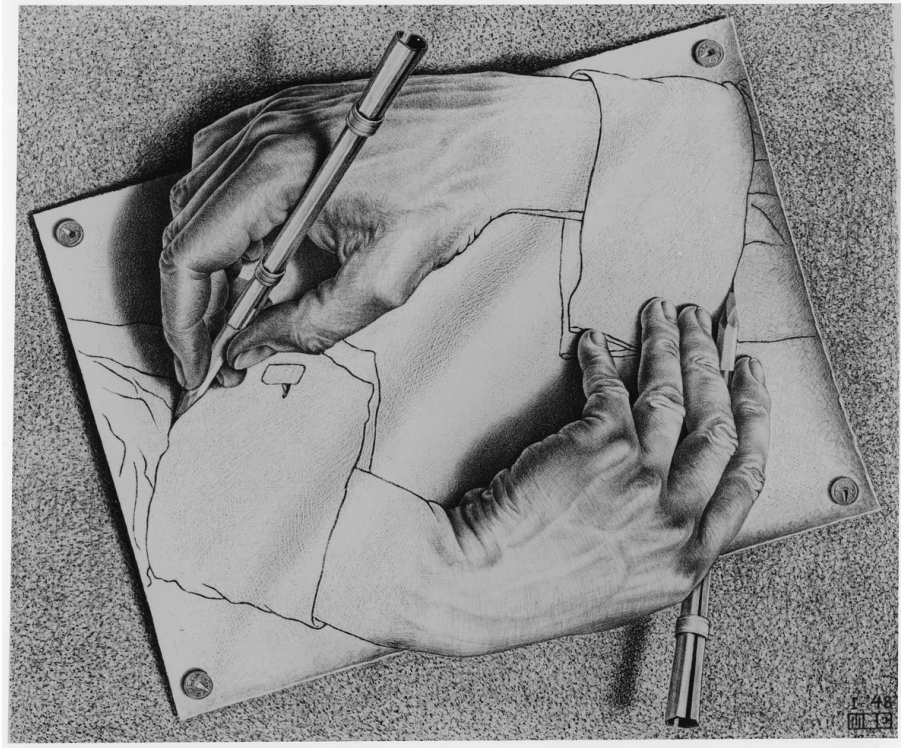{...}

Worlds within worlds

{…}

In his later adventures[1] the Phantom became an ontological engineer, a surrealist intent on remaking reality, wreaking havoc with inventions like the reverse telescope, an instrument with which he did not merely passively observe the heavens, but painted new nebulae and constellations upon them. The scale of his Faustian pranks became cosmic, and his connection with his origins more tenuous. In the end he became a human outline bounding a hole in space; a cipher marking a tear in the spatiotemporal fabric. — An observer summarized what he had done as follows: "He's hacked into the source code of the cosmos!"

Was that my ambition all along? — Was that what Newton wanted in the end? Was this the aim of the alchemist? — Translated into the modern idiom (i.e., dumbed down), I suppose it does sound like that. — This was the Promethean ambition, the ambition of Manfred: to be the equal of the gods, the architect of a new system of the world.

Of course this is obviously impossible, but there is always that Mephistophelean philosophical attitude, the spirit that negates, the need to find some way to conceive of the inconceivable, and this does suggest a way to do it: one might imagine that there was some kind of toolkit employed by the Demiurge for the assembly of universes; a hacker would call it an API,[2] a language mediating the interface between the programmer and the routines that do the real work at a lower level.

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[1] For some reason the provisional title was *Robot Lawyers from Hell*, but why exactly now escapes me. Probably that one was just burning a hole in my pocket, as it were.

[2] Applications Programming Interface. — Ordinarily I would scorn the use of an acronym in this context, but I've been using it for so long that I can scarcely conceive of any other way to refer to it. Even though I can literally feel the blood vessels that supply my brain constricting as I do so.

— Well. — In the beginning was the Word. — It does sound familiar.

<p align="center">{...}</p>

But I don't think I ever had a fundamentally paranoid view of the cosmos; just a sense of unrealized possibility. And the suspicion that, as Gell-Mann used to say, anything that is not forbidden is compulsory.[3] If things could be much more complicated than they appeared, then surely they had to be. — This was the principle of the fecundity of Nature: that She always had more imagination than you did.

<p align="center">{...}</p>

What is the fundamental problem? the relation of the mad scientist to the world in which he finds himself is that of a fictional character to the text in which he has been composed; he is the captive of narrative, he cannot claim the rights of authorship. He is ontologically derivative.

