bootstrap Paradox, unfolded into disentangled time. It illustrates templex auto-production in a dramatic, anthropological form.

#9.0 For the thermodynamic critique of time-travel see, for instance (Musser).

§9.0 Real templexity cannot be time-travel. The same natural-scientific conceptual apparatus that enables its formulation simultaneously installs the principles of thermodynamic economy that discipline its models. When rigorously stressed under logical examination, however, time-travel drama tends to release abstract diagrams that converge upon real potentialities. Most significantly, it arrives—through pure fictional hypothesis—at a schematics of auto-production.

#8.5 Auto-production, or sustained local entropy reversal, translated without residue turns to positive cybernetics (Maruyama).

§8.5 Modernity only linearizes in order to delinearize more thoroughly. The descendant of the thermodynamic time-gradient is cybernetics, based upon the formulation of thermic regulation through feedback (the steam-engine 'governor'), and ascending through increasingly sophisticated models of entropy dissipation—or local entropy decrease—into the mathematical sciences of turbulence, chaos, complex systems, self-organization, individuation, and emergent (or spontaneous) order. The abstract object of all such studies is the *convergent wave*, characterizing all natural process with reverse time-signature. Any such *local inversion of the arrow of time* is produced by an exportation of entropy, conducted by a dissipative system, or real time machine. These systems typify the self-assembling units of biological and social organization—cells, organisms, eco-systems, tribes, cities, and (market) economies. In each case, an individuating complex machine swims against the cosmic (global) current, piloted by feedback circuitry that dumps internal disorder into an external sink. The cosmic time-economy is conserved, in aggregate, but becomes ever more *unevenly distributed* as local complexity is enhanced. Self-cultivating—or auto-productive—complexity is time disintegration (templexity).

§8.4 For backward or reverse causality to be an intelligible concept, there has 'first' to be a time-gradient. The time 'dimension'—unlike those of space—has to bear an intrinsic directionality, or asymmetry, which classical mechanics does not provide. It is only with statistical mechanics, and the formulation of entropy measurement, that time acquires an 'arrow.' Thus equipped, the natural sciences have entitled themselves to a new, supplementary vocabulary. No longer restricted to descriptions of *causation*, they are now (which is to say, since the mid-to-late-19th century) freed to enter into discussions of *production*. From "A then B" to "A makes B" there is a shift into the order of temporal irreversibility. Unlike classical-mechanical entities, statistical-mechanical products bear intrinsic indices of succession, of a general economic type. Entropy measures of a global (or closed) system are production-time ordinates. The sequential order of any production phase is inherent to it, as a natural property. 'Before' and 'after' are not read-

§8.2 A drama requires actors. If an inadequately-interrogated conception of agency can disguise itself as a logical conclusion about the shape of time, it is worth asking how far this dissimulation can reach. To what extent has the world been fundamentally dramatized? Could the basic framework attributed to 'nature' have been conditioned by the requirement that it serve as a stage for intelligible action? Such a question is nothing more than the Grandfather Paradox inverted and employed as an investigative tool. Certain deeply-rooted intuitions about human agency, it might be suspected, exercise surreptitious authority in respect to tolerable conceptions of time. A dogmatic presumption of empirical human freedom—long understood to be implausible, and even unthinkable, by the tradition of transcendental-philosophical critique—has not only survived the supposedly irresistible onslaught of mechanical determinism, but has even maintained its dominion over the basic (temporal-causal) structures of natural-scientific explanation, which have been pre-programmed for conformity with its dramatic criteria.

§8.1 The integrity of the time-travel problem with the question of metaphysical liberty is a key to both doors. The Grandfather Paradox makes this evident. *If an individual could return to his past, what would prevent him from assassinating an ancestor, and thus making an inconsistency of his own existence?* The quandary tacitly acknowledges a contradiction between time-travel and radical private agency. In other words, no less than a paradox about time-

off from the time-line, but inscribed within the terms of the series themselves. Within the directional time of production, therefore, linearity is redoubled, or reinforced. Reversion is explicitly obstructed. (The thermodynamic argument against time-travel is the strongest that exists.)

§8.3 This is, recognizably, the Nietzschean skepsis, sealed by the figure of eternal recurrence, or ultimate nonlinearity of time. The natural sciences, even in their apparent sovereignty over the entire domain of empirical regularity, remain *enslaved* to an occluded idea of freedom, in whose terms they are parametrized, and in accordance with which 'determinism' is itself determined as a false opposition, bound to confirm in profundity that which—superficially—it denies. The keystone of this critique (and the entire preceding tradition of critical philosophy) is the transcendental argument that there is not, and cannot be, any conception of temporality properly *internal* to the natural sciences. Time is a basic presupposition, enabling access to phenomena, without constituting one itself. Duration is known only indirectly, through changes scientifically apprehended—measured—in reference to a cyclical criterion (which is to say, a 'clock'). The general relativization of duration within 20th century physics has confirmed the status of change (speed) as the scientific limit-concept, beyond which no rigorous objectification of time is able to proceed. The theater cannot be subsumed into the play.

travel, it is a depiction of self-contradictory freedom, in the absence of temporal constraint. One cannot return to the past to do as one wants, unless what it to 'want' anything (in reality) has already undergone fundamental revision. The freedom to choose an action inconsistent with one's established existence as an agent makes no sense. It is not a constructible circuit.

#8.0 Wells' geometric argument for the conceivability of time-travel begins on the very first page of *The Time Machine*.

§8.0 The stretching and twisting of time propels a passage from geometrical objectivity to topological abstraction. Yet, 'paradoxically'—to invest this term with the vague sense it bears in the time-travel literature—the escape of time into topology begins with a geometrization. H. G. Wells, in *The Time Machine* (1895), conceives time's irreducibility to geometry as a constraint. Relative to spatial dimensionality, time is a prison. Locomotion in time—time-travel—is uniquely locked, even relative to the vertical axis within which movement encounters its most obvious impediments. The eponymous time machine breaks the shackles of the time dimension. This first modern time-travel narrative, therefore, is primarily a treatise on freedom. Its greatest fictional innovation is an intuitable 'model' of liberation within the timeline. (When referring to 'time-travel' it is the Wells model that durably anchors its meaning.)

#7.8 Cumulative rhythmic innovation is described neither by a repeating cycle, nor by a linear departure into continuous growth, but by a spiral. It is a figure approximately indicated by the popular maxim: *History does not repeat itself, but it rhymes*. Contrary to common opinion, Mark Twain probably never wrote these words, or any very close to them. The uncertain provenance of the phrase, however, does not detract from its acuity. According to Barry Popik: "…the earliest published source yet located is by Joseph Anthony Wittreich in *Feminist Milton* (1987) where he writes: 'History may not repeat itself but it does rhyme, and every gloss by a deconstructionist need not be a loss, pushing us further into an abyss of skepticism and indeterminacy'" (Popik). (I confess to deep shock, if this is really the original source.) Positive cybernetics is spiro-dynamic. A web is a spiral. Spiromorphism envelops everything said here, even if its explicit thematization still awaits its occasion.

§7.8 Though staged as a break from the cycles of time, modernization is more realistically envisaged as a flight *into* cyclicity. Its primary signature—accelerating change—is itself a product of non-linear functions (epitomized by exponentiation). The modern, industrial economy tends inexorably to the self-exciting circuit of the robotic robot factory, and its autonomization is accompanied by strengthening quasi-periodic oscillations—business cycles, and long waves. As its culture folds back upon itself, it proliferates self-referential models of a cybernetic type, attentive to feedback-sensitive self-stimulating or auto-catalytic systems. The greater the progressive impetus, the more insistently cyclicity returns. To accelerate beyond

#7.5 It presently appears as if the absolute limit of time granularization is set by the Planck Time Unit, defined by the period taken for a photon to cross a Planck Length in vacuum, or ~5.4 x 10^{-44} seconds.

§7.5 As time modernization advances, it reaches back, but it also pushes in. Considered as sheer quantified improvement, the progress, or *ingress*, of temporal resolution through horology and chronometry has far outpaced the expansive development of time. The mechanical clockwork of the early modern period, up to the end of the 16th century, had reached an accuracy of roughly one minute per day. Pendulum clocks, based on the principles of Christiaan Huygens from the final years of the 17th century, reduced time-drift to less than a minute a week. H5, the maritime chronometer that won John Harrison the Longitude Prize in 1759, drifted by less than a half-second per day. By the 1920s, quartz oscillators had entered onto a development path which would eventually achieve accuracies of 10 seconds per year. Mid-20th century atomic clocks (cesium oscillators) crushed error down to a second every 300 million years, which the first quantum logic clock (2008) shrunk to less than a second in a billion years. With each advance in accuracy came a corresponding mechanical granularization of time.

#7.4 The Hebrew year, dating the age of creation, has been known as the *Anno Mundi* (AM) since the integration of historical time in the European Middle Ages. AM 5775 began (at sunset) on 24 September, 2014. While this historical duration is

light-speed is to reverse the direction of time. Eventually, in science fiction, modernity completes its process of theological revisionism, by re-discovering eschatological culmination in the time-loop. *Judgment Day*. The end comes when the future reaches back, to seize us.

§7.7 Like time-travel, modernity in its distinctive, progressive sense is the dramatization of something else. As an exoteric sign, public display, or collective drama, its central theme is a break-out from confinement within cyclical time. In this respect it bears a striking theological message, recapitulating the understanding of Judaism as the 'discovery of history'—a revelatory transition distinguishing Abrahamic from pagan religion, industrial from rural society, and cosmic mission from indigenous peculiarity. The attractions of this popularization are not hard to understand. After all, from the perspective of progressive modernism, cyclical stability is a trap, broken open (uniquely) by the ignition of self-reinforcing, cumulative growth. So persuasive is this vision that its subversion counts as perhaps the greatest of modern ironies.

§7.6 Modernization advances into the depths of time, in a double sense (at least). It promotes a disciplined regression (into the past) and an involution (into the 'inner' micro-structure of time). There is an augmentation of the zoom function—a 'liberation' of sorts—scrambling convenient discriminations between modernity and tradition.

sufficiently modest to serve as a baseline against which the modernist dilation of history can be gauged, it is important to note that the very principle of historical integration is not archaic, but dates back only to the early medieval period.

§7.4 Advance into antiquity is no curiosity of ethnicity or genre. It is rather a commonplace of modernity. Estimations of the earth's age, within modernity's classical (Occidental) core, suffice to illustrate this fact. The time-twinned figures describe an erratic yet unambiguous trend. The traditional beginning of terrestrial time corresponds approximately to the date implicit in the Hebrew Calendar, which counts from one year before creation of the world, less than six thousand years ago. By 1779 Buffon had pushed it back by an additional 70,000 years, and stripped it of all metaphysical originality. Kelvin's calculations, although notoriously impaired by the absence of a radioactive theory of heat, had nevertheless extended the earth's age by well over two orders of magnitude by 1862, to an uncertain range from 20–400 million years. By the 1920s, scientific consensus was closing upon the present (confident) figure—a few billions of years. In this respect, time modernization has been an exponential lurch into the deep past.

#7.3 China's striking cultural indifference to the futuristic literary mode is only underscored by the efforts made to identify counter-examples. In a discussion angled only slightly differently, this ethnic discrepancy might easily have been the central focus. A special edition of *Science Fiction Studies* has been dedicated to the Chinese contribution to the genre, but the specter of dogmatic normative universality is unmissable throughout the debate.

§7.3 It is here, precisely, that the greatest threat of misdirection arises, in a confusion between *losing the future* and *being left behind*. Such an equation overlooks the most notable feature of time-travel stories—their tolerance for retrospective science-fiction. To speculate upon a future that unlocks time-travel technology is to re-open the past, with progression twisted into an opportunity to regress. In China, especially, where the super-massive gravity-well of tradition has historically absorbed the preponderant part of speculative imagination, this peculiarity offers science fiction a chance to insinuate itself, around the back. Futurism enters the culture cloaked as renascent antiquity.

