Portals in Duchamp and Pynchon[1]

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In an earlier essay, I explore traces of the works and writings of Marcel Duchamp in Thomas Pynchon's fictions, particularly highlighting chess allusions as they inform the relation between geometry and hegemony, and the question of complicity in avant-garde discourses.[2] Duchamp and Halberstadt's treatise on the endgame, *Opposition et les cases conjugées sont réconciliées* (1932), addresses the complicitous arrangement of the two players at endgame as they conspire to delay

Fig. 1: From *Opposition et les cases conjugées sont réconciliées* 93

the end of the endgame as long as possible. The players agree to superimpose mirror symmetry on the sixty-four squares of the chessboard and to recalculate the precise "opposition" or "equilibrium" between the Kings after every move. They do so to avoid a "breach of opposition" which would bring on the catastrophic end. This act of geometric superimposition involves mapping the chessboard into Zones controlled by each King, and then requires each player to fold and invert the geometry of the chessboard so the Kings seem to be emerging out of the same square. The fold in the chessboard is called a "hinge," and each player must relocate the hinge after each move to control for the complex, perpetually shifting geometry of opposition. Each player then plots the move of the King in such a way that the opposition, also called equilibrium (a term from thermodynamics), remains intact. By following the rules of this treatise, one cannot win; one may only avoid defeat. For every move, each King is reversible
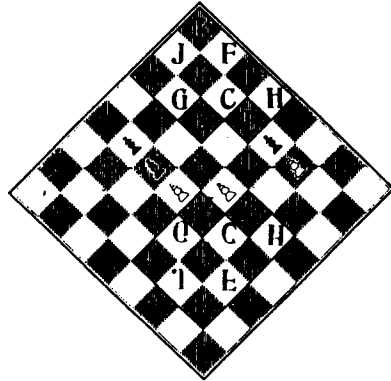
with respect to its other, and, whether the movements seem random or obsessively repetitive, the condition of draw remains. If both players use the tactic, breach of opposition occurs only when irreversible contingency in the form of a mistake creeps into this otherwise overdetermined ritual, precipitating the end of the endgame.

In the chess treatise, these inversions are represented graphically on transparencies, the position of each King marked on the diagrams in inverted form on opposite sides of the transparency. In effect, these transparencies parody the form of Duchamp's numerous glass assemblages, like *To be looked at (from the other side of the glass), with one eye, close to, for almost an hour* (1918–19)—on display at the Museum of Modern Art (MOMA) in New York City—a portal hovering between being a door and being a window. This assemblage figures, in the form of lead and silver edges in the
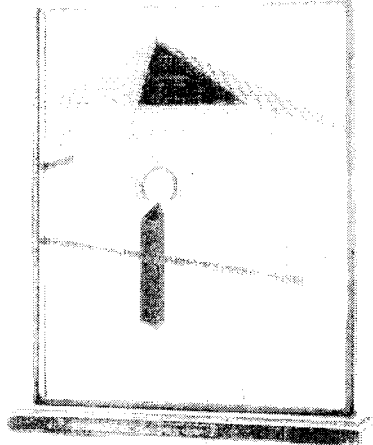
Fig. 2:   *To be looked at (from the other side of the glass), with one eye, close to, for almost an hour*

surface of the glass, a pyramid in N dimensions, and a crystal structure undergirded by radiating lines anticipating a part of *Large Glass* (1923) and peaked by concentric circles, while balancing unevenly two other circles in distorted perspective (reminiscent of the scales of justice). Viewers at the MOMA who venture to the other side of the glass assemblage and look into the central circle above the crystal see themselves in mirror inversion—upside down. These images are disrupted by random and contingent lines cascading through the assemblage which were caused by accidental breakage. The pyramid encodes the division-classification system of a library, the organizational structure of a totalitarian state, a corporation, the military, a university. The crystal encodes a perfect, symmetrical order resistant to entropy, while the accidental breakage encodes the contingency of duration as a necessary condition for entropic processes in science and society—whether described by Clerk Maxwell and Ludwig Boltzmann, or Henri Atlan and Ilya Prigogine; Henry Adams and Oswald Spengler, or Michel Serres and Gilles Deleuze.

Duchamp's concept of mirror symmetry and inversion extends to other realms as well, especially to his play with gender identity, exemplified by Man Ray's 1921 photograph of Rrose Sélavy,

Duchamp's alter-ego in drag. According to the logic of the chess treatise, then, Rrose Sélavy is encoded as Duchamp's complicitously inverted Other in a subject formation described in terms of interior warfare.

In Pynchon's *Vineland*, Zoyd Wheeler lives in a time-warp, a shadow of his past hippie self, his subject position defined in terms of nostalgia for the hope of cultural transformation represented by the counterculture of the 1960s. To collect mental-disability checks from the government, Zoyd must make himself visible once a year to certify his disability through an act of transgression. Reduced to media eccentric, Zoyd dons a woman's dress and jumps through the geometry of a plate glass window in the Cucumber Lounge for the benefit of local TV news crews. An inversion of Slothrop's crossing the Schwarzchild radius of a black hole and thus disappearing from *Gravity's Rainbow*'s convoluted plottings (only to emerge multiple), Zoyd Wheeler's actions allude to John Archibald Wheeler's extension of Albert Einstein's general theory of relativity in geometrodynamics, Wheeler's unsuccessful attempt to explain not only the logic of black holes, worm holes and white holes, but the essentially geometrical nature of matter itself. Zoyd transfenestrates, confirms his disability, and then disappears to watch TV and eat Froot Loops for another year.

In *Vineland* and *Gravity's Rainbow*, portals in the form of plate glass windows, pier glasses and french windows sometimes open onto verdant scenes—like the redwood forest outside the Cucumber Lounge, the lovely landscape visible outside Slothrop and Geli's boudoir after their tryst, or Pirate Prentice's roof-top banana garden—that exemplify the time-irreversible perspective of non-equilibrium thermodynamics. This branch of thermodynamics describes self-organizing systems. These systems exhibit the conditions of contingency, aggregation, gestation, evolution

Fig. 3:   The portal to *Étant Donnés*

and other processes incapable of being reduced to trajectories mapped onto time-space geometries of the time-reversible perspective exemplified by Einstein's and Wheeler's relativistic physics. Yet these verdant scenes in Pynchon's fiction are only visited, or observed, as
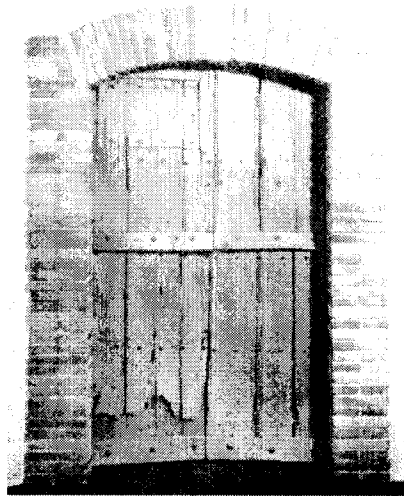
with the portal-as-chink in the boards of a medieval wooden door in an obscure, darkened hallway off the Duchamp Room in the Philadelphia Museum of Art, a peek at which reveals the scene of Duchamp's posthumous *Étant Donnés: 1 ° la chute d'eau 2 ° le gaz d'éclairage* (1968).