And how to escape that? — By authoring your own world, of course; but consider this twist: suppose you were to create a copy — perhaps perfect, but leave that question open for the moment — of the "real" world as it is; in extremis a Laplacian machine, whether digital or analog we aren't sure but — again — leave the question open. — Over *this* domain, presumably, you would then have the power of godlike command. — Suppose then that you begin rewriting its rules, indulge yourself in the sport of the Phantom. Is that the same?

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[3] According to George Zweig, this version of the principle of plenitude was known as the Totalitarian Principle. See his contribution to the Gell-Mann Festschrift, op. cit.

The question of whether you could tell the difference between the world and a sufficiently complex simulation of it should properly be an issue in the higher-order logic of quantum mechanics, but as usual it's more entertaining to discuss it by referring to a movie; in this case *The Thirteenth Floor.*[4] This looks like an exercise in the genre popularized by *The Matrix*, but it is actually a remake, of sorts, of a television movie[5] Rainer Werner Fassbinder tossed off in 1973 called *Welt am Draht*; that, in turn, was based on a 1964 novel by Daniel Galouye called *Simulacron-3*, which of course owed a great deal to the works of Philip K. Dick,[6] and with due diligence we could no doubt trace its antecedents back through Borges to St. Augustine, had we but world enough and time.[7] — At any rate, *The Thirteenth Floor* confirms the wisdom of John Sayles, that all science fiction movies are basically *The Tempest*,[8] and involve a fundamental

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[4] Dir. Josef Rusnak, 1999.

[5] Two parts, 3 1/2 hours, the digital restoration of 2010 may still be on YouTube; there is an elegant little essay about it by Ed Halter titled "World on a Wire: the Hall of Mirrors" on the Criterion website. My personal impression, having seen it only once, was that Fassbinder in between quotes from philosophers was trying his hand at a standard action movie, as if he had been contemplating selling out and going to Hollywood.

[6] Most relevant in the present context is *The Man in the High Castle* [1962], which presents an alternative history in which the Axis won the Second World War and occupied the United States. The Dickian peculiarity is that the characters in the novel gradually come to the realization that they *are* characters in a novel, and their reality is fictitious. The I Ching plays a prominent role, and Dick claimed to have employed it in the composition of the text. (He also, quite obviously, employed a lot of drugs.)

[7] Within the science fiction genre the theme is best exemplified, as usual, by a story of Robert Heinlein: "They", published in *Unknown*, April 1941. In this a man is confined to a mental institution because he thinks the world is an illusion created by malevolent beings who are deliberately trying to deceive him. The punchline, of course, is that he is right.

[8] Ironically he states this axiom in the context of his explanation of how he ended up writing a movie for Corman (*Battle Beyond the Stars* [1980]) which was pitched to him as "*The Seven Samurai* in outer space." Not at all the same.

triangle of a sorcerer/mad scientist, his beautiful daughter, and a dashing young shipwrecked mariner/lab assistant/whatever who falls for her. In this case the mad scientist is removed from the plot at the outset and the beautiful daughter isn't really his daughter, at least not in this reality, but— anyway — the mad scientist has constructed a computer simulation/virtual world which exactly duplicates Los Angeles in the 1930s, in which he and all of his associates have doppelgängers which they can inhabit (as ghosts in the machine) by some curious process which involves lying down in a sensory deprivation tank, putting on a standard-issue Movie Science wire beanie, zooming through some light-show hyperspace, and waking up in an alternate reality. He is murdered under mysterious circumstances, and the protagonist, his assistant, falls under suspicion and in self-defense must conduct an investigation which involves repeatedly inserting himself into the simulation. — The conceit of the thing is that the doppelgängers in the constructed reality pass the Turing test with respect to themselves, carry on their lives independently when they aren't being possessed, and experience their possessions as episodes of amnesia. — A mysterious woman appears claiming to be the daughter of the deceased. Complications ensue. — The punchline (Spoiler Alert, as they say) is that just as Los Angeles in the 1930s is a simulation running in the Los Angeles of the 1990s, so Los Angeles in the 1990s turns out to be a simulation running in the Los Angeles of the 2050s; the protagonist finally pops out of the 90s into the future, takes possession (revenge of the avatar!) of the body of the guy who had been playing him to murder the mad scientist, and is reunited with his mentor and the girl, who in this dimension really is his daughter. Presumably they all live happily ever after, or at least until they discover Los Angeles in the 2050s is a simulation running in Los Angeles of the 2110s.

So what is actually interesting about that? We have the picture of a simulation running in a simulation running in nominal reality, but this has to remind us of the story about the earth

being a flat stone resting on the back of four elephants standing on a turtle; why stop there, or anywhere? The chain could just as well be infinite in both directions, meaning that we would naturally be looking for a fixed point, i.e. a simulation which runs in itself.[9] — So isn't that the right idea? That reality, like the Ego, should be a simulation of itself?