#7.2 The assumption of anarchy underlying realist international relations theory, according to which order achieved above the level of the nation state can only be an emergent property derived from systematic interactions between state actors, has considerable application to the situation of world cities. These hubs relate to each other through an abyss, theoretically represented by a subtraction of authority. There is no power capable of protecting their global role, which is settled in the frigid, ultra-thin atmosphere of world metropolitan mountain peaks at an altitude beyond state competence or capability. To describe this environment as 'Darwinian' or 'Hobbesian' is not a positive claim, but a negative one. There is no order to which they

can appeal, transcending the fragile one arising from their mutual, 'unforced' interactions.

§7.2 Cities of the future are shaped by intense competition, because tomorrow is a tight, fiercely contested niche. As a unit of Social Darwinism, the futuristic city is comparable to an exotic tropical flower. It competes, primarily, through attraction. There can be a few of these cities, but only a few. Merely to speak of a 'global city' is already to acknowledge all of this. Sustaining the singularity of the time-line weeds out feeble pretenders, with unique ruthlessness. Futurity is unevenly distributed because it is scarce.

> **#7.1** Positive and negative externalities of urban spectacle, while vast in their consequences, elude the scope of the present discussion.

§7.1 A 'city of the future' is Gibsonian in precisely this sense. That is nothing new, nor could it be. It has always leaked back, in coincidence with modernity. Tomorrow is a social magnet, as has been known for some considerable time, at first merely reflectively, but ever increasingly as a techno-responsive object. It is in part an excludable good, and not uncommonly even a positional one, even if the simultaneous—and extraordinary—inclusiveness of futuristic spectacle will also tend to delay us. Panoramas are rarely perfectly privatized, but the future is not available *just anywhere*. On the contrary, it is the object of multi-level, intense competition. It is something to be cultivated, tended, bought, sold, and built upon.

> **#7.0** Since, with at least provisional plausibility, the transcendental or (fundamental) ontological difference between time and temporalization can be securely aligned with the distinction between entropic and negentropic directionality, or the normal (cosmic) and inverse (evolutionary) arrow of time, Gibson's linkage of the future to uneven distribution is bound to remain resiliently provocative.

§7.0 The tombstone of Ludwig Eduard Boltzmann (1844–1906) is capped by an inscription of his entropy formula $S = k \log W$. There is no need for us to pause before the tangle of ironies here, which can be left for the worms. It is merely an opportunity to speculate upon a different—and virtual—tombstone, dedicated to Cyberpunk innovator William Gibson (1948–20??) whose epitaph has long been confidently predictable: *The future is already here—it's just not very evenly distributed*. Even shallow digging quickly begins to reveal the profound content that the two formulations share.

> **#6.14** By suspending the introduction of prestige mainstream modernist construction until the age of computer-assisted architectural design, Shanghai has largely escaped the ravages of rectilinear skyscraper minimalism. The boxy puritanism of International Style functionalism has been absorbed into a more fluid aesthetic of 'clean design' and (the crucial descriptor) 'sleekness' that discreetly tolerates curves, continuous irregularity, and subtle expressions of extreme formal complexity. The designs of global architecture giant KPF (Kohn Pedersen Fox)—massively involved in the re-engineering of the Shanghai skyline—

#6.13 Shanghai has been as thoroughly saturated with Art Deco heritage and influence as any city in the world. Prominent buildings exemplifying the style include the Capitol Building (146 Huqiu Lu, CH Gonda, 1928), the Grand Theater (now Grand Cinema, 216 Nanjing Xi Lu, Hudec, 1928), the Peace Hotel (Bund 19-20, Palmer & Turner, 1929) and the Paramount Ballroom (218 Yuyuan Lu, Yang Ximiao, 1932). An especially remarkable Art Deco cluster can be found at the 'Municipal Square' intersection of Jiangxi Middle Road and Fuzhou Road, dominated by Hamilton House (Palmer & Turner, 1931), the Metropole Hotel (Palmer & Turner, 1934) and the Commercial Bank of China (Davies, Brooke & Gran, 1936). Much of this fabulous architectural legacy has been documented in the work of local photographer Deke Erh (Kanagaratnam). Art Deco styling became so deeply infused into the fabric of the city that its patterning and distinctive motifs (such as sunbursts, zig-zags, and arcane signs) can be seen on innumerable *lilong* gateways from the 1920–40s. At another extreme, the city's ultramodern Jin Mao Tower in Lujiazui (88 Century Avenue, Adrian Smith, SOM, 1999) synthesizes crystalline forms, pagoda segmentation, and patterns derived from traditional Chinese numerology, under the guidance of unmistakable Art Deco influences. An even more pronounced example of contemporary Art Deco construction and decoration is provided by the new Peninsula Hotel (Bund 32, David Beer, 2009), designed as a conscious tribute to Shanghai's high modernist style.

§6.13 Rising above the *lilongs*, and clustered in zones of exceptional early 20th century economic

illustrates the new 'modern' style at a zenith of excellence. Mainstream modernism is comparable in profound ways to the Mao Zedong images on Chinese paper currency. Everything has changed, but the signs of formal continuity are preserved all the more scrupulously precisely on that account.

§6.14 Finally, therefore, there is a retarded arrival of mainstreamed global modernity—still adorned by the tattered ideological iconography of the International Style—but pre-emptively ironized by the precocious retro-futurism of Shanghai Deco. At its moment of arrival it has already been obscurely outflanked, or outstripped, by an ignited time-circuitry immunized against its specific teleological pretensions. This is a condition that might be consistently labeled *Neo-Modern*. On one continuum, it extends from the vulgar Bauhaus garbage of the command economy era, through utilitarian construction of more recent times, to the glistening super-tall towers designed by international architectural giants, but it extends far further—and perhaps even more consequentially—across a myriad *renovation* projects of wildly variable grandeur, which have as their common principle an explicit absorption of modernity into something new, precisely equivalent to a dispersed exhibition of *modernist heritage*. The complex trend built-out through the city's contemporary architectural evolution inclines towards a display-casing of itself—simultaneously self-referential and retro-futural—a repetition, a subsumption, and a return. It would be easy to be persuaded that Shanghai's sole profound obsession is time travel.

tunistic, they synthesized Western terracing with Chinese courtyard-centered arrangement to produce an innovative mass housing solution local to the city, characterized by fractal involution, commercial-residential micro-fusion, and design diagonalization between mass-production of standard units and resilient idiosyncrasy. This level of the city is at once the most tractable to formalization, and the most elusive in its integral secrecy. It is into the discreet bulk of the *lilongs* that Old Shanghai slips, when it disappears from casual scrutiny, as if into an implexed, urban hinterland. Somewhere in these 'mazes' or 'warrens' lies the Sphinx's lair.

#6.11 As the problem of templexity is self-consciously localized, it might be expected that this archaic urban stratum—through which the 'international' city of Shanghai is conjoined to indigenous 'national' tradition—will prove especially conductive to ideo-political tensions. Preliminary indications of the coming Chinese time-politics (see note #1.2) have been highly suggestive in this respect. For a non-local (and predominantly English-speaking) audience, however, the more immediately significant urban time-circuits are those enmeshed in a recognizable dynamic of capital accumulation, operating in a code that unambiguously processes the fate of the world.

§6.11 The first stratum is composed of a thoroughly, and repeatedly, reworked exhibition of the city's pre-modern legacy. Now concentrated in the iconic cluster of the Old City, and distributed among the city's gardens and temples, it has ac-

current (especially the major thoroughfares of the International Settlement), are the edifices of Shanghai modernity's third—Deco-dominated—stratum. These are buildings that most definitively symbolize the historical city, by making its high-modernist 'Golden Age' a *theme*. In Deco, Shanghai modernity is instantiated as, or at least alongside, a non-verbal philosophical reflex, which seizes the urban time-structure as a self-referential object. It is this silent self-commentary (through which modernity becomes *modernist*) that connects Deco to the infinite—as unbounded recursive potential—and thus initiates the forward time-loop of Shanghai's peculiar destiny. Whatever happens henceforth, its return has been anticipated, with mute lucidity, and intricately encrypted within the signs of the city's high-modern futurism. An ultimate epoch is reached, and scrambled within a retro-silted code.

#6.12 See in particular Hanchao (Lu).

§6.12 Secondly, and traditionally constituting the preponderant mass of Shanghai's modern architectural substance, is a stratum built gradually from lane housing blocks (*lilongs* or *longtangs*), over the course of a century (from roughly the mid-19th century to the mid-20th). As modernity ignited in Shanghai—under foreign protection—the city was infolded by compressive growth, which had made it the world's most intense urban space by the late 19th century. The *lilongs* were its most distinctive contribution to the world of architectural possibility. Fundamentally hybrid, practical, and oppor-

within a disciplined, generic urbanism can be anticipated as the *normal* outcome of proceedings, assuming only ordinary standards of methodological integrity. As the computerization of the natural sciences has demonstrated *generally*, the ability to run complex simulations tends inevitably to an encounter with real individuals (singularities). Attention to the exceptional, therefore, should not be understood here as an appeal to theoretical heroism.

§6.0 Every singularity is an exception. No emergent real individual is able to fall, without remainder, under a general law. 'Shanghai time-travel' cannot merely be a typical phenomenon, or the instance of a wider regularity, whether socio-political or philosophical. Each such anomaly is scaled to the city, capturing its absolute, cosmic contour. (The way it happened is telling.)

§5.4 'Decopunk' is the sign of a return. Its complexity can seem overwhelming. It folds back, exorbitantly, into that which had already folded into itself. Nothing expresses the cultural tendency of *positive cosmopolitanism* more completely, more cryptically, or more surreptitiously than the Deco modernist matrix thus re-activated. Its mode of abstraction is inextricable from an ultimate extravagance, intractable to linguistic condensation, and making of *decoration* a speechless communication, or ecstatic alienation, through which interiority is subtracted. Emerging from the fusion of streamline design trends with fractionated, cubist forms and the findings of comparative ethnography, it

quired a fully contemporary—and primarily recreational—function as urban historical stage-scenery. This 'Ancient Shanghai' is a theatrical simulacrum of native (*Jiangnan*) tradition, whose modernity lies specifically in its strategic inauthenticity. Even during the relatively early years of the colonial period, the Old City was adjusting itself pragmatically to this role, through experimental branding of lost time as commercially re-packaged antiquity. In Shanghai, it is the enduring tradition of historical re-staging, and not the durability of the re-staged object, that trawls up the deep sediment of urban time.

§6.1 The architecturally-incarnated time-structure of Shanghai modernity has four principal—but intricately interconnected—'layers.' These correspond approximately, and coincidentally, to orders of historical succession, structural elevation, and capital density.

#6.0 A projected transcendence of generic theory in the direction of raw singularities has manifestly offered opportunities for ascetic intellectual raptures. Cosmo-physical precedents for such a path—most prominently in the study of black holes—suggest that such exquisite cognitive torture, while undoubtedly entertaining, is typically redundant and unproductive. The self-limitation of generic models through immanent encounter with emergent singularities does not seem to require supplementary metaphysical exhortation. Any sufficiently sophisticated, reality-tested science reaches such a threshold automatically. The acknowledgement of efficient urban singularities

strategic inflationary laxity (in respect to rhetoric, inference, reputation, and even grades).

§5.3 This is the modernity from which 'post-modernity' has noisily departed. Since the 1960s, postmodern criticism has condescendingly reconstructed (and aggressively 'deconstructed') a model of cosmopolitan modernism that conforms to the vision of its most *clearly outspoken* architectural proponents, the partisans of the International Style, whose complacent assumptions of cultural neutrality and universal authority provide an organizing object of disparagement. This self-demolishing digression is designed solely to announce the irrelevance of its topic, in the name of Deco (the world's essentially undeconstructible modernity). Postmodernity has no application to Shanghai.