In this work, the naked, partially dismembered female form displays the entrance to the womb, and is flanked by other icons depicting the irreversible contingency of duration: the irreversible durational flow of the fountain, the entropic processes of the gas lamp, as well as the vagina as portal to the site of gestation, where local organs develop autonomously and yet coordinate spontaneously into a global body. This complex assemblage is arranged on a chessboard field, which can be seen only by reference to the notes and scale drawings published by the Philadelphia Museum. This *Manual of Instructions* offers a glimpse into the process of creating the assemblage, since the field itself is

Fig. 4:   *Étant Donnés: 1 ° la chute d'eau 2 ° le gaz d'éclairage*

invisible—a given condition of Being upon which the images of contingency, of Becoming, have been carefully constructed. Thus it functions as a mirror inversion of the *Green Box Notes* to *Large Glass*, which, as we will see, addresses the various processes of interpretation by the viewers of that already created assemblage.

For Duchamp and Pynchon, portals mark the boundary between contingent processes of becoming and geometric superimpositions. They thus invite transport between two different styles of cognitive functioning, as well as between two epistemological and ideological stances toward nature and human beings as external others.[3] Outward structures of hegemony may be
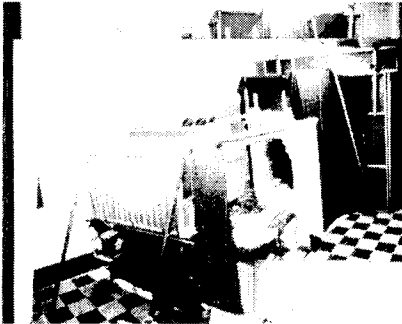

Fig. 5:   A study for *Étant Donnés*

inverted parodies of mirror interiorities: particular epistemological assumptions and institutional practices studied by physicists and social philosophers respectively may be linked to the relative domination of particular cognitive processes, processes which bear ideological weight, with aesthetic and political consequences. Duchamp and Pynchon focus on the relentlessly geometric, schematic nature of dominant cognitive processes hinged between the inside and the outside: *subject formations* for Duchamp and *subject positions* for Pynchon.[4] Juxtaposing geometry, portals, cross-dressing and mirror symmetry in their works makes visible the virtual interiority and cultural manifestations of what Deleuze and Guattari call "the Body without Organs" (BwO), a concept of wholeness applicable to the individual subject and to culture in the most general sense, and which is defined as having contingent and smooth as well as geometric and striated spaces. Using Duchamp's and Pynchon's artistic constructions thus provides an opportunity to explore an ethics of cognition implicit in Deleuze and Guattari's project.[5]

Portals in Pynchon

Let us begin with the geometry of subject positions in *Gravity's Rainbow*. Pirate Prentice's surrogate dream landscape spells thermodynamic doom. Gritty as well as grotesque, with both visual clarity and sensual distortion, the novel's opening passage presents the opening gambit between geometry and complex, entropic systems by juxtaposing the Crystal Palace as an icon of order and progress with Oswald Spengler's worst nightmare, the last gasp of the civilization phase without the promise of a pawn or piece of tropical refuse emerging into a Queen or prime symbol. Here masses of people slowly spiral or knot through passageways into some darkness from which there is no hope of escape.

Pirate wakes from this nineteenth-century-style nightmare into end-of-the-war London. By contrast with his surrogate, Pirate lives in a house whose roof is covered with soil once devoted to the cultivation of pharmaceutical plants yielding alkaloid crystals, but now both the garden and Pirate are devoted (largely) to other possibilities. This "progressive *knotting into*" (GR 3; Pynchon's emphasis) involves, not an obsessive, doomed entanglement and narrowing downward, but the dissolving of boundaries between various sources of humble scum, presenting immediate possibilities for order, for the spontaneously hot ferment of compost. Pirate is growing bananas, and these horticultural shenanigans in response to a wartime shortage contrast starkly with the impending endgame of equilibrium thermodynamics implied by his

surrogate nightmare. The condition of the earth in the hothouse and the fruits of Pirate's labors in that earth suggest not "the fall of a crystal palace" (3) but beginnings, not the final seizing hush but the music of mitochondria. Given "the politics of bacteria" (5), the spirals of DNA strands, the non-equilibrium thermodynamics of culture, though Pirate may remember the horrors of entropy in his surrogate dream, he lives embracing its potential. The distinction between attitudes toward entropy as threat or promise hints at the epistemological crisis underlying the ideological struggle: the fear of an endgame and the obsession with control, or the intuitive understanding of contingency as an initial condition for self-organizing systems requiring the relinquishing of that very control.

Irreversible, entropy-producing processes, Prigogine writes, "play a fundamental constructive role in the physical world; they are at the bases of important coherent processes that appear with particular clarity at the biological level" (BB xiii). I have argued elsewhere that Prigogine's distinction between the time-reversible perspective (premised on geometry) and the time-irreversible perspective (premised on contingency and statistics) serves as a powerful heuristic for analyzing Pynchon's cultural poetics (see IWMP), but I would like to take one more progressive knot inward by examining the portals that foreground the epistemological tensions created by intercourse between the two perspectives.

Pirate wakes and begins his morning rituals:

> Pirate in the lavatory stands pissing, without a thought in his head. Then he threads himself into a wool robe he wears inside out so as to keep his cigarette pocket hidden, not that this works too well, and circling the warm bodies of friends makes his way to *French windows*, slides outside into the cold, groans as it hits the fillings in his teeth, climbs a spiral ladder ringing to the roof garden and stands for a bit, watching the river. (6; emphasis added)

Across the nightmare metropolis and into the banana trees: Pirate's progress completes what the faceless invisible masses scarcely dare hope for. The reference to *French* windows (capitalized in the novel) reminds us of Duchamp's *Fresh Widow* (1920) assemblage in the MOMA, a French window with panes rendered opaque black so that, as a dead end and a portal, it signifies the yes/no blankness of DADA, as well as the horizon of observation, the gaze beyond which requires the motive of the voyeur, or perhaps of the ontological hero or villain. Once through the portal, Pirate climbs a spiral ladder like the double helix of DNA—an inscribed steady state far-from-equilibrium, waiting

for coupling and self-replication. He then stands among his banana trees, observing the remnant monoliths of the Age of Iron and anticipating a banana breakfast that is the direct result of those self-organizing processes—just before he glimpses a V-2 contrail on the horizon.