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There is also a bullshit probability argument (of course — this is the veritable Golden Age of bullshit probability arguments) that purports to establish that what we are living in is almost certainly a simulation, presumably some kind of immersive computer game, and not "real" reality, because — but you thought Descartes was paranoid? it is to laugh — because, for instance, we can imagine the world as a story written down, say, in some volume of Borges' library, and then point out that there are an arbitrarily large number of prefaces and postscripts which could purport to be frame stories into which that volume can be embedded. — If this reminds you of what Goodman said about "grue" of course no fucking wonder. — But, I reiterate: any frame story in which this one is embedded would by the same argument itself almost certainly be a simulation embedded in something else, and the question again would be whether there is any natural limit, a simulation of itself, or at least some simple closed chain (cf. *Dead of Night*), and meta-Fassbinder wins again.

Moreover this argument makes it obvious that the world could be a simulation in an arbitrarily large number of alternate realities *all at once*; and thus that (no surprise) there are more things in heaven and earth than are dreamt of by the Wachowski

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[9] Yes, this really is the ontological argument. I love this shit. — Is this the moment when I remark, aside, that Georg Cantor schooled himself with a study of the medieval theologians? Maybe.

siblings. — The real question, obviously, is what it would mean for everything to be a simulation of everything else.

{...}

Of course the real question would never occur to a computer geek,[10] and in the post-*Matrix* era it's become fashionable to speculate that the world we see is nothing but some kind of (first-order) simulation; there are even rumors that a few crazy Silicon Valley billionaires are funding a project to bust out of it.[11]

(The mythology of *The Matrix* is just that of Plato's Cave, with the curious inversion that the people who have seen the revelation and have become enlightened are the ones living in caves underground, while the prisoners of illusion dwell in a very comfortable unreality.)

About which I have to say [a] this is wonderfully paranoid and [b] I have to admit that if Isaac Newton were alive today he would probably be looking for the backdoor. Just as he looked

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[10] Let me reiterate that, as a class, these are people with very limited educations, and a very poor grasp of abstractions; economic incentives have conspired to produce from otherwise promising raw materials an entire generation of failed scientific and mathematical talents whose intellectual developments have been distorted and compressed into a single, infinitely narrow, dimension.

[11] "Many people in Silicon Valley have become obsessed with the simulation hypothesis, the argument that what we experience as reality is in fact fabricated in a computer; two tech billionaires have gone so far as to secretly engage scientists to work on breaking us out of the simulation." — Tad Friend, "Sam Altman's manifest destiny," *The New Yorker*, October 10, 2016. — Speculation centers on Altman and Elon Musk. See also: Andrew Griffin, "Tech billionaires convinced we live in the Matrix are secretly funding scientists to help break us out of it," *The Independent*, October 6, 2016; Janet Burns, "Elon Musk and friends are spending millions to break out of the Matrix," *Forbes*, October 13, 2016.

for the philosopher's stone and tried to read all human history from Biblical chronology.[12]

Nonetheless it's difficult to believe these idiots really know what they are talking about. Let alone how to go about it.

The movies suggest there would be telltales: Fassbinder inserts rewrites of history and reality (with characteristic cues on the soundtrack) which perplex his protagonist; in *The Thirteenth Floor* people driving out into the desert discover the interstate comes to an end and the graphics fade out into wireframe. — Similarly in paranoid moods one may have wondered whether the Moon really had another side. Though when the first Russian orbiter circled round the back, sure enough there it was. (American paranoiacs then argued the photographs were Commie fakes, since the back side didn't look the same as the front, but when our own spacecraft got there of course they saw the same thing.) — But you really don't expect something so obvious.

What you might guess is more likely is something subtler — like, say, rounding error: as I discovered to my chagrin, on primitive Macs without floating-point processors a rotating cube rapidly shrank to a point, taking the fun out of premature attempts at 3D graphics; perhaps similar computational limits become apparent when the Laplacian machine is put under stress. Or perhaps if a random process is repeated sufficiently many times the answers begin to cycle. — Some signature of finite computational

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[12] For instance he predicted the second coming of Christ would occur in 1948. Fortunately this is not widely known, or it would further reinforce already insufferable Boomer narcissism.

capacity might exist.[13] — And we do, admittedly, see some such indications: the Bekenstein bound on information capacity, e.g.[14]

It is possible that the quantum theory of gravitation may explain the physical world as a tangled web of spin networks, a sort of monadology of quantum computers; which may prove possible to translate into the cinema of kung fu and black leather, who knows.