#5.2 The "International Style" is most succinctly defined as the abstracted, ideological framing of the *Modern Architecture: International Exhibition* (New York, 1932), articulated by Henry-Russell Hitchcock and Philip Johnson, and later crystallized as a book-length architectural manifesto (*The International Style*, 1935) (Hitchcock and Johnson).

§5.2 As we know, what spoke of modernity—to the point of radical identification, usurpation, or near-total absorption of the historical impulse self-apprehended as *modernist*—was the 'International Style,' defined by an uncompromising *logic* of functional and geometrical idealization. By projecting an elimination of all discernible geo-historical or cultural reference from the urban landscape, such

exults in cultural variety, arcane symbolism, and opulence of reference—concrete colonial epistemology and metropolitan techno-science are equally its inspirations—as it trawls for design motifs among the ancient ruins of Egypt and Mesoamerica, Chinese temples, recursive structures, sphinxes, spirals, ballistic machine-forms, science fiction objects, hermetic glyphs, and alien dreams. It is neither language nor anti-language, but rather supplementary, ancillary, or excess code, semiotically-saturated or over-informative, hypersensible, deviously circuitous, volubly speechless, muted by its own delirious fluency. It has no specific ideology, but only every ideology. If it ever existed, it always has.

#5.3 For reasons that are to a considerable extent sociologically intelligible, based upon the professionalization of non-technical academic disciplines within the era of mass tertiary education, postmodernism has been uniquely devoted to its own difficulty (and thus to the implicit special competence of its practitioners). Extreme animosity to 'vulgar' summarization was its central practical (if not professed) ethic. Even today, with its prestige greatly attenuated, an aura of cultural deterrence still surrounds it. This will eventually seem simply bizarre. Its intellectual content was almost entirely exhausted by the more-or-less rigorous translation of macro-economic management principles into humanistic disciplines. Pomo was Keynes for literary theorists—displacement and postponement of consequences, ontological dissipation, hyper-politicization on behalf of an installed revolutionary power, and

'modernist' designs aspired to the universality of a *negative cosmopolitanism*, liberated from the entrapments of peculiarity. Abstraction was to be attained through monumental anti-constructions, the world's first *absolute edifices*, unfixed from the coordinates of space, time, and tribe, and thus supporting—whether by incidental necessity or strategic design—a discourse of intrinsic global authority, combining the most exhaustive programmatic practicality with the loftiest theoretical purity. Through the International Style, social structures of all kinds, spearheaded by exemplary public buildings, were to find their consummate reconciliation with the universally communicable Idea.

> **#5.1** The positive—and thus non-universal—cosmopolitan modernism of Deco has yet to reach us. Its peculiar temporality is already indicated by an intrinsic retrospection, which is reciprocally to say *anticipation*, such that the consolidation of the term 'Art Deco' did not take place until the 1960s, even though it was from the beginning a reference to the *Paris Exposition Internationale des Arts Decoratifs* of 1925. *Ab initio*, it is a term that encapsulates high modernism within a loop.

§5.1 It begins, in the middle, with Deco. *Art Deco*, we are told, from one side, in little more than a whisper—for this is a 'tradition' remarkable for its verbal inarticulacy. There was no Art Deco Manifesto. For over three decades, there was not even a name. The opportunity for theoretical self-comprehension—if it ever existed—was missed (and no remedy is yet in sight). *Decoding* is its basic impulse, we might presume, when its concrete accomplishments are registered. It is scrambled code, in any case. *Decopunk* has been irreverently recommended as the name for its anachronistic or 'retro-futurist' return. 'Deco' will eventually do, as the sign of a vivid yet unspoken modernity.

> **#5.0** For a detailed engagement with Shanghai as a 'City of the Future' see (Wasserstrom).

§5.0 Remembering that *'time-travel' is the dramatization of something else*, these musings from interbellum Providence initiate a virtual tour of the Shanghai time-travel industry. It's not new (unsurprisingly), but it is growing fast. *Looper* is unmistakably part of it. The City of the Future entangles urban spectacle inseparably with prophecy. One sees, now, what is yet to come. The impression is anachronism. Even the strangest idea, given only sufficient capitalization, can be constructed as a communicable intuition.

> *Your idea for a time-voyaging machine is ideal—for in spite of Wells, no really satisfactory thing of this sort has ever been written. The weakness of most tales with this theme is they do not provide for the recording, in history, of those inexplicable events in the past which were caused by the backward time-voyagings of persons of the present and future. It must be remembered that if a man of 1930 travels back to B.C. 400, the strange phenomenon of his appearance actually occurred in B.C. 400, and must have excited notice wherever it took place. Of course, the way to get around this is to have the voyager conceal himself when he reaches the past, conscious of what an abnormality he must seem. Or rather, he ought simply to conceal his identity—hiding the evidences of his "futurity" and mingling with the ancients as best he can on their own plane. It would be*

> *excellent to have him know to some extent of his past appearance before making the voyage. Let him, for example, encounter some private document of the past in which a record of the advent of a mysterious stranger—unmistakably himself—is made. This might be the provocation for his voyage—that is, the conscious provocation* (Lovecraft, 216–217).

§4.0 Approaching the same problem from a very different direction, H.P. Lovecraft insisted upon time discipline as a literary principle, most notably in a letter to Clark Ashton Smith (1930):

> **#3.4** The vulgar error of identifying 'time-travel' with *changing the past* is explicitly dismissed by the Novikov Self-Consistency Principle, which preserves hypothetical templexity while setting the probability of any anterior state modification at zero. See the relevant Wikipedia discussion, or, more technically, the critical 1990 paper by Novikov *et al.*, 'Cauchy problem in spacetimes with closed timelike curves' (Friedman, *et al.*).

§3.4 It would be surprising if the linkages between time-travel and political economy were anything other than nonlinear. Neither the economics nor the politics of time-travel is a compact, still less a straightforward topic. As public drama, time-travel is a production, in a sense that absorbs logistic and commercial attention, no less than theatrical direction. The relevance of monetary theory is, perhaps, less expected. Yet it is quite clear that a hard money criterion satisfies a selective function in respect to the operation of time machines. Elimination of all inflationary time machines automatically re-integrates a singular timeline, however topologically complicated it might be. Conservation laws are preserved. Economic analysis is applicable to questions of time discipline, which selects out 'time-travel' trajectories as non-serious as soon as they change the past.

§3.3 If this seems like a thirty-year doubling period, appearances can be deceiving. It is 'in fact' (or at least in consistent fiction) instantaneous. Set up the time-machine beside the vault, and envisage the procedure from the perspective of the operator, in 2074. Open the vault. It contains one gold bar. Remove it, place it in the chronoporter, set the destination to 2044, activate. Cross immediately to the vault. It now contains two gold bars. Remove both, return to the chronoporter, repeat. Cross immediately to the vault. It now contains four gold bars. Quite soon, we're going to need a bigger vault. This is the model for a bullion fast-breeder. Assuming—preposterously—that value persists under such conditions, the time machine generates a smoothly exponential increase in wealth, approximately for free.

§3.2 Consider an ingot of gold. Assuming perfect durability—no great stretch across historically-relevant time-scales and in the absence of abnormal nuclear processes—its physical substance can be understood as existing throughout the whole of the time-line. Once mined, and consolidated as a standard unit, it lasts 'forever.' Now place this unit of bullion in a time-machine, and

deposit it three-decades back in time. Like the human time-traveler, it is 'now' doubled. Since it already existed at every moment in the past, at the point of its retro-arrival it now occupies the same position in time twice, and continues to do so, throughout all subsequent time. Place it then beside its original instance, in a vault. After thirty years have passed, there are two ingots available for reverse chronoportation. Remove them from the vault, and put them into the time-machine…

#3.1 Mike Dickison's excellent *Looper* commentary succinctly describes this implicit procedure for unlimited wealth, among other (extreme) missed opportunities (Dickison).

§3.1 What *Looper* presents as merely a payments system tacitly describes an under-performing money-making machine. By operating it, one realizes a monetary process that exceeds the most feverish Austrian School economic nightmares. The time-machine *prints precious metals*.

§3.0 To reduce the potential of time-travel technology to economic calculations is indubitably simplifying, but it helps with the accounts. *Looper* is conveniently forthcoming about how its exchange circuit works. The killers of 2044 are paid in bars of precious metal—silver for 'ordinary' hits, gold for 'closing loops' (in singular acts of self-termination). The bullion is sent back from 2074, and circulated through an internal exchange operation, which normally swaps it for (Chinese) paper currency.

#2.7 Hypothetical templexity is investigated cosmo-physically under the name of the 'closed timelike curve' (Thorne). As noted by Seth Lloyd *et al.*, "...closed timelike curves are a generic feature of highly curved, rotating spacetimes..." (Lloyd, *et al.*). The apparently quite distinct invocation of 'closure' within cybernetics, to describe the object of a nonlinear function, is walled-off from this figure less by a definite boundary than by a transient condition of theoretical underdevelopment. The usage in *Looper*, of course, is merely a theatrical sign, selected for *pathos*. Any profound connection is coincidental.

§2.7 The movie has one conceit that merits particular attention, since it is accompanied by an instance of unique terminological assertion. 'Closure'—a word interlocked tightly with the discourse(s) of temporal nonlinearity—receives an innovative sense in *Looper*. As might be expected, it is dramatically stretched. While retaining its geometrical and/or topological denotation as a complete twist (of time), it is invested with a supplementary specificity as the completion of a life, through auto-assassination, of the double. The three decades of a looper's professional career is consummated when he is sent back to die at his own hand. This special act of murder-suicide 'closes the loop' *that the assassin is*. Death is personally and precociously settled. From this formula, which is presented as a standard arrangement, or regular procedure, the plot of *Looper* departs into exception.

§2.5 Brad Brevet puts it a little differently: "Any movie involving time travel is going to have problems, without fail. […] Why is this? Because, shocker, **time travel doesn't exist**. Therefore to make it a reality in a feature film is an impossibility without problem spots" (Bevet). To avoid tripping over Brevet's dogmatic metaphysics, it is sufficient to re-iterate—and parenthetically extend—the terms of our working usage: *time-travel is the dramatization of something else (which might not exist)*. It is essentially simulation. Cinema has an entirely plausible claim to it. The story comes first. Once upon a time anomaly.

> **#2.4** When asked by Borys Kit, at *The Hollywood Reporter*, *What are some of the biggest hurdles for time-travel movies?* Johnson answered: "Figuring out how much to explain, figuring how to keep it simple. With this film especially, because even though it's a time-travel movie, the pleasure of it doesn't come from the mass of time travel. It's not a film like *Primer* […] for instance, where the big part of the enjoyment is kind of working out all the intricacies of it. For *Looper*, I very much wanted it to be a more character-based movie that is more about how these characters dealt with the situation time travel has brought about. So the biggest challenge was figuring out how to not spend the whole movie explaining the rules and figure out how to put it out there in a way that made sense on some intuitive level for the audience; then get past it and deal with the real meat of the story" (Kit).

§2.4 Once seen, it's immediately time to move

> **#2.6** The Chinese astro-calendric cycle, generated by the combinatorial exhaustion of twelve annual 'animals' (or 'branches') and five elements, is a 60-year period, alternating between (30-year) phases of light and darkness. The synchronization of this rhythm with the country's modern history—most notably the duration of the 1949–79 command economy era—is (at the very least) casually intriguing. A further associative leap to the 30-year (2044–74) *Looper* cycle, however, might reasonably be accused of recklessness.