In a passage that balances this one nicely, the Zonal nomad Slothrop meets Geli Tripping, who mistakes him at first for her lover Tchitcherine. They become lovers in a bombed (or rather reconfigured) town, their open boudoir reflecting the manifestations of a new, spontaneous ordering:
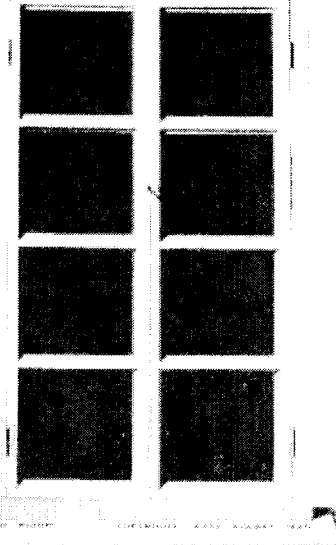

Fig. 6:   *Fresh Widow*

> Slothrop, though he doesn't know it yet, is as properly constituted a state as any other in the Zone these days. Not paranoia. Just how it is. Temporary alliances, knit and undone. He and Geli reach their arrangement hidden from the occupied streets by remnants of walls, in an old four-poster bed facing a *dark pier glass*. Out the roof that isn't there he can see a long tree-covered mountain ascending. Wine on her breath, nests of down in the hollows of her arms, thighs with the spring of saplings in wind. (291; emphasis added)

Although Slothrop is annoyed because Geli reaches orgasm while obviously fantasizing about Tchitcherine, the reference to the Duchampian opaque portal pivots the open system of their love-nest, in which the green life spiraling up the mountain and the spring-energy of Geli's thighs like saplings suggest a dissolved boundary between inside and outside, an openness allowing for the spontaneous celebration of the condition of becoming.

This passage and the Pirate passage both emphasize organic dissipative structures in contrast with the dissipative wastefulness of machines. Even though Geli tells Slothrop "'It's an arrangement. . . . It's so unorganized out here. There have to be arrangements'" (290), these temporary alliances, exemplifying the behavior of irreversible systems far-from-equilibrium, become local processes generating order out of the chaos/refuse of the war machine. That Slothrop seems to

accept these alternative orderings gives us pause as we examine a more overt link between geometry, portals, the liberatory claims for self-organizing cultural processes we associate with Slothrop's crossing the Schwarzchild radius of a black hole, and the suspicions of Baudrillardian complicity we associate with Zoyd's jumping through the front window of the Cucumber Lounge in drag.

Slothrop's Black Hole and Zoyd Wheeler in Drag

A crucial issue in *Gravity's Rainbow* is the status of Slothrop's subject position when he disappears four-fifths of the way through the novel. His behavior is often described in terms of sub-atomic and molecular phenomena, but his disappearance is represented as a passing over the threshold of an anomaly in Einstein and Minkowski's space-time geometry: the Schwarzchild radius of a black hole. A black hole is a node where curved space-time may be said to spiral down into a point of such density that its gravitational field does not allow

Fig. 7:   "Deformation of spacetime by a black hole" (Hayles 195)

even light to escape. A black hole can therefore be thought of as terminating in a singularity, as in N. Katherine Hayles's explanation of Slothrop's disappearance. Yet a black hole may also indicate a portal: what enters the black hole is absorbed by a posited substantial field on the *other side* of the space-time continuum. Some of Pynchon's references to Slothrop's scattering and absorption by the Zone fit this theory, which echoes the metaphysics of the ether, creating an opposition between geometry and essence, the critique of which we must defer for now.

A black hole may also actually be a worm hole, allowing for the possibility of jumping from one place to another, or from one time to another, in hyperspace. Like Der Springer (the chess knight), Slothrop does leap about the Zone, disappearing and reappearing. More interesting, a black hole may be reversed. Mathematical representations of white holes have been developed to describe how matter might emerge from a node in space-time geometry: a black hole might function as a white hole in a parallel universe—for example, as a
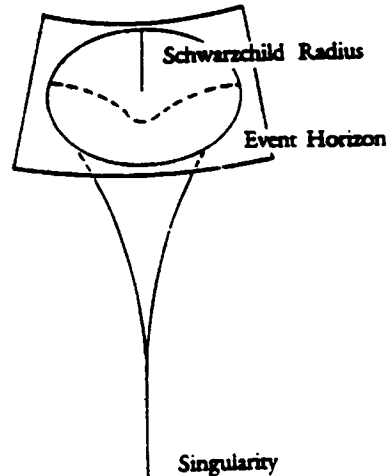
swirling tornado can transport Dorothy to a place that is clearly no longer Kansas. These speculations have their mathematical basis in an extension of general relativity, called geometrodynamics, pioneered by Richard Feynman's teacher at Princeton, John Wheeler, whose last name should ring bells for readers of *Vineland*.
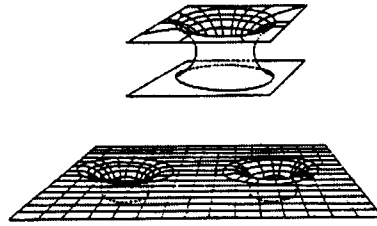

Fig. 8:   Above, a white hole; below, a worm hole (Wheeler 48)

Mathematical studies of gravity and electromagnetism in the 1940s and 1950s demonstrated that the "footprints" left by gravitational and electromagnetic fields are so precisely represented geometrically that, Wheeler and others came to believe, these footprints could themselves be considered the full manifestation of the fields: one could talk about gravitational and electromagnetic fields entirely in terms of geometry. Wheeler's speculations led him to conceive of not just fields but matter itself as geometry. Geometrodynamics attempts to fashion matter out of the geometry of curved empty space, the democritean unit being the geon. Theoretically, the geon can trap radiation in a gravitational field, in effect establishing a holding pattern, like a standing wave, that resists leakage for a measurably significant time. Although existing independent of any real mass, "The geon moves through space as a unit. It responds to the gravitational fields of other masses. It also exerts forces on them. It provides a completely geometrical model for mass" (Wheeler xii). Geometrodynamics represents all forces and processes in terms of an invariant, ontologically stable frame that dissolves the distinction between form and essence. At its moment in the history of field theories (mid-1950s–1960s), this theory was thought to promise the ultimate hegemony, to be the beginning of Einstein's dream: a grand unified field theory of everything. It has had, however, no experimental validation.

In fact, geons are fictions; they bear no resemblance to any observable phenomena. Historically, Wheeler's geometrodynamics is a dead end in theoretical physics. But the fact that geometrodynamics has become theoretically quaint should not keep us from observing a possible correspondence between matter and geometry on the one hand, and hegemony and the status of the subject in Pynchon's fictional universe on the other. Wheeler's relentless attempt to reduce everything to a geometrical frame helps situate the problem of control and complexity, not only in terms of the ideological function of geometry in the discipline of physics, but in cognitive acts as well.