But the commonplace opinion is not so sophisticated. Weinberg summarizes it as follows:

> Wolfram ... suggests that space consists of a network of isolated points, like cells in a cellular automaton, and that even time flows in discrete steps. Following an idea of Edward Fredkin, he concludes that the universe itself would then be an automaton, like a giant computer. It's possible, but I can't see any motivation for these speculations, except that this is the sort of system that Wolfram and others have become used to in their work on computers. So might a carpenter, looking at the moon, suppose that it is made of wood.[15]

No shit.

{...}

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[13] One might guess (as I did) that the Heisenberg uncertainty principle could be interpreted in this fashion, but the idea doesn't work. As Von Neumann pointed out long ago, any attempt to reproduce the results of quantum mechanics by using (real-valued) probabilities to explain incompleteness of information must fail.

[14] The surface area of a black hole can be interpreted as an entropy, and measured in bits; this defines an (enormous) upper bound for the information content of the volume contained by any surface of that area.

[15] Steven Weinberg: "Is the universe a computer?" *New York Review of Books*, 24 October 2002. (Review of Steven Wolfram, *A New Kind of Science*.)

That a sufficiently detailed computational simulation might as well be real is hardly a new observation. But suppose you regarded this as a branched reality: a subprocess taken seriously as a parallel world on its own. Has this some correlate in the quantum-mechanical formalism?

Suppose you *compute* the cat alive and the cat dead, in other words. Can the states be superimposed? Can a computed cat be superimposed with a real cat? Is there an ontological distinction between them?

{...}

The analysis of the simplest ideas can lead to enormous complications. Curry remarks somewhere that he only invented combinatory logic because he couldn't understand substitution.[16] It is only typical that attempting a complete analysis of such a triviality entailed the creation of a new branch of mathematics.

{…}

Before quantum mechanics and the digital paradigm took command of the universe of discourse, the more natural conjecture was that the universe is scale-invariant: that worlds might be contained within worlds — physically, *ad infinitum*.

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[16] About this problem Stoy [*Denotational Semantics*, MIT Press 1977] remarks that it is much harder than it looks, and his treatment will show that Hilbert, Gödel, and Quine among others all had it wrong. — And this only in the limited context of *computer* languages. See also the discussion of Abelson and Sussman in *Structure and Interpretation of Computer Programs*. [Cambridge: MIT Press, 1996.]

Leibniz, the inventor of infinitesimals, in a letter to John Bernoulli[17] which also appeals (of course) to the evidence of "the animalcules of the microscope" as proof of the indifference of the scheme of things to scale, states categorically that

> Nature knows no limits. And so it is possible — indeed, it is necessary — that there should be worlds not inferior to our own in beauty and variety, in the smallest bits of dust, in fact, in atoms. And though this may seem even more wonderful, nothing prevents animals from passing over into such worlds when they die. For I am of the opinion that death is nothing but the contraction of an animal, as generation is nothing but its unfolding.

— an interesting corollary of the principle of plenitude, and (in fact) as plausible a mechanism for the transmigration of souls as any. — In a digital, or any chain-of-being interpretation of the hierarchy, no more than a countable number of variations on the theme of the physical universe might be contemplated; but in this version we might replicate the Cantor set, and generate an uncountable number of variations, rendering more plausible the idea that Library-of-Babel extensions of every world-thread might exist in some replica of the original.

(Though of course there would be an *infinite* manifold of possible extensions, and ……. .)

<center>{...}</center>

Swift:

> So, naturalists observe, a flea
> Hath smaller fleas that on him prey;
> And these have smaller fleas to bite 'em,

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[17] November 18, 1698; cf. Loemker pp. 512-513.

And so proceed ad infinitum.
Thus every poet, in his kind,
Is bit by him that comes behind.[18]

{…}

Curiously enough, this later became a standard trope of pulp fiction; see for instance Ray Cummings, *The Girl in the Golden Atom*.[19] — His hero (referred to only as "the Chemist," in obvious imitation of Wells), says[20]

> I believe that every particle of matter in our universe contains within it an equally complex and complete a universe, which to its inhabitants seems as large as ours. I think, also that the whole realm of our interplanetary space, our solar system and all the remote stars of the heavens are

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[18] Swift half-seriously assumes poets must be imitators of their predecessors, and that entropic decline is therefore inevitable; see previous remarks on Cervantes — which were equally inspired, now that I think of it, by the battle of the Ancients and Moderns in *A Tale of A Tub*.

[19] Other variations include the later (famous) story "He Who Shrank", by Henry Hasse (included in Raymond J. Healy and J. Francis McComas, eds. *Adventures in Time and Space* [New York: Random House, 1946]) and the concluding ellipsis of the remarkable film *The Incredible Shrinking Man* [Jack Arnold, 1957; from a novel of Richard Matheson].