§2.6 For ease of comprehension we can follow the plot (that's what dramatization is for). There's only one time-traveling agency—the Rainmaker's criminal syndicate—and perhaps only one time machine. (If there are more, it makes no difference.) Further restrictions are implicit. The machine only works backwards, and—as far as we are aware—it crosses exactly 30 years (the same 30 years). It is less a general time-travel capability than a specific wormhole, connecting two definite dates, whose arrival and departure times are differentiated from themselves by no greater distance than is required to avoid congestion. It does not become clogged. Once again, we immediately see, dramatic imperatives reign. The machine is shown as a single gate. It cannot (apparently) be duplicated, and fed through itself. It does not proliferate. It is abstract stage machinery, supporting a dramatically delimited narrative function. *Looper*'s time machine is the objectification of a twisted script, and nothing significantly more.

on. Dramatic stupidity is far less a mistake than a deliberate decision. Its significant frame is not logically-consistent time-disturbance, or coherent non-linear narrative, but *apparent* consistency, and coherence *effect*. Even in the age of cinema, the dominant imperatives are theatrical. In other words—cast into a philosophical register—they are *weakly transcendental*. When questioned about *Looper*'s 'plot-holes,' director Rian Johnson is frank, even cynical about them. Doesn't the movie's dramatically-satisfying ending unravel its chrono-plastic consistency? "If it's important to you to really justify that beyond 'It makes sense in a story type way,' you'll have to get into multiple time lines existing in never-ending loops of logic" (Lussier). Which is to say, *get lost* (in the off-stage time-spaghetti). It isn't something that Johnson needed to work. After all, he isn't a time-gangster but an entertainment orchestrator. The cinematic order imposes its own (sovereign) rules on the phenomenon.

§2.3 *Looper* suffices entirely as an illustration. In outlining the movie's absurdity, we can speak quite rigorously of a *dramatic stupidity*. The principal fictional agents truncate their potential achievements, to a comically extreme degree. While it might be hyperbolic to describe a functioning time-travel procedure as a source of infinite virtual power, such a description is plausibly suggestive. Crude—or dramatically stark—time-travel capability allows for an open-ended revision of the past, and consequently of everything that follows

from it. Additionally, and (at least superficially) *infinitely*, this capability is reiterable. Outcomes arising from 'prior' time revisions can be fed-back through loops, generating 'new' outcomes, which are themselves resources for further interventions. It is difficult to set logically-consistent limits on the potential of such recursive time-modification. Absolute power is exhibited as a program. Yet *Looper*'s time-gangsters, apparently uninhibited by cosmic constraints or moral qualms, find *almost nothing to do*. Their negative opportunism is so extreme it blinks out, self-exempted from the bounds of dramatic perception. Whatever their business is supposed to be, it involves a steady trickle of killings, and that is all we learn. Godlike capability has shrunken down to a miserable little racket. Of course, it's stupid.

§2.2 As previously intimated, working backwards from the absurdity is the laziest path, pre-arranged by rules of convenience, and packaged for facile consumption. The dramatic imperative is for time-travel to be shown, which requires that it be radically delimited. It is from this delimitation, or depotentiation, that a dazzling absurdity emerges.

> **#2.1** Arthur Rimbaud's *"Je est un autre"* was recorded in a letter to Georges Izambard (13 May 1871) (Rimbaud, 113). This remark, together with the pointed disturbance of the Cartesian *cogito* immediately contextualizing it, tags a threshold of literary modernism, and thus—retrospectively—an action of the future upon the past.

§2.1 The acme of time-travel drama is a short loop back. This trip is bounded by the wave-length of the human life-span, within which the anomalous folding, and consequent doubling, is encapsulated. One meets itself, and is no longer one, at least straightforwardly. *I* is an *other*. This meeting, which modernity has so long awaited, is at once uncanny, dramatic, and absurd.

> **#2.0** The double, or "temporal doppelgänger," is the principal dramatic representative of the uncanny in time-travel fiction (Rye). Freud's (1919) reading of E.T.A. Hoffman's 'The Sandman' is an inevitable reference (Gray). Shane Carruth's *Primer* (2004) remains the most extreme development of the device. See also Christopher Nolan's *The Prestige* (2006), for a comparably brutal study of redundant duplicates, in which the mechanics of time-travel are less prominently foregrounded. The theoretical synthesis of this topic with that of near-futuristic mind-copies—such as Robin Hanson's 'ems'—can be anticipated with some confidence (Hanson).

§2.0 There are innumerable ways in which the core *Looper* scenario is absurd. To wring sense from it requires some care, and a stubborn attention to drama. Above all, it is necessary to focus upon the principal protagonist of the time-travel narrative—its archetypal hero—*the double*. Insofar as the sheer prominence of this topic is concerned, *Looper* cannot be faulted. Its twin-lead promotional presence was built entirely around it. All time-travel—or Wellsian liberation of a body within the time-line (we will come to that)—is a process of duplication. When staged by an agent, within the

span of an individual life, this doubling is dramatized—most starkly, by a potential self-encounter. Two segments of the same life-time are folded into anomalous proximity. Joe-1 (Bruce Willis) and Joe-2 (Joseph Gordon-Levitt) converse about the strangeness of time-travel, which is the framing oddity of the conversation occurring at all. Twisted time is staged as a semi-broken identity.

§1.9 *Looper*'s Kansas City is a body dump. The movie's only significant macro-political agency is a criminal syndicate that uses on-set Kansas City time (2044) as a secret graveyard. Awkward corpses are retro-deposited there, to disappear. That is how entropy dissipation is configured as a pop-culture plot device. The present we have yet to reach will be a waste dump for its future. A structural production of meaninglessness can be discharged there. Derelicts shamble through it, perhaps pausing to squint uncertainly into the camera, drugged on senseless ruin. Threaten them with a weapon and they move on, heading nowhere. The only point left here is to die.

§1.8 America, too, has lost the future, but in a very different way. It has become the theater of entropy, still central to a cinematic drama in which the accumulation of disorder holds the stage. As expected in an environment of degraded information, we know little. In consistency with the great Anglophone tradition of dark futuristic fiction, critically relayed by William Gibson's *Neuromancer* (1984), it is not even clear whether America still ex-

ists as an integrated polity. We find ourselves, in any case, in a grim, deteriorated, crime-wracked Kansas City, where history has spectacularly gone wrong. "I'm from the future, you should stay in America"—no one in *Looper* says that.

§1.7 Panning back from the movie to its production process, we see Paris lose the future. It could not easily be any simpler, or more graphic. Relic French lessons tell a story that has ceased to be part of the story. It was unaffordable. There is, of course, much that could be said, but we're finished with it. Like Joe, we shall have no occasion to go there. It is our shelved 'elsewhere.'

> **#1.6b** "What happened to America?" is the Cyberpunk question *par excellence*.
>
> **#1.6a** The stressed formula here, while echoing traditional philosophical concerns about the relation of appearance to reality, is situated by a fundamental intolerance for the epistemological frame. The subject who pretends to know is a dramatic personification of productive time circuitry. The staging of the philosophical dilemma suggests—at a minimum—theatrical ironization. Hence the expectation that cinematic depiction, considered as a contemporary display mode of the urban process (or time machine), will consistently run ahead of the philosophical proposition, while providing its content, and even organizing its manifestation. The socially-formalized philosophical position lacks the resources to frame itself authoritatively, except through idealization. It is *zoomed-in* (staged, enveloped, or embedded) relative to the operational contexts accessed by capitalist mass media, which are technically and financially empowered to *make even the city a set*.

§1.6 Terminological rectifications are typically a fleeting indulgence. Every word, or common term, is a packet of fate, resistant to recommended usages. It is nevertheless necessary to note that 'time-travel' is in critical respects an unfortunate term. It suggests the transportation of a body through time, which is a uniquely misleading image of time-anomaly. To speak in this way, as it is convenient to do, requires systematic irony if it is not to lead—by inevitability—to grave conceptual error. 'Time-travel' can only be rigorously pursued as *the dramatization of something else*. This is a qualification, and a path.

> **#1.5** On another—hypothetical—timeline, where the ideo-politics of time disturbance were more consistently emphasized, the theme of 'revisionism' would have maintained a dominant position throughout. Between revisions of the past, which constitute the principal narrative permission of the time-travel plot, and revisions of ideological doctrine—indissolubly bound to the topic of official history—the boundary is wholly illusory. Insofar as such a border is taken to exist, this is entirely due to systematic intellectual neglect.

§1.5 Passage from the business strategy of *Looper*'s Chinese co-producer, DMG Entertainment, to the cosmic disordering of time, involves a traverse through thickets of revisionism. Rough-draft versions of these multiple, intricately-entangled revisions are immediately evident, in re-con-

ceived production and distribution plans, re-written scripts, ideological reconstruction, and a reworked world order. Running through all of these rectifications is the Sino-Futurist time-loop, which *Looper* dramatizes for popular media consumption. For so long as revisionism remains our theme, we are still in the dramatic frame.

> **#1.4** Even the most pedestrian (and, indeed, scarcely literate) account of the concrete *Looper* production process finds itself drawn into templex considerations of the spiral, the double, speed modifications, and time disintegration: "The director of *Looper* Rian Johnson […] cut these scenes out of the movie but the Chinese backers wanted [them] back in to showcase the streets of Shanghai for Chinese audiences. The production came to a compromise and the result was two versions of *Looper*. The scenes, involving Gordon-Levitt's character's downward spiral, were cut out [of] the American version because test screeners felt it slowed down the pace of the film, while Chinese test screeners didn't mind the narrative slowdown" (Obias).

§1.4 Joe has been learning French. Perhaps it was too troublesome to edit that out, when the script was revised. (We're still talking business, and not time-travel 'yet.') Hollywood discovered that doing the future in Europe has become impractical. Paris had to go, despite the language lessons, recorded—indelibly—in the first version of the film-script. Historical and commercial realities were constructing a palimpsest, over-written by Sino-Futurism. Production economics and Chi-

nese distribution opportunities fed-back into the story-line. The Shanghai cityscape and Xu ('Summer') Qing were grafted in.

§1.3 "You should go to China," Joe is told by his criminal overseer, Abe. "I'm going to France," Joe insists stubbornly. Abe responds with what—for us—is the most critical line in the movie: "I'm from the future. You should go to China." With these words, *Looper* makes Sino-Futurism its topic. The hyper-modern *China Event* overspills the existing order of time.

> **#1.2** Time-travel is a model of ultimate subversion, so its manifestation can be expected to trigger a security response. To the extent this is not seen, the deficiency can be confidently interpreted as non-seriousness…but then it gets complicated. The signature of time-travel is entangling irony, cross-linked to the plasticization of memory, and this is most conveniently denounced as irreverence (or non-seriousness of another kind). This allows for the categorization of time disturbance as a non-serious issue, which merits serious attention precisely on this account. The formal statement publicized by the Chinese broadcasting authorities on the problem of emergent time-travel ideology takes this approach, almost exactly. The Western reportage was—no less expectedly—frivolous in a perfectly reciprocal sense.

§1.2 A 'city of the future' loops forwards, and back, through time anomaly. Yet time-travel appears—'initially'—to introduce more specific complications. In China, these have been explicitly

baked into Shanghai's Art Deco high-modernism. The re-opened city of the early 1990s, once again and without hesitation, made overtly futuristic architecture its sign. In a process of double-dating, yet to be patiently explored, 1994, 1999, 2008, and 2014 set re-envisioned futures on the vertical outer-edge of the skyline.

> **#1.0** A process of self-reinforcement (or positive loop) is already evident at the most mundane level of *Looper*'s socio-historical realization. The movie's framing geopolitical scenario has been culturally anticipated, and thus works as a *confirmation*, which neatly coincides with a concrete business opportunity: "Johnson felt that the offer from his Chinese distributors helped the film fit into a common idea about the future, which is that Asian megacities will be tomorrow's lands of opportunity" (Newitz). Simply following this circuit, with sufficient doggedness, tells us almost everything in advance.