Here it is useful to recall late-nineteenth-century attacks on the ontology of geometry: Henri Poincaré's insistence on the social origin of geometrical constructs like calculus through such heuristics as the three-body problem—often cited as one ur-text for chaos theory; and Henri Bergson's critique of the psychological and social costs of our spatialization of time in lived existence dominated by clock time and calculus—often cited with reference to the theory of cognitive science called emergent properties.[6] These costs apply equally to our metaphorical schema and social institutions.[7] We will formalize this problem further in contemporary terms by drawing on the philosophical writings of Deleuze and Guattari, and on the distinction between computational and emergent-properties models of cognition in the cognitive science of Francisco Varela, Evan Thompson and Eleanor Rosch.
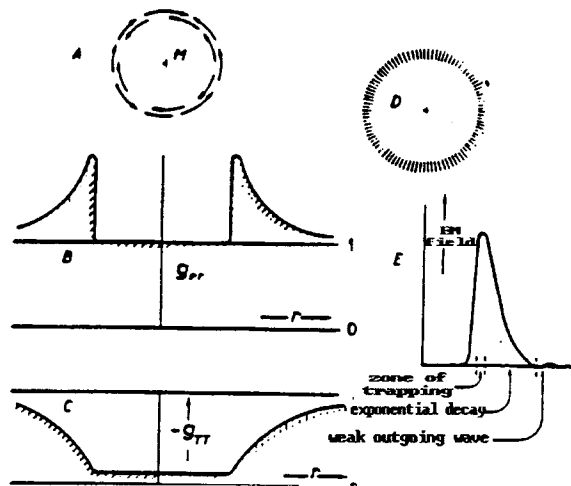
Fig. 9:   A geon (Wheeler 26)

In *Gravity's Rainbow*, space-time geometry corresponds to the discursive and repressive formations of the state at war—war in the most general sense. Slothrop's subject position in the Zone remains free and contingent precisely because those formations disintegrate at the end of the Second World War. Only when the flows or moirés of the Zone begin to close up into the geometrical chessboard of a new game between the United States and the Soviet Union does Slothrop disappear within the Schwarzchild radius. In *Vineland*, Zoyd must alter his subject position by making himself visible once a year to certify his mental disability. This former hippie has been reduced to media eccentric, a cross-dressing, transfenestrating buffoon. Since a plate

glass window may represent the geometry of space-time, perhaps Zoyd's leap is a breaking-through from the void, from the invisible marginality of his slothful, countercultural time-warp, back into time and visibility—aided (or undermined) by the tactical use of clear sheet-candy stunt glass.
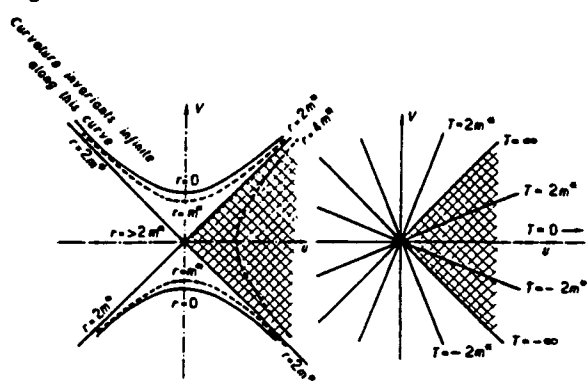

Fig. 10:   A two-dimensional representation of a four-dimensional
             black hole (Wheeler 45)

What is disturbing about Zoyd's yearly ritual is his motive: not his fervent commitment to keeping Prairie, but his tacit willingness to live parasitically off the system he has devoted his life to resisting. His resistance seems merely an act of transgression-for-hire—a way to pay the bills. So, while Slothrop disappears into a black hole as if to liberate himself from the Soviet and American matrices closing off the contingencies of the postwar European Zone, Zoyd emerges from a white hole (or perhaps a worm hole) to confirm his abject dependence on those matrices (a matrix is a reductive, two-dimensional representation of a four-dimensional event [*OED*]). Unlike the hope implied in *Gravity's Rainbow* by the disappearance of Slothrop and the emergence of the Counterforce, there is no escape from geometry, no hidden, privileged realm, in John Wheeler's or Zoyd Wheeler's universe.

We begin to suspect there is no metaphysical other side where we might find Slothrop's traces, because, perhaps, everything really does exist in two dimensions. While Slothrop's disappearance may imply his impotence to resist the emerging matrices which threaten humanity with the endgame of Mutually Assured Destruction, it also marks the traces of hope, exemplified by his absorption in the Zone and his figuring the potential of the Counterforce. Zoyd's commitment to a bankrupt way of life bankrolled through yearly ritual debasement of his ethical currency marks a cynical complicity, a seduction by the forces

Fig. 11:   Frank Zappa   Fig. 12:   Marcel Duchamp as Rrose Sélavy

he supposedly resists. Though Zoyd does leap through the fake plate glass, it seems *there is no over there, there*.

The link between geometry and complicity is reinforced by the fact that IG Farben funded an Einstein Institute for physics research in Cracow during the 1920s and 1930s. This fact seems to undercut the virtual yet moral influence Einstein exerts on the landscape of *Gravity's Rainbow* by way of his often reworked remark that the atomic bomb he helped create initiated an epoch marked by the birth of a new technology without the wisdom requisite to manage that technology. Einstein's financial arrangement with the corporation that went on to produce the gas used in the death camps, as well as the plastic Jamf supposedly used in conditioning Infant Tyrone's erection, reverberates with the relation between geometry and complicity. But we need to take this one step further by noting that Einstein's physics is as dependent on the geometrical frame as Wheeler's physics is.

Einstein often invoked Spinoza when discussing his vision of an eternal, unchanging Being underlying all the multiple complexities of phenomena, a Being Given—to literalize Duchamp's title *Étant Donnés* —that makes geometry possible.[8] Deleuze and Guattari point to Spinoza's *Ethics* as exemplifying philosophical thought produced by the Body without Organs. Duchamp's *Étant Donnés* captures perfectly a clash of worldviews represented by Pirate's surrogate dream on the one hand and his banana garden on the other, and by the Baudrillardian

nightmare synthesis of Zoyd's simulacrum of Jim Morrison breaking on through to the other side while dressed like Frank Zappa on the cover of *We're Only In It For the Money*. By now, however, we can see that Morrison and Zappa are not the only inspirations here; Einstein and Wheeler, and Duchamp, particularly in drag as Rrose Sélavy, deserve equal billing. Here we move from the issue of subject positions to that of subject formation, from geometric representations of hegemonic dominance and the possible inescapability of complicity, to the mirror interiority of schematizing at the level of cognitive processes, as informed by the philosophy of Deleuze and Guattari and by the cognitive science of Varela, Thompson and Rosch.

Duchamp's Chess Treatise, the *Green Box Notes* to *Large Glass*, and Rrose Sélavy

For Duchamp and for Pynchon, art is simultaneously an act of creation and an act of destruction. For Duchamp, "the spectator brings the work in contact with the external world by deciphering and interpreting its inner qualifications and thus adds his contribution to the creative act" (SS 140). The artist, the work of art and the spectator meet in a common field where the event as an interference pattern of creation and interpretation resembles the seemingly symmetrical vectors created through time by chess pieces on the sixty-four squares of a chessboard—"eros' matrix" (SS 51). For Duchamp, and for Pynchon, the mappable relativity of subject positions merely externalizes the mirror interiority of subject formations within the artist and within the observer. Paralleling Poincaré's and Bergson's diagnosis of the social origins of geometry as a medium of control, as symptomized by Wheeler's physics, Duchamp's and Pynchon's works demonstrate the mind's inevitable tendency toward the condition of geometry. Both model the ways cognitive processes are seduced by an infinite regression of virtual spaces divorced from the vital processes of living systems. The cost of this seduction constitutes its pathology.