[20] [1922] Chapter I, A Universe in an Atom.

contained within the atom of some other universe as gigantic to us as we are to the universe in that ring.[21]

— within/without which, etc. — though now it is natural to ask the question: if we shrink/expand far enough, do we eventually return to the universe in which we started?[22]

Cummings uses this as the premise for a pulp adventure novel, but later variations on the theme were more explicitly Leibnizian; e.g. Henry Hasse's "He Who Shrank",[23] in which the protagonist, the hapless laboratory assistant of a mad scientist, is fed a potion which causes him to shrink indefinitely. (In a Wow Finish typical of that era, after adventures without number his shrinkage finally ceases when he arrives on a blue planet which — gotcha — turns out to be the Earth.)

{…}

Scaling invariance would make it possible in principle to construct a Laplacian machine — which would, of course,

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[21] The influence of Wells is (as stated) obvious; the direct influence of Leibniz less so, since it is likely the popular conception of the atom as a miniature solar system encouraged this line of speculation in Cummings, et al. — As for other influences: "The Chemist produced two small paper packages from his wallet. 'These drugs are the result of my research,' he said. 'One of them causes contraction, and the other expansion, by an exact reversal of the process. … I have made them as you see, in the form of tiny pills, each containing a minute quantity of the drug. It is by taking them successively in unequal amounts that I expect to reach the desired size.'" — One pill makes you larger/And one pill makes you small… .

[22] Consistent with a popular conception that supposes, roughly, that if you count to infinity you get back to the beginning again. I suspect this may also have been an intuitive motivation for the idea of the Eternal Recurrence. — One should note as well that in some of the crazier spatialized-multiverse versions of inflationary cosmology domains/"universes" might be supposed to be replicated, and one can "compute" an exponentiated-astronomical number representing the distance from here to here, taking the long way around.

[23] *Amazing Stories*, Vol. 10, Number 11 (August 1936); pp. 13-56.

instantiate the paradoxes of complete prediction and/or temporal feedback loops — which, in turn, bear a curious resemblance to the wormhole time machine. — What would a scale model of the universe look like? exactly as Thorne pictured the terminus of a wormhole for Nolan in *Interstellar*, a shiny crystal ball filled with stars.

Quantum mechanics in a nutshell, on the other hand, is the observation that you can't build a scale model of an atom — not at all obvious before the fact, indeed J.J. Thompson literally tried to do it in the laboratory after he discovered the atom had positive and negative electrical constituents.

You have to wonder if there is some connection here. Is granularity necessitated by the fact that scaling invariance entails paradox?
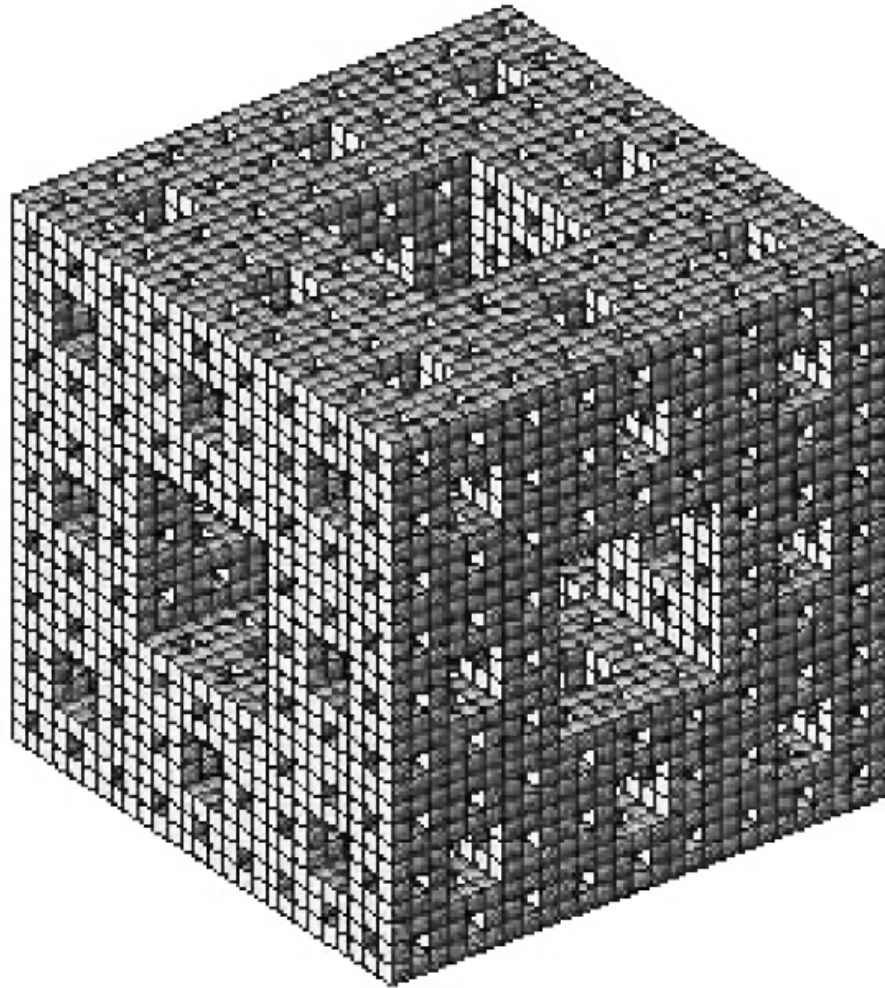
Not possible.