§1.0 "This time travel shit, just fries your brain like an egg," says the mobster, Abe (Jeff Daniels), in Rian Johnson's *Looper* (2012). By tangling the story-line, it auto-dismantles a process of dramatic production. Narrative ruin is the time-travel effect. When it works, it eventually raises the suspicion that something else has happened instead.

> *Let me explain entropy to you. It isn't difficult. It's the gradient of temporal irreversibility. Imagine a video of someone dropping an egg. It falls to the floor, and smashes. Now dismantle the video into stills. Can you re-assemble the time-line? Of course you can. It's only necessary to follow the divergent wave. Eggs don't spontaneously un-smash. If you*

ideo-political. In 2011, Chinese broadcast authorities denounced time-travel fictions, apparently concerned by mass-defections of the citizenry into a pre-republican past, under the influence of narratives that "casually make up myths, have monstrous and weird plots, use absurd tactics, and even promote feudalism, superstition, fatalism and reincarnation" (Barboza). As English media coverage illustrates, it is all too easy for Westerners to revert to glib comedy when interpreting this official recognition of an emerging time-politics, even as the epoch of Occidental superciliousness closes dramatically.

> **#1.1** Since Reform and Opening reached the city, Shanghai's succession of vertical development-tidemark towers have all been situated in Lujiazui, business-core of the Pudong New Area. Each of these buildings—the Pearl Orient TV Tower (1994), Jin Mao Tower (1999), Shanghai World Financial Center (SWFC, 2008), and Shanghai Tower (2014)—makes an overt architectural statement about historical time, formulated as a referential loop through tradition. These display circuits have been consecutively dilated, as they extend back through Sputnik-socialism, Deco, and *Jiangnan* garden-design (encrypted with the lost moon-gate that was to top the SWFC), to an opening scroll, in which the enveloping spiral of civilization is recapitulated.

§1.1 Shanghai reaches back across three decades to provide Johnson with his city of the future. It's been doing that a lot in recent years. Before science fiction had a name, it had already been

saw that, you'd know the snaps had been arranged backwardly. The process of smashing—passing from an improbable to a more probable state—marks out the arrow of time…"
"But teacher…"
"What is it?"
"How come there are eggs?"

1: Templexity

Semicolons are generally disparaged as pseudo-pneumatic fripperies. Several additional maddening tics can no doubt be rapidly itemized.

For some among us, a final irritation is introduced by the systematic decision in favor of logical (rather than conventional) punctuation. Inverted commas are modeled approximately upon mathematical parentheses, to enclose isolable statements.

Templexity is indistinguishable from unbounded real recursion, so it cannot be lucidly anticipated independently of a historical completion—or 'closure' (apprehended in the multitudinous sense noted in the text to follow). There could only have been a beginning—a prolegomenon to the rigorous formulation of templexity as a question—and the topic itself retracts this, even before its proposal. The real process is not the resolution of the problem at the level it appears—dramatically—to have been initially posed, but its re-absorption into the alien cognitive matrix which inherits it. 'Templexity'—as a sign—marks the suspicion that, if we are *waiting for this to happen*, we still understand nothing.

Anything shown through actors has been formatted for them. Even if we decide, eventually, that the ultimate shape of Topological Meta-History has been adequately captured by Bruce Willis' crooked smile, it was at least prudent to explore the alternative case.

When templexity, time-anomaly, is staged as a drama—which is to say, more controversially, aestheticized, produced as a public presentation, or even manifested (to us) in general—it undergoes a predictable, systematic transformation. The phenomenon ('time-travel') is a reconstruction, pre-selected for consistency with the possibility of *plot*, which is, in turn, a proxy for *intelligible agency*.

While discussing dramatic composition in the *Poetics*, Aristotle tells us:

> A whole is that which has a beginning, a middle, and an end. A beginning is that which does not itself follow anything by causal necessity, but after which something naturally is or comes to be. An end, on the contrary, is that which itself naturally follows some other thing, either by necessity, or as a rule, but has nothing following it. A middle is that which follows something as some other thing follows it. A well-constructed plot, therefore, must neither begin nor end at haphazard, but conform to these principles (Aristotle, 1450b25–35).

The judgment brought to bear upon time-travel drama, while inexplicit, is nevertheless con-

spicuously damning. Crucially, it provides a clue of inestimable value to the structure of dramatization.

The adhesion to Shanghai as a companion on the path to templexity, and even as an investigative horizon, while more inherently dignified than the attachment to a profoundly-flawed Hollywood pop-entertainment product, is also vulnerable to harsh interrogation. Does even the generic city—let alone the specific city—make any genuinely substantial contribution to a discussion of the abstract fabric of the world? Is the role of the city—as already in the movie—not in fact merely *decorative*? Such objections have undeniable force insofar as they draw attention to the radical under-development of the urban-thematic perspective, but in this regard they should be considered a stimulus rather than a termination. If nothing obstructs complete relapse into generic urbanism here, excepting vague guidelines for historical study and disconnected propositions of extreme metaphysical pretension, a sympathetic evaluation would begin elsewhere: with the degree to which this—as yet merely suggestive project—converges upon a (comparably germinal) re-initiation of the question of time. It is through a re-integrated exploratory horizon, determined by exact coincidence between the problems of templexity and urban singularity, that advances, retardations, and false leads are measured by an appropriate criterion. To invoke the city as the emergent *subject* of the question of time is not merely hypothetical but—when approached

at the scale appropriate to the real cognitive agency involved—fully experimental. The tacit (and vulgarized) question: *What is Shanghai coming to think about this?*

From the beginning, it is evident that *Looper* cannot bear even the slightest theoretical stress, so its prominence is liable to disconcert. There is no refuge to be found, however, in its dismissal from consideration as a mere *pretext*, unless—once again—this term is ascribed far greater cognitive density than is reasonable to expect. The movie is first of all a complex cultural *fact*, and then a historic metaphysical *symptom*, and finally a *machine part*. Its philosophical credibility plays only the most insignificant role in any of this. *What is added to our understanding of the world, once we are told it is such that* Looper *has been produced within it?*—That is the approximate query sustaining its presence here.

Templexity, unlike 'time-travel,' is not limited to its narrativization, but is that which time-travel narrative—or drama—is ultimately about. To salvage this proposition from casual dogmatism, it is necessary to admit, hypothetically, that time-travel might be 'about' *nothing*. This is even probable, if thoughtfully understood. Templexity is therefore an emergent question, at least initially, and for 'us.' If it is assumed here that the reader has been waylaid upon return from a theatrical production themed overtly—and to a still greater degree tacitly—by time-travel in Shanghai, the sample audience envisaged drafts a 'we' that we can start with.

To have seen *Looper* is unnecessary, if you can at least pretend to have done so. Nothing more is required than acquiescence to the (almost) entirely empty proposition: *It has begun* (and been seen to have begun).

We can reach the end in a single moment: *Cities are time machines*. Some will work better than others, and the workings of each have been singular. (If grammatical tense and quantity are scrambled in the process, it is not especially difficult to see why.)

Does time itself include the potential to surprise us? As soon as we begin to suspect so, a reflective undertaking that is properly—and even ultimately—philosophical has begun. This journey has 'always already' started, as the transcendental criticism insists. The process has only to learn what it is. That, however, takes time.

0: Forward

Nick Land

Templexity: Disordered Loops through Shanghai Time

Editor's Introduction

Peter Heft

While there were various reasons for putting this book together, the simple fact that the two essays herein weren't already (physically) in print ought to suffice. Both texts in this volume—*Templexity: Disordered Loops through Shanghai Time* and *Future Mutation: Technology, Shanzai, and the Evolution of Species*—read like perverse twins of one another, the former dealing with time from the viewpoint of the city abstracted to time as such, the latter, the materiality of time as it relates to emerging technologies and future(~~shock~~) life. Or phrased differently: the former examines time and the city at a macroscopic scale, the latter, time and the city at a microscopic scale. Given the deep resonances between the two texts—although markedly different in tone—it seemed obvious to bind them in one infernal package: *Visions of Futures Past*. The texts are also significant for another reason: they expand upon themes brought forth at different 'times,' and in different contexts, by their respective authors.

Templexity is, first and foremost, an expansion on section four, "Twisted Times," from the first *Urban Future* pamphlet while also, and more significantly, being a quasi-write-up of Nick Land's presentation at the 2012 Shanghai Studies Society (alongside Jeff Wasserstrom), "All Tomorrow's Parties: Shanghai Futurism." While the talk tackles issues besides (or rather, in addition to) the ones discussed in *Templexity—e.g.*, resonances between specific buildings in Shanghai and how, within architecture as such, there are necessarily twisted time-loops, something Wasserstrom also brings to the fore—the talk itself was a nascent version of *Templexity* that can only really be made sense of retrospectively *through Templexity*. If one is to take seriously the thesis that cities act as time machines—or the weaker thesis, time-dilation devices—then the republication of *Templexity* is necessary, as following plague-time cities are undergoing rapid re-*generation* to try to make up for *lost* time.

Future Mutation is also an expansion on previous work. Anna Greenspan has written extensively on Shanghai—see her monograph, *Shanghai Future: Modernity Remade* (2014)—while also working with the Hacked Matter research collective looking at DIY and *shanzai* manufacturing in China. Following her previous work, *Future Mutation* (co-written with Suzanne Livingston) can be seen as a reinsertion of speculative and extrapolative philosophy into *shanzai* research. Indeed, *Future Mutation* can itself best be read as the syzygetic twin of Greenspan's 2015 paper with Silvia Lindtner and

David Li, "Designed in Shenzhen: *Shanzhai* Manufacturing and Maker Entrepreneurs," itself an ethnographic analysis of *shanzai* manufacturing and its role in "making Shenzen." Taking up many of the same themes, *Future Mutation* is a philosophical retooling of "Designed in Shenzhen" with a focus not on ethnography, but cyberetics. If one is to live amongst machines—as we all currently do—then Greenspan and Livingston's comments on the increasing ubiquity of 3D printing (as well as its uses) and the future of the human ought to be taken seriously. Despite being 'outdated'—indeed, any essay on technology will always be outdated by the time it is published—there is a certain feeling of amusement one gets as one reads that "the [2015] dreams [of drones were] more mundane: wind-surfing cameras that help perfect your golf shot" whilst a child flies a toy drone past your high-rise window using RC, or a Roomba mapping your apartment for Amazon bumps into your leg.

A note on the structure of the texts seems warranted. Although obvious and intuitive to me, it might prove frustrating—indeed, formatting this book was exhausting. The two texts—the perverse twins—are obviously mirrored, folded around this introduction. *Future Mutation* reads normally, but *Templexity*, given the topic and nature of the text, reads slightly differently. Starting from the midpoint, page i, *Templexity* begins on the left, page 0. Each paragraph is, of course, to be read normally, but instead of traversing down the page, one crawls up it, clinging for dear life as one flips back

Future Mutation: Technology, Shanzai, and the Evolution of Species

Suzanne Livingston + Anna Greenspan

You cannot stop what can't be stopped, you cannot touch without being touched.
—Nick Land

Technology obeys no-one's will. Can we play along with it without laboring to master it?
—John Gray

Copy

New technologies build themselves through a conglomeration of parts from all around the world; the design teams of Silicon Valley, the raw material from the mines of Africa, the capital markets fuelled by the Middle East. Shenzhen is the gathering place; a central node in the circulatory system. This is where the body of global electronics is assembled and shipped out.