The diagnosis of this pathology, as well as the hope for the mind's liberation from it, can be seen as the vital impetus for all Duchamp's work from *Nude Descending a Staircase* (1912) on. We have already mentioned how *Opposition et les cases conjugées sont réconciliées* delineates the rules governing the avoidance patterns of the two Kings seeking opposition, and that what goes on in the minds of the players is more important than what is actually on the board. Breach of opposition is a disruption of regal equilibrium, a moment of positional disadvantage due to a miscalculation that precipitates the end of the endgame, a moment both players avoid at all costs. Duchamp's chess

treatise can also be read as a rhetoric of the aporia, so breach of opposition corresponds to the charged moment Duchamp calls, in the *Green Box Notes* to *Large Glass*, "exposure."

The aporia serves as a portal which triggers mirror interiority in the mind of the observer. It pivots the destabilized planes of verbal and visual structures, a chaotic vortex triggered by the avant-garde event. Carol P. James reveals Duchamp's laws governing the rebus as a sign for disturbance as well as an aporia of the sign: "This chiasmus, a mirrored angle or 'double invagination,' not only disturbs the linearity of reading with a 'trajectoire des surveillances du coin de l'oeil' but also inscribes reading as a figure, a letter" (RA 108). James emphasizes Derrida's sly double entendre for the space opened up by the chiasmic rebus in the systems of verbal and visual signs and their significances, confronting the instability of aesthetic cognition by a mind capable of generating an infinite regression of spatial frames to account for those multiple and indeterminate significances. While James refers specifically to Duchamp's readymades, the double entendre is also appropriate for the subject position of the observer as voyeur peeking through the chink in the door of *Étant Donnés*.
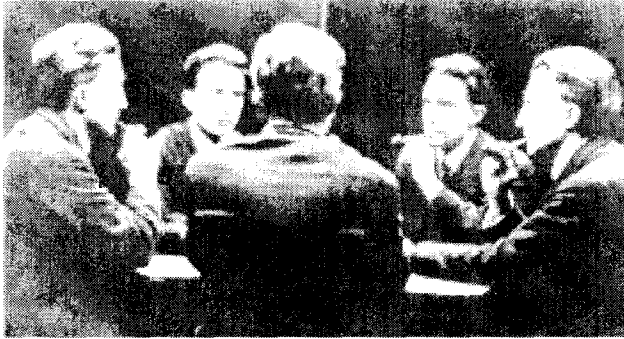
Fig. 13:   Photograph of Marcel Duchamp taken with a hinged mirror (1917)

Duchamp coined the term "metairony" to indicate how the affirmation and denial of meaning can be generated by this chiasmic invagination, and he calls the metaironical device a "hinge" or "hook." He defines both in the *Green Box Notes*, and we have seen how crucial the concept of the hinge is in his chess treatise. The concept is fundamental for understanding Duchamp further:

> perhaps make a *hinge picture*. (folding yardstick, book. . . .) develop the *principle of the hinge* in the displacements 1st in the plane 2nd in space. Find an *automatic description* of the hinge.

Perhaps introduce it in the Pendu femelle. (SS 27; Duchamp's emphasis)

Remembering that hinge is the term for the crease in the geometry of
the chessboard that enables the mirror inversion of the Kings'
positions, we observe that Duchamp carefully distinguishes between
two kinds of hinge here: one in the plane of the formal artifact (or
chessboard), with reference to the position of the antagonists; the
other in space, the field of thought within the spectator(s) (or
chessplayers).[9] Duchamp then links the concept of the hinge to the
Pendu femelle, so the ambiguity of artifact (chess pawn or art object),
in turn, refers to his preoccupation with the archetypal presence or
absence of woman as Other, as neoplatonic Bride, or perhaps as senile
or at least mechanical (drag-or-delay) Queen. The name of Duchamp's
female alter-ego, Rrose Sélavy (artist as pendu femelle, as invaginated
work of art), is highly suggestive: "erre ose," "arroser la vie," "eros
c'est la vie," capital R "Est-il R(Art)?" or even the English tautology
"rose is a rose is a rose."[10] Rrose Sélavy is an inversion of the artist
Marcel Duchamp: together they form a portal, an external, mirrored
invagination of the internal artist into external warring Kings on the
public chessboard/field of art itself, projected by the art event in turn
back into the mind of each spectator.[11]

Duchamp therefore seeks to conceptualize and visualize how the
aporia initiates a confrontation between artist and observer which then
must be sustained within the cognitive processes of that observer. The
portal of the aporia disrupts the force-field on which the complicitous
relations between artist and observer exist, a field defined as the
tension between what is "unexpressed but intended" by the artist and
what is "unintentionally expressed" (SS 139), the various cognitive and
hermeneutical activities brought to the object of art. This force-field,
which Duchamp calls "Delay," and which he judges both intoxicating
and habit-forming, resembles the vectors created through time on the
sixty-four squares of a chessboard during a match, "a game between
artist and onlooker, or a drug as I said before" (qtd. in Tomkins 18).
Duchamp describes the laws governing this Force-field with pseudo-
mathematical precision, and they help to conceptualize the charged
moment of Exposure which ends the endgame of art in the avant-garde
event. An infinite regression of mirror interiority increasingly
destabilized, this terrifying event short-circuits the force-field formed
by the complicity between artist and observer.

A more intricate sense of Duchamp's concept of delay comes from
his Preface to the *Green Box Notes*, in which he juxtaposes delay with
the concept of exposure:

Given   1st the waterfall
             2nd the illuminating gas,
we shall determine the conditions for the instantaneous state of Rest (or allegorical appearance) of a *succession* [of a group] of *various facts* seeming to necessitate each other under certain laws, *in order to isolate the sign of the accordance between*, on the one hand, this *state of Rest* (capable of all the *innumerable* eccentricities) and, on the other, a *choice of Possibilities* authorized by these laws and also *determining them*. (SS 27–28; Duchamp's emphasis)

Beginning with what would become the title of *Étant Donnés*, this passage dissolves one opposition, that of art and interpretation, and creates another. On the one hand, we have "the instantaneous State of Rest (or allegorical appearance)," which is "capable of all the innumerable eccentricities," indicating a liberating moment of undetermined cognitive flows experienced as pure contingency. On the other hand, we have "succession," "various facts," "a choice of possibilities," which collectively indicate the superimposition of spatial and temporal difference on cognitive processes, responding to the world habitually, experiencing the flow of duration as a series of still frames—mathematically through calculus, conceptually through schematic forms, musically through staves, bars and time signatures, artistically through a single-lens reflex or motion picture camera. These two categories, in turn, bracket an in-between category: the activity of "we" who must determine this opposition, "isolate the sign of the accordance between" the state of Rest and the choices simultaneously authorized by and determining the laws.

The distinction between succession and rest itself delays Rest, which is synonymous with exposure:

For the instantaneous state of rest = bring in the term extra rapid
We shall determine the conditions of [the] best exposé of the extra rapid state of Rest [of the extra rapid exposure (= allegorical appearance) of a group. . . . . . etc.
nothing perhaps. (SS 28)

The pun on exposure and exposé signifies a momentary and surreptitious flash *and* a scandalous revealing in the journalistic sense.[12] It thus provides within itself the difference between the moment of exposure to the pure apprehension of duration stripped of schematized formations, and the conceptualizing of that moment (which also defers the moment), while titillating us (as voyeurs) as well. The glimpse of

the cross-dressed other becomes the site for the scandal of subjectivity and its reverberations through potentially infinite dimensions.