{...}

The regress

A variation: a movie which is contained as a flashback within itself. — This suggests the problem of classifying the types of temporal loops.

(And why couldn't it work like the Cantor set? between moments A and B interpose two intervals repeating the interval [A,B] —)

{...}

There is also a sort of Gnostic version of the infinite descending chain of simulations, in which each contradicts the one enclosed within it — something like the perverse Zeno machine controlling a bulb which begins off at time 0, turns on at t = 1/2. turns off at t = 1/4, and so ad infinitum — and then you ask whether it is on at t = 1 — but this by construction has no fixed point, no stable limit: the gods deceive us, but they in turn are deceived by their own creators, and so on until we tire of untangling the twists in the plot.

{...}

Charlie Kaufman employs a Borgesian variant of the simulation device — actually, two of them — in *Synecdoche, New York* [2008]: Philip Seymour Hoffman portrays a theater director who conceives of a vast production, staged in a warehouse in New York City, in which actors play the roles of real people, including the director and the actors in the production themselves. In the

version in the original screenplay,[24] the production is intended to be a simulacrum of the life of the city around it (the mock-adjective "verisimilitudinous" is repeatedly applied and considered for a title) and the necessity of its incorporating a potentially-infinite nested series of subwarehouses in which subproductions are being staged is explicitly recognized; in the film version this doesn't seem to be carried past one or two steps, but the interaction between the actors and the people they are portraying is continuous and humorous, and a confusion develops between them which suggests that in creating fiction it isn't obvious who is writing whom. In neither version is the project ever completed, though Hoffman dies trying.[25]

Kaufman used the device originally in *Being John Malkovich* [Spike Jonze, 1999], the plot of which turns, famously, on the premise that by crawling into a tunnel hidden behind a filing cabinet in an office in New York, anyone can enter the mind of John Malkovich and inhabit his experience for fifteen Warholian minutes. Eventually Malkovich discovers what is going on, tries it out himself, and finds himself in an Alice-in-Wonderland world where everyone is his clone and every word is "Malkovich." — Though of course Malkovich inhabiting Malkovich *is* Malkovich.

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[24] Preliminary drafts and shooting scripts can be found online in various locations, notably simplyscripts.com; Kaufman's scripts are of particular interest not simply because he is *sui generis*, but because his original conceptions for *Being John Malkovich*, *Eternal Sunshine of the Spotless Mind*, and *Adaptation* (among others) were much weirder and funnier than the versions that finally found their way to the silver screen.

[25] Truth as usual conceding nothing to fiction, the Russian Ilya Khrzhanovsky has recently concluded a fifteen-year project based on the life of the physicist Lev Landau called, simply, *Dau*, which has been conducted on similarly verisimilitudinous principles and involved a cast of 400 principals and 10,000 extras. Though it began as a simple biopic, it turned into what has been described as "a parallel world," less a film set than an immersive environment in which as a sort of offhand corollary 700 hours of footage were shot and have, preliminary to roadshow exhibitions in Paris, London, and Berlin, been edited into 13 feature films. See Steve Rose, "Inside *Dau*, the 'Stalinist Truman Show'," *The Guardian*, 26 January 2019.

There could be no difference. (This *is* the being of John Malkovich.)