The market condenses in an area known as *Huaqiangbei*. Wide crowded streets are illuminated by strips of neon and LEDs, which are plastered over cheap looking malls with their blue tinted

and forth ("Does time itself…" → "We can reach…"). What a reader will also notice is Land's usage of silcrows and octothorpes. The paragraph after a given silcrow is the main point he is making, while the paragraph after a given octothorpe ought to be read as an extended footnote, adding additional information and flavor to the text. Toss your deviide around a couple of times and you'll get the hang of it. If not, call customer service.

Enjoy these two exciting essays packed together!

glass and gray, drab concrete. The monotony of the urban landscape is all-too-familiar to anyone accustomed to the new pop-up cities of China. Peering inside the windows, however, one gets a taste of the intensity of all that is clustered inside. Building after building, floor upon floor, stall upon stall, shelf upon shelf, is dedicated to the buying, selling, and building of electronics. Everywhere are mountains of wires, mounds of chips, spools of lights, cases of buttons and nobs. *Huaqiangbei*, Shenzhen is a high tech toolbox for the world.

The city's population is almost all the same age. This is a town of workers, not a place for the young or the old. Employees stand behind signs advertising companies whom few have ever heard: "Victory Star Electronics," "First Semiconductors," "Gimi Technologies." Each has carved out its own tiny, individual space designed especially to host a particular species of microcommercial activity. Despite the fame of factory giants like Foxconn, the dizzying scale of electronic production in Shenzhen is not all united in any single operation. Instead, the magnitude arises from a multiplication effect; an enormous amassing of many small parts.

Some of the tech on show is cutting edge (one booth proudly displays a touch screen 3D TV), but most is more mundane. One mall is stuffed with wiring and routers. Inside another, thousands of surveillance cameras all watch themselves in an unrelenting display of machinic vision. The most colorful mall is devoted entirely to cell phone accessories. Myriad stores contain rows of identical plastic kitties, bears, or bunnies, which are sold to add personality to the intrinsic standardization of the device.

Upstairs, where the buildings are darker and emptier, in a zone reserved for packaging, the secrets of *Huaqiangbei* are revealed. Two workers form a chain, one folding cardboard retail boxes, another sticking labels: 'iPhone 4'; 'Samsung Galaxy,' the precious guarantee of branding stripped of all mystique by the cool indifference of the clone. The most popular item to emerge from the markets of Shenzhen is the copy-cat cellphone. This is where you come to find a 'Motopola,' a 'Nikia,' or even a fake 'Xiaomi' (which is the copy of a clone). Though some counterfeits try to disguise the fact that they are fakes many are more open and playful. Shenzhen is the birth-place of *shanzhai*, the zone in which copying—which is both inherent to digital technology and a critical part of the cultural traditions of China—have fused with the production of electronics.

Shanzhai traces its roots back to 2004, when the Taiwanese company MediaTeK released a multipurpose chip that made mobile phones cheap and easy to produce. A wave of small factories, many of them family owned, immediately seized the opportunity to feed an already ravenous market for counterfeits and began pumping out copies at a delirious speed. *Shanzhai* companies operate in a

nebulous, quasi-legal zone external to both corporate regulations as well as government rules. The name '*shanzhai*' means mountain village and the term signals a kind of bandit, anarchist mode of production that functions outside the formal legitimacy of either capitalism or the state. Today there are hundreds of millions of *shanzhai* phones in circulation, not only in China but throughout Asia, Africa, Latin America, and the Middle East, where some argue it was the "glut of cheap cell phones that helped enable the Arab Spring" (Lindsay). This knockoff technology has spread to the most remote corners of the planet. Even in the hermit kingdom of North Korea, the trade in *shanzhai* goods is said to be robust. Inside China the practices of *shanzhai* have spread far beyond cellphones. The irreverent copy-cat—quick, flexible, and close to the street—has come to define a culture that is anarchic, entrepreneurial, and increasingly operates at the cutting edge of high tech.

Reproduce

One of the most profoundly relevant texts on the issues raised by contemporary technology was written nearly one hundred and fifty years ago. In 1872, Samuel Butler travelled to the then remote colony of New Zealand. Inspired by his journey, Butler wrote the novel *Erewhon*. In this long ago voyage to a place far removed from civilization ('erewhon' is an anagram for nowhere), he perceived the first stirrings of a new species—alien and unknown—which was evolving from the intimate interminglings of human and machine.

Erewhon is set in a wild and sparsely inhabited place. It tells the tale of an early settler named Higgs who is driven to explore an uncharted land. Warned and then abandoned by his native guides, Higgs makes his way alone over a steep mountain pass. There, on the far end of the island, he encounters the Erewhonians, an unknown civilization with odd customs and curious beliefs.

One of the most striking anomalies of this fictional race is their complete—even fanatical—renunciation of all machines. As soon as he arrives in this faraway land, Higgs' own wristwatch is dramatically confiscated. The only other machinery he sees during his time immersed in this alien culture is broken, unused, and safely encased inside a museum. Higgs finds this especially strange since it is clear from the historical records that hundreds of years previously, Erewhonian society had reached a most advanced degree of technological sophistication. The basis for this mystifying behavior, Higgs eventually discovers, can be traced back centuries to arguments posed in a philosophical tome known as 'The Book of the Machines'—a fictional text within a text that is kept guarded within the libraries of Erewhon.

'The Book of the Machines' begins with a time-travel scenario, imagining intelligent creatures returning to the deep past when our planet was nothing but a "hot round ball." No one could have

dreamt from this embryonic state that life would one day sprout on Earth. Yet, Butler speculates, just as human consciousness emerged from dark matter, is it not possible that "some new phase of mind" could still arise that is "as different from all present known phases, as the mind of animals is from that of vegetables?" "[I]t would be rash," he warns, "to say that no others can be developed, and that animal life is the end of all things" (Butler, 118). In doing so, he maps out a scenario that has never been more relevant—that technology may, as a result of its own driving forces, be transforming us as a species, stretching our senses, reformatting our brains, giving us new organs controlled from afar, altering all that is most intimately human.

The Book of the Machines' advances its most far-reaching and radical arguments in wrestling with the possibility of technology's drive to reproduce itself. "It is said by some," contends the author, "that machines can never be developed into animate or *quasi*-animate existences, inasmuch as they have no reproductive system, nor seem ever likely to possess one." Yet, just because machines do not marry, or "that we are never likely to see a fertile union between two vapour-engines with the young ones playing about the door of the shed" it does not mean that the potential for reproduction is closed. We can already observe an enormous diversity in the reproductive systems of existing life forms. Why, argues Butler, should this mutiplicitous variation come to an end? After all, "[n]o one expects that all the features of the now existing organisations will be absolutely repeated in an entirely new class of life. The reproductive system of animals differs widely from that of plants, but both are reproductive systems." What would make us presume that this ongoing process has now, suddenly, come to an end? Surely nature, as Butler wrote, "has not exhausted her phases of this power?" (Ibid., 127)

According to 'The Book of the Machines,' technology has long ago adopted its own clever evolutionary mutation. Without the ability to reproduce on its own it has involved us in its own creation. We have become machine parts whose purpose is to help technology breed. Butler convinces with a rich and powerful analogy:

> Surely if a machine is able to reproduce another machine systematically, we may say that it has a reproductive system. What is a reproductive system, if it be not a system for reproduction? And how few of the machines are there which have not been produced systematically by other machines? But it is man that makes them do so. Yes; but is it not insects that make many of the plants reproductive, and would not whole families of plants die out if their fertilisation was not effected by a class of agents utterly foreign to themselves? (Ibid., 127)

We are to machines as a bee is to a clover, the reproductive organs of a species that is not our own.

Mutate

Across the spectrum of both people and technology are the continual traces of reciprocal mutation—one serving the other, becoming the other, subverting the other, each indistinguishably sharing in the other. This susceptibility to the alien, the mutant, is an unavoidable attraction buried within us all. In his great work *Creative Evolution*, the philosopher Henri Bergson details the phenomenon by contrasting it to the idea of evolutionary teleology—the notion of an original starting point and a higher, more perfected form. Bergson's work presents a creative force—a surge of life, driving life itself—far different from the mechanistic view of evolution that the Darwinists proposed. Of that, Bergson wrote, "we should soon have been able to determine its direction, if life had described a single course, like that of a solid ball shot from a cannon. But it proceeds rather like a shell, which suddenly bursts into fragments, which fragments, being themselves shells, burst in their turn into fragments destined to burst again, and so on for a time incommensurably long. We perceive only what is nearest to us, namely, the scattered movements of the pulverized explosions" (Bergson, 98). Bergson presents an explanation of evolution as an inclination towards ever richer and often more dangerous complexity; a tending towards the fringes, which does not stop at an ideal point where a species has reached a smooth and well-functioning adaption to their physical environments, but instead adapts again towards the unforeseen.

Innovations, whether in people or things are most often an undermining of the original, not a process of perfecting. *Shanzhai* is a form of copying that drifts to become something new. When it succeeds, the original is left far behind. In this way the process of *shanzhai* manifests a strong underlying urge in the development of technology—to move beyond the moment where faithful copies of what has gone before are optimally useful and function perfectly well, to the point where they become something novel and distinct. In this way technology designed to serve us carves its own pathways of escape.

Many in the business of technology now view the force of *shanzhai* not as a corruption but as an entirely valid form of product development. What has made the thousands of *shanzhai* producers successful as businesses in their own right is the ability to spot holes and gaps in the strategies of the large market incumbents. Many started out as manufacturers of cheap, straight copies but as their approach became more inventive and resourceful, they upgraded to making much more localized versions of the main product—adding extra features, customizing according to niche demand. This modular approach has enabled *shanzhai* producers to capture vast and far less affluent market segments (taking advantage of the wealth at the bottom of the pyramid). As they do so, they hack straight into the supply chains of their giant com-

petitors. According to Zhang Haizhen, owner of a *shanzhai* company, quoted in the *New York Times*: "It's really common for factories to do a night shift for other companies. No one will refuse an order if it is over 5,000 mobile phones" (Barboza). *Shanzhai* players seek out the blind spots in a main player's strategy and with speed on their side, enter a market and surreptitiously grab a substantial, sometimes even shocking, share.

Today the cycle of copying has become so voracious that for the most successful *shanzhai* players, there is nothing left to copy but each other—a mindset fuelled by the tight ecosystem of parts, knowledge and R&D, testing, packaging, and marketing know-how which unites the 30,000 plus *shanzhai* companies that cluster around Shenzhen's *Huaqiangbei*.This is not to say, however, that even within the *shanzhai* community, all forms of copying are held in equal regard. Eric Pan of "Seeed Studio," a firm positioning itself between the boutique designs of a growing maker culture and the rich ecosystem of *shanzhai* factories that know how to bring products to market, talks of 'branded mutants' who just steal the name of another for profit alone, as opposed the 'legitimate replicas' who stay true to an original ethos and DNA of a product but also seek to make it better, and can then even ally with the original to create a new iteration and evolve again. In this he refers especially to his own business in modular electronics, prototyping hardware innovations for community inventors. 'First,' he says, 'you can copy alphabets, then you develop your own handwriting, finally you create your own articles' (unknown).

In these complicated mixtures of parts, recipes, and inspiration, where and to whom can property be attributed? It is becoming increasingly common to legitimately brand derivatives as exactly that—a copy with its own features and flair. Arduino, the sensory electronics community, pioneered a brand system which allowed individuals within their network to use their brand and make it their own—like cooks making their own version of an expert chef's recipe. This recipe-based model, says Zach 'Hoeken' Smith of "Makerbot," who now has a base in Shenzhen, is precisely the ethos of open source. The goal is to take an original and alter it so it's different, more individual, more specific to circumstance, better in some identifiable way. Here brands work hard—not as a badge of ownership, or a stamping of authenticity, but as a signal of a mindset or drive, which are much less tangible. Yet, the dilemma remains—at what point does a copy cease to be a replica and become instead an entity of its own?