Furthermore, this passage addresses, equivocally, what may be the essence or function of the "accordance between," of exposure itself as a potentially infinite mirror interiority. Is it an allegorical appearance? "The Bride basically is a motor. But before being a motor which transmits her timid-power.—she *is* this very timid-power" (SS 42; emphasis added). Is exposure, made possible by double invagination, itself simply a hieroglyph that can be called a transcendental signifier, a "sign of the accordance between"? Or is it "nothing perhaps"? After all, the literal English translation of *Étant Donnés* is not *Given*, but *Being Given*, an assumption of Being as an offer of "nothing perhaps," or a reminder of Being's fiction by demonstrating its crystalline impossibility in the contingent world of irreversible duration. Or perhaps it represents the end of the tyranny of Being, the necessary premise for all geometrical constructs, in the pure contingency of Becoming, liberated by the disruption of the mechanisms of signification, a disruption which constitutes the terror of the avant-garde event.

All this toying with oppositions suggests an infinite regression, a mirror interiority exemplified by the capacity of calculus to divide time into an infinite number of points on a trajectory, or the capacity of n-dimensional geometry to generate an infinite regression of interior spatiality in much the same way: "The Pendu femelle is the form in *ordinary perspective* of a Pendu femelle for which one could perhaps try to discover the true form. This comes from the fact that any form is the perspective of another form according to a certain *vanishing point* and a certain *distance*" (SS 45). Steven Weisenburger demonstrates the intelligibility of narrative embeddedness to at least the fifth degree in *Gravity's Rainbow*,[13] and that embeddedness has a cognitive correlate in Duchamp's representation of the mind constructing thinking spaces as a series of telescoping frames (potentially) in infinite regression to stave off the doom of the subject's dismantling, to delay exposure. Thus Duchamp suggests a fundamental opposition between the irreversible processes of exposure possible during a posited pure apprehension (à la Bergson) and the dynamics of delay (as in calculus, photography or film) in forms of geometry extended to the Nth degree, symptoms of the striations of cognitive control which experiences exposure as threat.[14] Duchamp defines this threat as an "indecisive reunion" (SS 45) of all objects of cognition into an irredeemable flux of affect. Given the frequently-remarked hypertextual quality of Pynchon's fictions (one may not be able to visualize Weisenburger's analysis without recourse to hypertext), we may suspect that hypertext, as striated cyberspace, simply externalizes

—projects, in the Freudian sense—what Poincaré and Bergson diagnose as the mind's tendency toward relentless geometricality, as I have argued elsewhere.[15] Despite the liberatory claims of hypertext's practitioners and theorists, our current fascination with the virtuality of hypertext may be merely the most contemporary symptom of this pathology.

After the passages on delay and exposure quoted above, Duchamp adds a permutation: "If, given [*in the dark*]," repeating *"in the dark"* after a reference to the illuminating gas (28; Duchamp's emphasis), or clouds of signification surrounding the art-i-fact at the moment of exposure. Here he seems to insist on the interior and contingent nature of the condition of exposure in relation to the succession or the cognitive tactics of delay: it must take place within the individual mind in solitude. The concept "we" in effect has no being except as an arbitrary sub-category within delay itself, yet, paradoxically, the "we" can manifest itself only in terms of individual consciousness. The dispersed plenitude of the I between art and fact, generated by exposure to the avant-garde artifact, reverberates in a sophisticated way with recent accounts of complex systems in physics and cognitive science and their implications for philosophy and cultural studies.

"Nothing perhaps" underscores the play on the presence/absence *telos* of any infinite progress or regress of opposing categories, of which the blankness of DADA is the manifesto. In the blankness of DADA, signified by sheer, opaque or mirroring glass in Duchamp's assemblages, and, by implication, through references to the indeterminate nature of black holes as singularities or as worm or white holes in Pynchon's fictions, we may make visible the relation between the various forms of becoming and the Body without Organs in the writings of Deleuze and Guattari.

Geometry, Cognitive Science, and the Body without Organs

In *The Embodied Mind*, Varela, Thompson and Rosch represent the mind as having two competing cognitive processes occurring simultaneously. Cognitive processes at the local level, from the senses, the bodily organs, and the operations of memory, self-organize or emerge into a global state. That global state may be considered fictional, since it has no being, but it does really function to constrain the lower-order processes so it can act in the world as if it were unified and autonomous. These competing cognitive processes may help inform our understanding of Deleuze and Guattari's distinction between, on the one hand, various processes of becoming associated with the senses, the circulatory and nervous systems (including the

operations of memory), and the bodily organs, and, on the other hand, their crucial concept the Body without Organs, the operations of which are usually described in terms of geometrical constructs, like "plane of consistency" and "strata," and in terms of the "waves" or "intensities" that flow through these surfaces and depths. The striations of the BwO resemble the constraints by the unified, autonomous global construct on contingent cognitive processes through schematic superimpositions. The condition of contingency, which characterizes processes of self-organization, is always already becoming in a non-dialectical relation with those superimpositions. This tension between top-down, deterministic and constraining, and bottom-up, contingent and emergent processes has epistemological and ideological weight in cognitive science in the distinction between the computational and emergent-properties perspectives.

The shift from the computational model to an emergent model of cognition resulted from the discovery of two fundamental limitations in the computational model. The first limitation (the "Von Neumann Bottleneck") results from the *"sequential* rules" (Varela 86) that constrain the processing of symbolic information: only one rule can be applied at a time. The second limitation results from the fact that any loss or malfunction of even a small number of symbols or rules can cause catastrophic failure of the system.

Varela, Thompson and Rosch argue that work like that of Bergson, Merleau-Ponty, Prigogine and others in contingency and self-organization, in the mind as well as in chemistry and physics (non-equilibrium thermodynamics), alerted cognitive scientists and computer scientists to possible rules governing natural and artificial intelligence. While they note that "[t]here is no unified formal theory of emergent properties," symptoms of such systems have been identified across disciplinary boundaries: "in each case a network gives rise to new properties" (88); and the ability to formalize and replicate artificially those properties, observed in a large variety of physical and cognitive phenomena, represents a fundamental shift in the understanding of the function of systems generally.

But what makes this shift from the computational model to the emergent-properties model interesting is its ideological as well as epistemological significance. Varela, Thompson and Rosch explain in terms of three questions the distinction between the two paradigms.

The computational paradigm:

Question 1: What is cognition?

Answer: Information processing as symbolic computation—rule-based manipulation of symbols.

Question 2: How does it work?

Answer: Through any device that can support and manipulate discrete functional elements—the symbols. The system interacts only with the form of the symbols (their physical attributes), not their meaning.

Question 3: How do I know when a cognitive system is functioning adequately?

Answer: When the symbols appropriately represent some aspect of the real world, and the information processing leads to a successful solution of the problem given to the system. (42)

The emergent-properties paradigm:

Question 1: What is cognition?

Answer: The emergence of global states in a network of simple components.

Question 2: How does it work?