<p style="text-align:center">{...}</p>

Still earlier I'd tried this out myself, in the context of a computer game [*Labyrinth*, 1985]: in the text-adventure genre, which briefly fascinated me, one would enter short descriptions of possible actions such as "Pick up sword," "Pull coin from pocket," etc., to navigate an imagined landscape, solve a series of problems, and acquire a legendary treasure (or whatever); it occurred to me that the semantic possibilities of even a very simple linguistic syntax would allow for the solution of the puzzle presented, e.g., by a troll guarding a bridge demanding payment of a toll of fifty cents when you only had a quarter, if you put the quarter in your pack (you always had a pack), put the *pack* in the pack, put *yourself* in the pack, reached into the pack *within* the pack, pulled out the first quarter, picked up the second quarter, and then got out of the top-level pack and handed the two coins to the troll. Because nothing in this alternate reality forbade an infinite descending epsilon-chain, did it? though it did seem unlikely anyone but a logician would think of this solution to the puzzle.[26]

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Von Stroheim was famous for insisting on building his own sets, in grandiose dimensions — the replica of Monte Carlo he created for *Foolish Wives* [1922] was said to have cost three quarters of a million dollars, a ton of money in the Twenties. (MGM, then still willing to write his checks, bragged about it in their advertisements for the film.) Probably he was just trying to outdo Griffith's Babylon, but there was method in his control-freak madness, and you have to suspect that if he'd made a movie

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[26] But again, compare the wormhole.

about Hollywood he would have claimed the original was inauthentic, and built a copy on the other side of the hill. — Moreover, you have to suspect he would have been right.

(See also Borges, "On Exactitude in Science".)

{...}

In re *The Tempest* as a model for the science fiction scenario: the purest example is *Forbidden Planet* [Fred M. Wilcox, 1956 — IMDB, as always in on the joke, lists Shakespeare first among the writers, albeit "uncredited"], though there are many variations on the theme, older and newer: e.g. the best movie version of *The Island of Dr. Moreau, Island of Lost Souls* [Erle C. Kenton, 1932], starring Charles Laughton[27] was a precursor (the daughter is the Panther Woman, the male protagonist is a literal castaway washed up on the shore); the serials *The Whispering Shadow* [Albert Herman and Colbert Clark, 1933](no island but a sort of wax museum with automata, Bela Lugosi as always is the definitive Mad Scientist) and *The Lost City* [Harry Revier, 1935] (the jungles of the Dark Continent, mad scientist enslaved by even madder scientist); *The Thing* [Howard Hawks pretending to be Christian Nyby, 1951] (Arctic outpost), *Tarantula* [Jack Arnold, 1955] (isolated desert laboratory); *Terror From the Year 5000* [Robert J. Gurney, Jr., 1958] (literally an island); and *Them!* [Gordon Douglas, 1954] — desert again but no unity of place, father and daughter are both scientists, compare of course *Ant-Man* [Peyton Reed, 2015]. — Genetic mutation of scenarios in the Fifties (no doubt the result of radiation from all those atom bomb tests) produced the inversion of making the mad

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[27] And photographed by the great Karl Struss! who was also cinematographer for *Rocketship X/M* [Kurt Neumann, 1950] and *Kronos* [Kurt Neumann, 1957], the best specimens of black and white cinematography in Fifties science fiction; he worked with Neumann again on the classic *The Fly* [1958], this time in color.

scientist the romantic lead and the father a general, see *Earth Versus the Flying Saucers* [Fred F. Sears. 1956] or for that matter the backstory of The Incredible Hulk; Indiana Jones and the Ravenwoods are another variation. *Ex Machina* [Alex Garland, 2015] also follows this template, but is perhaps more closely related to the variation (predating cinema but anticipating it)[28] in which the sorcerer's daughter is an automaton (*L'Eve Future*, Villiers de L'Isle Adam, 1885); compare the related variations in which the sorcerer isn't even there, just his automated virtual-reality dinner party (*La invención de Morel*, Adolfo Bioy Casares, 1940),[29] and *Sky Captain and the World of Tomorrow* [Kerry Conran, 2004], in which the sorcerer is dead but his robots labor on to fulfill his mad vision.

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[28] Cf. Geoffrey O'Brien, *The Ghost Opera*. [*The New York Review of Books*, 5/30/1991.]

[29] This was filmed as *L'invenzione di Morel* [Emidio Greco, 1974.] Here the action does, in fact, take place on an enchanted isle, and the shipwrecked mariner (quite understandably) falls in love with the apparition of Anna Karina.

"It would be like a character in a novel beginning to write his own story." — This sounds strange, but novelists testify it happens all the time.[30][31]

But suppose a character in a novel were an author himself, and wrote a tale within a tale. (As John Barth never tired of pointing out, this postmodern device goes back to the *Arabian Nights*.) At second (or is this third?) order, it could easily be ambiguous who was writing whom.

And passing to the limit, then?

{...}

You say that that the character doesn't "really" write himself into the story, that there is some unconscious process of emulation, some internal laboratory of the imagination in which these golems are assembled and tested which can be modeled and explained in a purely mechanistic fashion, and of course this is true. — But the point is not that no such explanation exists (one always does); it is that this is not the *only* possible explanation,

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[30] Elmore Leonard once described his process to Martin Amis as auditioning characters in the opening scenes, finding out which ones could talk, and then giving them free rein. In every book, he said, some minor character would be introduced en passant, usually as a means of providing a needed piece of information, and then would come to life and elbow his way into the plot.