Bergson showed that a non-stop splicing of organisms, entities, and their environments is all that there is. We do not evolve into ever more perfect versions of ourselves. Instead, component parts split off and find new avenues to explore, throwing up ever new traits and varieties to investigate and wander through:

> [W]e shall not witness the detailed accomplishment of a plan. Nature is more and better than a plan in course of realization. A plan is a term assigned to a labor: it closes the future whose form it indicates. Before the evolution of life, on the contrary, the portals of the future remain wide open. It is a creation that goes on for ever in virtue of an initial movement (Bergson, 104–105).

Competitive advantage does not come from incremental additions to what has worked in the past. It is instead a much more sudden and calamitous shaking down of the status quo. In recent times, *shanzhai* companies have begun to sue the likes of Apple for the stealing of ideas. The takeover of copies has begun.

Replicate

Copying, cloning, mass manufacturing is a vital thrust in the development of modern technology. It is the key to producing at scale, which has long been a driver of capitalism. But this picture is now being complicated by the arrival of the 3D printer—the prototype of a universal replicating machine.

Discussion of this enormously popular technology circulates around three key themes: the wish to enable the creation of bespoke objects and machines; the determination to equip as many people as possible with the tools to create objects and machines for themselves (mass education is inherent to the mission behind 3D printing); and finally, and most interestingly, the race to see those objects and machines effectively self-reproduce. For the researchers and devoted developers of 3D technology, 'machines jumping out of machines' is seen as the ultimate goal for the movement—there is no more solid affirmation of a machine's ability to make, than its ability to make itself.

In 2005, the RepRap project at the University of Bristol in the UK was established to develop printers which could effectively build their own components. From the start, this was presented in evolutionary terms—but importantly, with the human user as a kind of *über*-master able to drive a constant Darwinian line of radical improvement. According to founder, Dr. Adrian Bowyer:

> RepRap will be a mechatronic device using entirely conventional (indeed simple) engineering. But it is really a piece of biology. This is because it can self-replicate with the symbiotic assistance of a person. Anything that can copy itself immediately and inescapably becomes subject to Darwinian selection, but RepRap has one important difference from natural organisms: in nature, mutations are random, and only a tiny fraction are improvements; but with RepRap, every mutation is a product of the analytical thought of its users. This means that the rate of improvement should be very rapid, at least at the start; it is more analogous to selective breeding—the process we used to make cows from aurochs and wheat from wild grass. Evolution can be relied on to make very good designs emerge quickly (Bowyer).

What appears underestimated here, in the early breakthrough days of the technology, is the ultimate liveliness of such designs. As the pursuit of technological self-realization has continued, intelligence has not remained confined to the humans on the side-lines of those machines, masterful though they may appear to be. What is being produced is not a passive, dead technology but rather a gradual awakening of matter, the emergence, ultimately, of a new form of life. 3D printing might only now be about to find its ways into our homes, but for figures at the forefront of the field like Neil Gershenfeld, it is a technology that is, already, superseding itself. What projects like RepRap began nearly a decade ago are now evolving into a much deeper idea of printing and fabrication—not the random knickknacks that proliferate today, but a form of molecular manipulation, where data and objects become interchangeable. Gershenfeld describes the enormous leap represented by this approach in very clear terms:

> Scientists at a number of labs (including mine) are now [...] developing processes that can place individual atoms and molecules into whatever structure they want. Unlike 3D printers today, these will be able to build complete functional systems at once, with no need for parts to be assembled. The aim is to not only produce the parts for a drone, for example, but build a complete vehicle that can fly right out of the printer (Gershenfeld, 46).

The reference to the flying force of technology continues:

> [A]nother assembler we are developing uses parts on the scale of centimeters, to make larger structures, such as aircraft components and even whole aircraft that will be lighter, stronger, and more capable than today's planes—think a jumbo jet that can flap its wings (Ibid., 62).

In this scenario, machines emerge from machines fully made, mechanically complete at conception—one very sophisticated moving piece, not a kit of separate parts. Most importantly, they have the potential to be packed with data, able to see, hear, and sense. Gershenfeld's work, at the boundary of computer science and material science (epitomised by some early research in his lab to create a 'paintable computer'—a liquid medium that can literally be painted on so you can have an inch of computing power wherever you need it, potentially turning a whole house into a computer) is several steps ahead of the present day possibilities of 3D printing, but it brilliantly lays out an inevitable future. He is accelerating a set of connections that packs computer intelligence into materials and materials into self-reproducing things. Arduino, as a mass market open-source movement just like certain lines of 3D printing technology, is helping to set the path. Today, everyone from large corporations to DIY enthusiasts are hard at work creating objects with the intelligence to sense and react to the world. Tom Igoe, one of Arduino's founders, worries that the name 'Internet of Things' puts too much attention on the gadgets constituting this new technological wave. What is shifting, he explains, "is not so much how we see computers, but

how computers see us" (unknown).

Evolve

The field of robotics was traditionally seen to be in the service of man. The mechanical slave was imagined as a faithful reproduction that obeyed. Robots were conceived as our mirrors, which, at their pinnacle, would match us in physical and mental intelligence. Today, this fairy tale approach is only a fraction of the story—much of the progress in robotics is focused less on replicating humans than on changing their environment, and disrupting their place within that environment.

The great roboticist Hans Moravec plots the arrival of a new kind of body, born through generational reproduction and consequent mutation. His vision begins with 'second-generation' machines that humans engage with as pets (recent strides made in the world of social robots, designed to provide company for the elderly is early proof of this development). His vision continues with "a sufficiently advanced third-generation robot, whose simulation extends to other agents—robots and people—[who] would be able to observe a task being done by someone else and formulate a program for the task itself. It could imitate" (Moravec, 106). Out of these copying machines emerges a fourth-generation robot with "human perceptual and motor abilities and superior reasoning powers" who "could replace us in every essential task and in principle operate our society increasingly well without us. They would run the companies and do the research as well as performing the productive work" (Ibid., 125).

Moravec's imagination extends still further, reformatting the intermeshed relation between human and machines. Not isolated, or distinct from one other, the exchange between nature and artifice is no longer one of simple tasks, where machines serve us, but one of mutual evolution, where organic and inorganic parts learn from each other on a massive, unprecedented scale. The human body unfolds, melding with the mechanosphere. Butler already foresaw this type of distributed intelligence a century ago:

> The lower animals keep all their limbs at home in their bodies, but many of man's are loose and lie about detached, now here and there, in various parts of the world—some being kept for contingent use, and others being occasionally hundreds of miles away [...] We do not use our own limbs other than as machines (Butler, 136).

Moravec pushes further, drawing from the present to imagine the bodies of the future:

> Earth life and present research robots give an inkling of the myriad body shapes: spiders, bugs, pogo sticks, snakes, blimps, cars, barrels, power shovels, bipeds, quadrupeds [...] booms and nozzles. Bits of a single body may be distributed over distances: a camera here, an arm there [...] all in communication [...] An Ex [ex-human] may often be surrounded by an illuminated cloud that does its

bidding as if by magic (Moravec, 150).

In Moravec's future vision, mutants are all that is left.

Rewind

According to 'The Book of the Machines,' the intimate relationship between humans and technology has left nothing untouched. "Man's very soul is due to the machines" writes Butler, "it is a machine-made thing: he thinks as he thinks, and feels as he feels, through the work that machines have wrought upon him, and their existence is quite as much a *sine qua non* for his, as his for theirs" (Butler, 124). Emerging through this intense cross-fertilization is a single inseparable entity, that which philosophers Deleuze and Guattari call a "vertebro-machinate mammal" (Deleuze and Guattari, 285).

This emergent symbiosis undermines the comfortable, commonly held assumption that technology is just a tool, designed to fulfill our desires and serve our needs. The idea that machines must "now and ever be man's inferiors" masks a more threatening, subterranean reality. "[T]he servant," contends 'The Book of the Machines,' "glides by imperceptible approaches into the master […] How many men at this hour are living in a state of bondage to the machines? How many spend their whole lives, from the cradle to the grave, in tending them by night and day?" "This is the art of the machines—they serve that they may rule" (Butler, 124–125).

In the fictional world of *Erewhon* this (still popular) sci-fi dystopia, in which humans function as mere component parts until, one day, a machinic takeover makes debris of us all, persuaded civilization to implement a rigorous technophobic program. All machines were abandoned, our cyborg future was snuffed out, and technological evolution was brought to an end.

Over 120 years later, at the turn of the second millennium, Bill Joy, one of the co-founders of Sun Microsystems, propelled Butler's argument forward into the twenty-first century. His famous and highly influential article, "Why the Future Doesn't Need Us," makes an impassioned case for future management. Joy, echoing Butler, concentrates his concern on the reproductive capabilities of new technologies. "[R]obots, engineered organisms, and nanobots share a dangerous amplifying factor: They can self-replicate." With this capacity for reproduction, Joy warns, technology escapes our control. The article speculates on a series of "nightmarish scenarios" in which the destructive dangers of GNR (genetics, nanotech, and robotics) are "hugely amplified by the power of self-replication." In response to the terror of technological self-replication, Joy makes a plea for a 'steering of the future' such that technological evolution is tempered, certain pathways are avoided and knowledge and research is substantially re-

strained. "If we could agree, as a species, what we wanted, where we were headed and why," Joy writes, "then we would make our future much less dangerous—we might understand what we can and should relinquish" (Joy).

"Why the Future Doesn't Need Us" recognizes that far from any 'species wide agreement' on the management of new technologies, humans are strikingly blasé about the future as it arrives. "The new Pandora's boxes of genetics, nanotechnology and robotics are almost open, yet we don't seem hardly to have noticed," puzzles Joy. "Why," he asks with bemusement, "weren't other people more concerned about these nightmarish scenarios?" "Part of the answer," he writes, "certainly lies in our attitude towards the new—in our bias toward instant familiarity and unquestioning acceptance" (Ibid.). Humans appear to have an almost willful lack of awareness in the face of technological evolution. It is his recognition of this unconscious, wide ranging apathy, rather than his ultimately implausible appeals for global controls, that is, in the end, what makes Joy's future imaginings so haunting. We don't reflect upon new technology. Instead, we passionately, compulsively, addictively, engage.

When is the Future?

There is a time lag inherent in the future itself. A great gulf separates the human capacity to create the future and our ability, and desire, to comprehend or perceive the creation as it unfolds. This temporal dislocation renders us blind to the very processes that engulf us—through which copies become replicas, replicas become mutants, and mutants become us. "Both science fiction and futurism seem to miss an important piece of how the future actually turns into the present," writes Venkat Rao in his insightful article "Welcome to the Future Nauseous." "They fail to capture the way we don't seem to notice when the future actually arrives" (Rao). New technologies arrive without our detection. We mask them from ourselves in a myriad of ways. In their article "Yesterday's Tomorrow," scholars Paul Dourish and Genevieve Bell explore this theme with reference to the increasingly popular project of ubiquitous computing (Ubicomp). Beginning with Mark Weiser's foundational text, "The Computer for the 21st Century," they argue, the whole field of Ubicomp has been governed by a vision of the "proximate future"; a delayed futurism has been embedded in the project from the start (Dourish and Bell, 134–135). Yet, despite the fact that this foreshadowing is now over 20 years old, it continues today—even as cities, especially across Asia, become increasingly 'smart'—to be perceived as a vision that is waiting just around the corner, only about to arrive. "[T]he future always seems like something that is *going* to happen," writes Venkat, "rather than something that *is happening*." His article seeks to explore the intricacies of this cognitive dissonance. "How, as a species are we able to prepare for, create, and deal with, the future, while managing to

effectively deny that it is happening at all?" (Rao)

Venkat's explanation for this temporal paradox is to argue that "we live in a continuous state of *manufactured normalcy*"—a kind of mass psycho-social ruse that operates through "a mix of natural, emergent and designed mechanisms […] that work to prevent us from realizing that the future is actually happening as we speak" (Ibid.). The overall effect of 'manufactured normalcy' is to absorb the future whilst fabricating an extended present that traps us, comfortably, in the past. Our collective attitudes towards the technological future, then, function to reduce the world of tomorrow to "a crazed-familiarity" (Ibid.). Facebook is a particular symbolic example. Tapping our preschool desires for 'friends' and 'likes,' it attracts us addictively to an unprecedentedly intimate engagement with electronics. Looked at from the side of the machines, Facebook is one of the cleverest technologies out there—a highly sophisticated information suction which we both compulsively process and, simultaneously, disguise. We treat Facebook, writes Venkat, as if it were a school yearbook—assimilating into our daily life without thought or question. Yet:

> Facebook is not a Yearbook. It is a few warehouse-sized buildings containing racks and racks of electronic hardware sheets, each containing etched little slivers of silicon at their core. Each of those little slivers contains more intricacy than all the jewelry designers in history together managed to put into all the earrings they ever made. These warehouses are connected via radio and optic-fiber links to…. Oh well, forget it. It's a frikkin' Yearbook (Ibid.).