Answer: Through local rules for individual operation and rules for changes in the connectivity among the elements.

Question 3: How do I know when a cognitive system is functioning adequately?

Answer: When the emergent properties (and resulting structure) can be seen to correspond to a specific cognitive capacity—a successful solution to a required task. (99)

Ideologically, the first paradigm emphasizes total control of the trajectories of symbolic manipulation; any loss of control brings down the computational house. The primary structure for such control is the upside-down arboreal (root) configuration of genus-species, exemplified by the organization of files on a hard drive, whose geometrical correlate is the pyramid or perhaps the crystal. The second paradigm emphasizes the connections among elements of systems, the deliberate relinquishing of control of those elements, and the observing of contingently emergent, not necessarily predictable forms of order among the connected elements. The primary structures which illustrate the stability of such contingent processes are dissipative or aggregating systems: nonlinear catalysis, the homeostasis of a single cell, a colony

of single organisms like a rhizome, the emergent properties of a network of parallel-processing computers.

The exertion of top-down control and the contingencies of bottom-up emergence symptomize epistemological and ideological stances toward the world as well. In human cognition, both processes go on simultaneously, perhaps even at cross purposes. The social philosophy of Deleuze and Guattari has, with great precision, worked out the ideological and political implications of these two cognitive styles as these styles are encoded in the socius.

Deleuze and Guattari's "rhizome" exemplifies the emergent state, and, in fact, refers precisely to a functioning aggregation. Its principles include: 1) connectivity, the capacity to aggregate; 2) heterogeneity, as in the coordination of unlike elements; 3) multiplicity of connections, the variability of which is maximal; 4) asignifying rupture, which allows the system to function despite local breakdowns; 5) cartography as an inadequate representational form ("a rhizome is not amenable to any structural or generative model" [TP 12]); 6) decalcomania, the condition of infinite flexibility, adaptability and resistance to rigidity. All these principles refer to the functioning of self-organizing systems. Specifically associated with "all manner of 'becomings'" (21), the rhizome exemplifies a style of cognitive and social functioning that resists domination and determination, the condition of total control exemplified by the "radicle-system, or fascicular root . . . to which our modernity pays willing allegiance," represented by the "[b]inary logic and biunivocal relationships" that ideologically dominate linguistics, structuralism and, until recently, "information science" (5). But these two styles cannot engage in a Hegelian struggle to the death:

> You may make a rupture, draw a line of flight, yet there is still a danger that you will reencounter organizations that restratify everything, formations that restore power to a signifier, attributions that reconstitute a subject—anything you like, from Oedipal resurgences to fascist concretions. Groups and individuals contain microfascisms just waiting to crystalize. (9–10)

For Deleuze and Guattari, the answer to domination by calcification and binary determinism in the trajectory of symbols and in the behavior of human beings lies in the *in-difference* of emergent aggregative forms as they interpenetrate yet remain beyond the grasp of those crystalline structures (exhibiting the properties of complex, embedded geometric formations) resistant to contingent processes within and without the single cognizing subject. These two kinds of processes exist simultaneously and interpenetrate extensively, so whether a subject or

collectivity leans more toward one or the other is a question of its style of functioning. The laws governing the in-different emergence of aggregating processes and forms are called, collectively, "Becoming" (Becoming-Intense, Becoming-Animal, Becoming-Imperceptible, etc.), and they become complicated in terms of the stages by which aggregating forms (woman-child-animal-molecule) may begin to localize as a site of aggregation, evolve under the stress of external conditions, and then learn to function under the posture of in-difference.

The psycho-social site where the radicle-system dominates and seeks to control the various becomings is the Body without Organs, what might be called a preexisting condition of wholeness. The BwO *is* the global state itself, a *"field of immanence"* (TP 154) from which emanate top-down constraints, the reductio ad absurdum of which is the schizophrenic dream of the rubber body-suit without any holes through which to breathe, eat, defecate. Described in terms of the spherical wholeness of the egg prior to the complete formation of the embryo, in terms of hierarchical strata and of planes of consistency through which rhizomes must propagate but only by avoiding detection, the BwO constitutes the regime through which the exertion of constraints on various becomings may occur. Represented philosophically by Spinoza's ethics, psychoanalytically by the analyst's intrusion in the imaginary and symbolic formations of the patient—the betrayal of desire in the form of the hypochondriac body, the schizo body, the drugged body, the masochist body—the BwO can be understood simply as the superimposition of constraints on the lower-order cognitive processes emanating from the bodily organs, the nervous, circulatory, immune and other systems.

Just as the rhizome and its laws of becoming exemplify the conditions of emergence in the smooth space of the BwO, the striated space of the BwO exemplifies the strict rigidity of the computational model of cognitive functioning, of schematic modelings, structural representations, geometrical constructions of time, the formalist obsessions of art and music. While the BwO provides the spatial extensivity for various becomings to emerge, the question remains of how the enabling smooth space turns into the constricting striated space of cognitive schema symptomatic of *subject formation*, and of physical geometries symptomatic of processes for determining *subject positions* in science and in society. Deleuze and Guattari couch these processes largely in overtly political terms (in passages on "capture" [424–73], for example), but the question of causation remains moot.

Yet we have an important hint in Deleuze and Guattari's figure of the One-Eyed King (424–27), a king crippled by the lack of depth perception, condemned perpetually to reduce the four dimensions of

life to a two-dimensional plane. We can diagnose this King's impairment as congenital, or as a consequence of the will to schema or geometry for the purposes of operational control, the occupational disease of those who wish to rule—from within as well as from without. The King of Diamonds stares, like the intended audience for Duchamp's *To be looked at (from the other side of the glass), with one eye close to, for almost an hour*, because of a pathological condition. Poincaré and Bergson diagnosed this pathology, and also provided researchers like Prigogine and Varela the grounds for the science of complexity in physics and cognitive science. Deleuze turned to Bergson in his search for a critique of the cognition of duration as a spatial category, and of its aesthetic and political implications. Yet not just philosophers pursue the insights of science. Duchamp's and Pynchon's portals provide sites for reviewing the diagnosis, and for pursuing a cure.

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Notes

[1]A version of the material in this essay on Duchamp and chess was first presented at the twentieth annual Conference on Modern Literature, Michigan State University, October 1983. I would like to thank the library staff at the Museum of Modern Art for assisting me during more than a dozen visits to the museum's copy of Duchamp's chess treatise, visits made possible initially with the help of the Henry A. Parker Fellowship, Department of English, University of Michigan, in summer 1983. Parts of this essay were also read at Warwick University in November 1994 and at the American Comparative Literature Association Conference in Athens, Georgia, in March 1995. A draft was also published electronically. I would like to thank Eugene Holland, Nick Land, Paul Harris, Ronald Bogue and Eric Cassidy for their helpful suggestions.