[31] Obviously these could be multiplied at will — but — Harold Pinter in his Nobel Lecture [2005]: "It's a strange moment, the moment of creating characters who up to that moment have had no existence. What follows is fitful, uncertain, even hallucinatory, although sometimes it can be an unstoppable avalanche. The author's position is an odd one. In a sense he is not welcomed by the characters. The characters resist him, they are not easy to live with, they are impossible to define. You certainly can't dictate to them. To a certain extent you play a never-ending game with them, cat and mouse, blind man's buff, hide and seek. But finally you find that you have people of flesh and blood on your hands, people with will and an individual sensibility of their own, made out of component parts you are unable to change, manipulate or distort."

but that another picture may be simpler to employ in practice, and that we have, always, the principle of the Grin Without A Cat to remind us that the progress of theoretical explanation can carry us seamlessly from one ontological framework to another while leaving all our results unchanged. — It is not so much that reality is plastic, but that the symbiotic composite formed from the irreducible (perhaps unnamable) facts and their representations in imagination is. — And so you can't say, finally, that either author or character is an unmoved mover in this picture. They are related, that is all; there is a sort of differential equation describing their interaction; the motion of one is answered in the other.

(Here we might launch into a theory of demonic possession, but at that point, obviously, it is time to take leave of this line of speculation.)

{...}

When you say that a character takes on life, you mean that it has an internal logic that demands certain words and actions. It is like deriving the consequences of a set of assumptions. The internal mechanism, once described, entails behavior you may have anticipated.

This is the literary equivalent of a mathematical model. It is another kind of simulation.

There are doubtless hundreds of characters in Shakespeare that are more vivid than anyone you have met in real life. — The same applies to Quixote, Ivan Karamazov, Emma, Benny Profane.

You have the feeling with these that you do with the figures of geometry, that the diagrams you scratch in the dirt are just pale

shadows of unrealized ideals. That when real people speak, they are trying to be these characters, not the other way around. — It is unimportant whether Cagney talked like real gangsters or not; as soon as he opened his mouth, real gangsters were all trying to talk like Cagney.

{…}

Additional notes on *Welt am Dreht*:[32]

— The action sequences must have been incorporated in part because the lead, Klaus Löwitsch, was an excellent athlete who had trained as a dancer and found it easy to climb fences, vault over railings, etc.

— It is explicitly stated that the computer (Simulacron) can be used to model the world to make predictions; as a scale model it can be employed as a kind of Laplacian machine.

— There are hints of the possible infinity of the hierarchy.

— The influence of *Alphaville* is obvious (Eddie Constantine even has a cameo) — there are lots of gleaming modern interiors (with overtones of Weimar decadence).

— The visual logic of *Welt am Dreht* makes it clear that Fassbinder saw what the hierarchy of simulation entailed: in every shot, in every setting, windows and mirrors reflect the figures of the personae of the drama; often their images are also distorted by refracting glass. Even when the protagonist flees to what is supposed to be a rustic cabin a la Heidegger, its interior is hypermodern (with designer furniture) and there are mirrors everywhere. — At the denouement, the protagonist waves a gun

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[32] I did finally acquire a copy and watched it again; an experience which will bear repetition.

around and aims it, not at the female intruder, but *at her reflection.* — Fassbinder must have known, intuitively, that the paradox he was addressing was also that of self-consciousness. — More than that, he must have seen that the fundamental idea is one of representation, and that the correspondence between object and reflection need not be, as a category theorist would put it, iso:[33] not exact, not a perfect reproduction, not one to one. No more than what is captured by film is an exact reproduction of physical reality.

That is what makes memory possible, this form of data compression, the reduction of information from one copy to the next. — It is not an analog process, like copying a tape, which would reduce everything to a formless blur in a few steps. But something more like a digital copy, reducing the content of memory until some irreducible remnant remains.

{…}

Zhuangzi: "Now I do not know whether I was then a man dreaming I was a butterfly, or whether I am now a butterfly, dreaming I am a man—"

But once the question is posed this way it's obvious the possibilities are not mutually exclusive, that everything might as well be dreaming everything else; that the universe could be defined as that which dreams itself. — Unsurprisingly, this is also a definition of the Ego.

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[33] Really I should make this a functorial correspondence, but though the game of inventing mathematical metaphors is amusing, it is not infinitely diverting; and as Einstein said to Heisenberg in a related context, a good joke should not be repeated too often.