"From the moment of birth, people sense that the new environment around them is hostile," said the visionary theorist, Marshall McLuhan. "Every time an environment changes, we hasten to seek security and comfort in the old environment. […] [W]hat people see in the new is always the old thing, the rearview mirror. The future of the future is the present" (McLuhan). It is due to this persistent, inherent backwardness that the famed futurist Alvin Toffler got it so fascinatingly wrong. In his famous book *Future Shock*, Toffler predicted that the high-speed change just over the horizon would result in collective shock and mass trauma. He did not foresee the commonplace—even tedious—reality of Facebook. The shock of the future is that there is nothing shocking about it at all. "At the micro-level," writes Venkat, "I now possess a cellphone that works better than Captain Kirk's communicator, but I don't feel like I am living in the future I imagined back then, even a tiny bit" (Rao). At a talk on the Internet's next 5,000 days, technophilosopher Kevin Kelley echoes this same theme. "It is amazing," he says commenting on what has just been and also on what soon will be, "[but] we are not amazed" (Kelly).

Much of the debate around technology seeks to discern who or what drives the relationship between humans and the technologies that surround

us. Yet, in practice, these 'sides' have long disintegrated, subjected to the ongoing pattern of reproduction and mutation that marks our evolution. In this intimate interaction between the confinement of repetition, and the uncontrollable nature of change, boundaries and distinction are bound to dissolve. The language of master and slave, of source and enabler, has ceased to apply. We are not mere users of technology. We are used by technology. In this we become bit parts in a bigger toolbox of evolutionary possibilities—an infinite range of combinations of people and things that can adapt and merge with one another to create entities that are surprisingly, unpredictably, new. As John Gray puts it: "species are only currents in the drift of genes" (Gray, 6).

The whole point of AIs, argues Kelly, is that they should think differently to us. They may begin life in mimicking mode, but the more they can diverge from the human's preprogrammed path, the better. For Kelly, they'll take us on the most valuable journey—one that is anyway not an option. "I'm not worried about our place when there are a million different types of intelligence [...] we'll still find our place and we'll find other ways of thinking that are valuable to ourselves" (unknown). Moravec, in his own reflection on our predicament, encourages us to re-set the lens:

> [W]e [as humans] must [usually] perceive the world as compatible with our own existence—with a strong arrow of time, dependable probabilities, where complexity can evolve and persist, where experience can accumulate in reliable memories, and the results of our actions are predictable. Our mind children, able to manipulate their own substance and structure at the finest levels, will probably greatly transcend our narrow notion of what is [human] (Moravec, 208).

The question which of us is to be master and which will be slave leaves out our unconscious desire for future mutation. We live in an era of unprecedented technological intimacy, affect, and display. Never before have we been so uninhibited. We are constantly, compulsively touching our screens, obsessively uploading every fragment of data about ourselves. Many of us can't stop. Even touch is no longer enough. We want our technology closer, embedded, under our skins. Alongside our terror is a yearning for the alien intelligence we are in process of becoming. After all, in the end, we are evolutionary creatures ourselves. We fear change but, as our deep and profound complicity with technology makes clear, what we long for is to evolve.

Future Now

The economist Joseph Schumpeter, who detailed the boom/bust cycle that is inherent to the nature of capitalism, taught that innovation is most likely to arrive at the bottom of the wave. The invention of new technologies, one of the key drivers of the capitalist system, tends to become apparent in the trough, when resources are cheap and chasing easy money through microimprovements

to already existing technology is no longer so worthwhile. The revolutionary disruptions wrought by 'creative destruction' are thus more frequent in the downturn. By 2014, half a decade into the first great economic crises of the second millennium, something is stirring in the realm where humans meet machines. The eventual results of this mutation are still uncertain, yet some contours of the changes to come are starting to be apparent. In fields as diverse as network science, space engineering, genetics, and robotics, the closed realm of state led research, powered by enormous government expenditure, is giving way—or at least being coupled with—a whole host of cheaper, more decentered experiments that are being driven from below (*e.g.*, private space missions, citizen science, bio-hacking, DIY robotics, etc.). Alongside the possibilities opened by a new culture of entrepreneurial making is a corresponding intellectual and cultural shift toward stuff. In theoretical and philosophical circles this is being tracked by a trend towards the 'new materialism'; a transcendental turn that rejects the idealism of postmodernism which privileges thought and discourse over matter. More prosaically, our way of thinking about digital technologies is in the midst of a transformation. No longer is everything reducible to information, bits and codes, zeroes and ones.

Cyberspace has ceased to be conceptualized as an immaterial substance that is floating out there in the ether. Instead, there is an attention on infrastructure—the gargantuan structures housing blocks of computers (server farms) that are connected through concrete networks of wires and tubes (often supplied by the factories of Shenzhen). To put it somewhat reductively, we are in the midst of a cyclical return from software to hardware (which perhaps explains our current obsession with everything 3D) which more fundamentally affects who and what we are as a species. The pure age of the Internet, of hype over social media and excitement over the latest apps, is itself evolving. In its place is an attention to the more obviously physical. In the next 5,000 days we will give the web a body, said Kevin Kelly, in a talk in December 2007. 1,500 days later (in 2015) this embodiment is becoming ever more palpable. This new leap in hardware and materiality is bringing about a radical, uncomfortable, uncontrollable leap into the future; one in which machines are not just faster and cleverer than ever before but also more invasive, more embedded in our lives and our bodies. Mark Weiser's article, which propelled the field of Ubicomp, begins with the famous prophecy: "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it" (Weiser, 94). Slipping into the blank spaces of our lives, machines—wearable, embedded, implanted—are melting imperceptibly into the ordinary environment. At the limit technology shrinks so dramatically that it becomes ambient at the cellular level, disappearing as nanotech into cells and dust. "Its power becomes all the more

strengthened, more insidious, more familiar—and so more 'natural"' (unknown).

Most of what is being produced in the latest wave of 3D manufacturing, is crude: little plastic doodads, a pair of shoes, a coffeemaker, a handbag. Drones, outside of the military context may well enable us to re-think ideas of air travel, surveillance, and territory, but for now the dreams are more mundane: wind-surfing cameras that help perfect your golf shot, or delivery units that pick something up from the grocery store. In their actual output, the hardware innovations that are occurring today recall the computer culture of the mid-1970s. If 3D printers were videogames, we would be in the days of *Pong*. Nevertheless, experiments with 3D printers have begun in everything from food to body parts, and fear about robots cutting us out of the workforce are gaining ground.

These technologies are also following a well-trodden trajectory becoming ever cheaper, smaller, and easy to use. This will fuel their attendant proliferation. A whole host of companies now produce the machines for domestic use. Soon, no doubt, there will be a 3D printer in every home, and social robots may well be providing the vigilant company to the elderly who live alone. "The present machines," wrote Samuel Butler in 'The Book of the Machines,' "are to the future as the early Saurians to man. The largest of them will probably greatly diminish in size. Some of the lowest vertebrate attained a much greater bulk than has descended to their more highly organised living representatives, and in like manner a diminution in the size of machines has often attended their development and progress" (Butler, 127). Technology is plotting its own evolution and the purely human advantage is becoming increasingly small. New fusions and adaptions between the organic and the near organic continue. Silicon, once sand—the second most common element built into the earth's crust—carries deep within it an ironic reminder of our own amphibious evolutionary past. Our roots, as cybernetic organisms, come from the same source. Though we are often blind to the machines that surround us—technology is the ocean within which we swim—these exchanges and interactions fuel us. As evolutionary beings, we are willing participants, hungry to transform.

In Shenzhen companies, factories and markets are adjusting to the new products and modes of manufacturing that they bring. A realization is dawning. The age of the copy is over. It is time to mutate.

Bibliography

Barboza, David. "In China, Knockoff Cellphones Are a Hit." On *The New York Times*. Published April 27, 2009. https://www.nytimes.com/2009/04/28/technology/28cell.html

Bergson, Henri. *Creative Evolution*. Translated by Arthur Mitchell. Mineola, NY: Dover Publications, Inc., 1998.

Bowyer, Adrian. "The Self-replicating Rapid Prototyper — Manufacturing for the Masses." Paper presented at *8th*

National Conference on Rapid Design, Prototyping & Manufacturing, High Wycombe (June 2006). https://reprap.org/wiki/PhilosophyPage
Butler, Samuel. *Erewhon*. Mineola, NY: Dover Publications, Inc., 2002.
Deleuze, Gilles and Félix Guattari. *Anti-Oedipus: Capitalism and Schizophrenia, Volume 1*. Translated by Robert Hurley, Mark Seem, and Helen R. Lane. Minneapolis, MN: University of Minnesota Press, 1983.
Dourish, Paul and Genevive Belle. "Yesterday's tomorrows: notes on ubiquitous computing's dominant vision." *Personal and Ubiquitous Computing* Vol. 11 (2007): 133–143.
Gershenfeld, Neil. "How to Make Almost Anything: The Digital Fabrication Revolution." *Foreign Affairs* Vol. 91, No. 6 (Nov./Dec. 2012): 43–57.
Gray, John. *Straw Dogs: Thoughts on Humans and Other Animals*. London, UK: Granta Books, 2003.
Joy, Bill. "Why the Future Doesn't Need Us." On *Wired*. Published April 1, 2000. https://www.wired.com/2000/04/joy-2/
Kelly, Kevin. "The next 5,000 days of the web." Presented at the *2007 EG Conference*. https://www.youtube.com/watch?v=yDYCf4ONh5M
Lindsay, Greg. "China's Cell Phone Pirates Are Bringing Down Middle Eastern Governments." On *Fast Company*. Published June 14, 2011. https://www.fastcompany.com/1758927/chinas-cell-phone-pirates-are-bringing-down-middle-eastern-governments
McLuhan, Marshall. "The future of the future is the present." On *Marshall McLuhan Speaks Special Collection* (1967). https://www.marshallmcluhanspeaks.com/prophecies/1967-the-future-of-the-future-is-the-present/
Moravec, Hans. Robot: *Mere Machine to Transcendent Mind*. Oxford, UK: Oxford University Press, 1999.
Rao, Venkatesh. "Welcome to the Future Nauseous." On *RibbonFarm*. Published May 9, 2012. https://www.ribbonfarm.com/2012/05/09/welcome-to-the-future-nauseous/
Toffler, Alvin. *Future Shock*. New York, NY: Bantam Books, 1971.
Weiser, Mark. "The Computer for the 21st Century." *Scientific American* Vol. 265, No. 3 (September 1991): 94–104.