[2]"Invisibility, The War Machine and Prigogine," esp. 104–09. Many passages in *Gravity's Rainbow* refer to chess. Marcel, "a mechanical chessplayer dating back to the Second Empire," is obviously patterned on artist and chess master Duchamp. The robot, with "a remote manner" and "exquisite 19th-century brainwork," may not be given to linguistic play, however; he is "much too literal with humans" (675). Marcel "may be a bit repressed" (677), and is accused of having no "'soul'" (679), but seems paradoxically to be the source of an allusion to Kabbalah (680) with the earnestness Jack Burnham ascribes (in an unpublished manuscript) to Duchamp. These allusions to the avant-garde artist authorize us to make connections among the other references to chess. These include an iron queen of a railroad carriage giving the lie to Spengler by drawing the preterite masses to the endgame of thermodynamic doom (3), and Weissmann delaying the end of a chess game

with Ilse to keep her from Pökler (407–08). The underground hero der Springer is "'the Knight who leaps perpetually . . . across the chessboard of the Zone'" (376). Slothrop plays chess with Pökler (576), uses a plastic knight Säure Bummer gave him as an underground ID when he meets der Springer (494), and, like der Springer, quantum-leaps around the zone. Slothrop's Soviet counterpart, Tchitcherine, talks chess metaphors with Wimpe (344), and plays chess with Mavrenko, "the most maniacal, systemless chess player in Central Asia" (611). All together, these references suggest that Duchamp's chess treatise on the geometry of Kings' movements at endgame might help model not only the relation between novelist and reader in the zone of the work itself, but also the systems theory of culture-formation, whose tropical sources are mostly physics and information theory. As I point out in the earlier essay, chess has been used as a trope for quantum electrodynamic laws by Richard Feynman and for language by Ferdinand de Saussure and Ludwig Wittgenstein.

[3] I am not assuming the facile dichotomy between cognitive and social domains, but locating processes (bottom-up emergences, top-down superimpositions) common to both realms. See, for example, the similar approaches of Edwin Hutchins and Varela, Thompson and Rosch.

[4] Here my distinction is quite arbitrary: I could have reversed focus, or addressed the representation of both subject formations and subject positions in terms of physics and cognitive science in the work of both Duchamp and Pynchon. This arrangement is simply an attempt to economize. Yet another purpose for arbitrariness is to challenge the stability of the concept postmodern, as I argue in my forthcoming *Fables of Self-Organization: The Cultural Work of Complexity in the Avant-Garde*. The tendency to use physics tropes from reversible and irreversible systems pervades the avant-garde strain of high modernism *and* the work of postmodern artists and theorists. Could Jean-François Lyotard have written *The Postmodern Condition* before he wrote *Duchamp's Trans/formers*? I doubt it. When I asked him, at the IGHLS Conference at Texas A&M in 1994, he was graciously but decisively evasive.

[5] This essay's vocabulary of portals, hinges and folds in the chessboard resonates powerfully with Deleuze's vocabulary of the fold in his volume on Leibniz, *The Fold*. The distinction between the geometric forms in the physical universe represented by relativity theory and its extensions (à la Wheeler), and those forms in the mind represented by the computational and emergent paradigms of cognitive science corresponds in rich ways with Deleuze's account of Leibniz's distinction between "The Pleats of Matter" and "The Folds in the Soul." To engage with *the Fold* here would have made the conceptual apparatus of this essay too complex, but see my forthcoming book mentioned in note 4 for a more thorough treatment.

[6] See Poincaré, *Science and Hypothesis* 51–88, and "On the Foundations of Geometry"; Bergson, *Matter and Memory* 211–12, and *Creative Evolution* 190–218.

[7]Domination of our cognitive processes by geometric forms has costs in terms not only of our ability to read our own minds, but of the schema by which we render intelligible our experiences, our intellectual disciplines, our fundamental epistemological assumptions, our institutional practices and social formations. Take, for example, the spatio-temporal orderings of metaphoric schema in the works of Lakoff and Johnson, put to polemical use in English studies by Mark Turner. Examined from the point of view of Varela's and Deleuze's distinctions between bottom-up processes of emergence and top-down superimpositions, the claims Lakoff, Johnson and Turner make about the systems by which we order phenomena reveal a major category error. The cognitive processes producing the metaphoric schema they claim are symptoms of the body in the mind seem, in fact, more like superimpositions. Like time-space matrices latticed onto phenomenal flux, these schema exhibit, in the language of Deleuze and Guattari, the properties of striations over processes of becoming traversing the global state, the BwO.

[8]For Prigogine, "Being" and "Becoming" are the metaphysical correlates of reversible and irreversible perspectives on time, the first premised on the reducibility of phenomena to geometric representation, the second recognizing the need for statistical modeling of the complexity at the heart of phenomena. Duchamp would have been fully aware of both the physical and the metaphysical implications when he said, "I don't believe in the word 'being.' The idea of being is a human invention" (Cabanne 38).

[9]To underscore the sense that Duchamp's playful physics is an application of the laws of physics to cognitive processes as revealed during moments of aesthetic apprehension, compare his representation of the hinge or hook of thought in reference to the illuminating gas with Poincaré's description of the stage of creativity he calls "illumination" amidst swarms of thought by reference to Epicurus's hooked atoms: "during a period of apparent repose, but of unconscious work, some of them are detached from the wall and set in motion. They plough through space in all directions . . . like the gaseous molecules in the kinetic theory of gases" (SM 61). Poincaré's language for habitual thought as anchored in an inertial frame and liberated thought as an entropic process characterizes the substance of thought in terms of reversible and irreversible perspectives. Art, for Duchamp, as delay, demonstrates its complicity with the habitual rituals of thought, except when its grounding assumptions become destabilized by the avant-garde event, for which the readymade is ready-made. I am indebted to Linda Henderson for alerting me to the passage in *Science and Method*. See also Henderson 120–41, and her *Duchamp in Context*, forthcoming from Princeton UP in 1997.

[10]See James's Derridean accounts of the implications of these puns.

[11]See Craig Adcock's discussion of Duchamp's cross-dressing and a "transsexual geometry," in his "Duchamp's Eroticism."

[12]Rosalind Krauss's exfoliation of the photographic imagery implicated in the terms delay and exposure in the *Green Box Notes* to *Large Glass* deserves mention because of the implied reference to the mechanism of the camera. See *The Optical Unconscious* 95-145. But note that what makes the mechanism of the camera interesting in terms of Duchamp's relation to Poincaré and Bergson (whom he read carefully) is the problem of representing things in the world and in time from the perspective of cognition as the experience of pure, contingent duration unsullied by clock time and calculus. For example, Poincaré writes of the flash of illumination that brings forth creative, transformative insight that it "never happens that unconscious work supplies *ready-made* the result of a lengthy calculation in which we have only to apply fixed rules. . . . In the subliminal ego, on the contrary, there reigns [at these moments] what I would call liberty, if one could give this name to the mere absence of discipline and to disorder born of chance. Only, this very disorder permits of unexpected couplings" (SM 62-63; Poincaré's emphasis).

[13]See his essay in this volume. See also Bernard Duyfhuizen on the reader-trap of Bianca.

[14]On the role of geometry in the art of Duchamp and his contemporaries, see Adcock and Henderson.

[15]"Physics and Hypertext." For a pointed response to this challenge to the liberatory rhetoric of hypertext theorists, see Stuart Moulthrop, "Rhizome and Resistance" and, with John McDaid, "'Not Yet Blindingly One.'"

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