

THE WIND AT ZWÜLFKINDER:
TECHNOLOGY AND PERSONAL IDENTITY IN GRAVITY'S RAINBOW

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two patterns create a third: a moiré, a new world of flowing shadows, interferences . . .¹

In the section of Gravity's Rainbow devoted to the story of Franz and Ilse Pöckler (397-433), Pynchon contrasts two models of scientific thought and perception. Like many characters in the novel, Franz separates the world into subject and object, habitually cutting himself off from outside sources of experience, and grounding his sense of reality in deterministic causal explanations. He is "the cause-and-effect man" (159), thus cast from his earliest appearance in the novel, whose patterns of thought and valuation presume the rigid dualities of Newtonian physics. Against the Newtonian model of the perceiving subject stands the opposing view of modern physics, one which permits no absolute division between the world and its perceiver, and which describes a more elastic reality than previous physical theories, with their reliance on the idea of causality, have been able to allow.²

These are highly polarized outlooks on the self and reality, and while they are not, as scientists and historians of science have cautioned, available for easy translation into literary terms, they do encourage a literary response. Pynchon's preoccupation with paranoia, for example, as both the perception and the projection of highly structured, ineluctable mechanisms of control transforms an intensely private worry into a powerful expression, and sometimes parody, of the Newtonian world view. Where patterns abound in Pynchon's writing, as in nature, we seek evidence of a purposive meaning within or beneath the connections.

And yet, if paranoid suspicions of all-encompassing mechanism grip the reader of Gravity's Rainbow, there is also the countervailing model of the new physics, a model which, apart from all it implies about how our senses perceive the world, can also reveal something about how we are intended to read Pynchon. Recent critics, aware of the many epistemological concerns shared by writers and scientists, have seen fit to treat the indeterminacy of meaning that we inevitably encounter in Pynchon's text as a structural analogue of Heisenbergian indeterminacy. Such readings are offered, for the most part, in justification of the supposed intractability of Pynchon's text--creating a scientific rationale, as it were, for the novel's resistance to analysis.

Despite such a reassuring formal implication, however, the philosophical implications of quantum mechanics can provide only

a partial analogue for Gravity's Rainbow's world view. The difficulty is not simply that references to quantum mechanics in Gravity's Rainbow are rare and, when they do occur, oblique. These references provide proof enough of Pynchon's familiarity with the epistemological lessons of the new physics. But they do not imply a straightforward application of the lessons. As physicist and literary critic Alan Friedman notes, Pynchon in Gravity's Rainbow questions the tenets of the new physics at least as thoroughly as those of former times: "the world views associated with quantum physics are ultimately considered as an equal and opposite madness to the paranoia that threatened when all-encompassing linkages were the model for explanations. . . ."3 If Friedman is correct, Gravity's Rainbow does not depend on the accepted truths of contemporary science for thematic truths any more than it relies on an outmoded Newtonian vision. The new physics and the old are better viewed as the complementary halves of Pynchon's vision, simultaneous orders that are neither affirmed nor denied, but, like the superimposed lines in a moiré, joined together in a pattern of tensed opposition.

Like many other components of Pynchon's vast novel, the clusters of images that constitute the textual reality of the Pöckler story appear to have been prompted by a complex technological setting. In Gravity's Rainbow, the technological landscape created by human beings is part of the natural landscape, and its elements influence the characters' sense of communal and individual identity. Thus Pöckler, a wartime rocket engineer at the Third Reich's Peenemünde research facility, continually brings technology to bear on his conscious intellectual and emotional life. Franz himself only rarely and imperfectly intuits his involvement with the people and conditions of the world outside, but although this character's alienation and perceptual failure are a recurrent theme, Pynchon generates an alternative structure of possible human relations in the narrative's dual symbolism.

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. . . barn-swallow souls, fashioned of brown twilight, rise toward the white ceilings . . . they are unique to the Zone, they answer to the new Uncertainty. Ghosts used to be either likenesses of the dead or wraiths of the living. But here in the Zone categories have been blurred badly. The status of the name you miss, love, and search for now has grown ambiguous and remote, but this is even more than the bureaucracy of mass absence--some still live, some have died, but many, many have forgotten which they are. Their likenesses will not serve. Down here are only wrappings left in the light, in the dark: images of the Uncertainty. . . . (303)

In this passage the narrator of Gravity's Rainbow uses the Heisenbergian motif to surprising effect, presenting under the rubric of "the new Uncertainty" a confusion of categories that blurs even the line between living and dead souls. The scene is the underground Mittelwerke in Nordhausen, which, years before the narrative present, Gerhard Degenkolb had built under a mountain to protect the rocket works from air attack. Pöckler had come to the Mittelwerke "in early '44, as the rocket was going into mass production" (283) to work at the procurement end of the V-2's fast-expanding bureaucracy. But what was then the scene of frenzied activity is now depicted as a strangely Disneyfied tourist attraction that, since the plant's evacuation in February and March of 1945, has come to resemble nothing so much as a buried necropolis.

. . . once upon a time lathes did screech, playful machinists had shootouts with little brass squirt cans of cutting oil . . . knuckles were bloodied against grinding wheels, pores, creases and quicks were stabbed by the fine splinters of steel . . . tubeworks of alloy and glass contracted tinkling in air that felt like the dead of winter, and amber light raced in phalanx among the small neon bulbs. Once, all this did happen. (303)

The factory assembly line is abandoned now--"only the lateness and the absence that fill a great railway shed after the capital has been evacuated"--and the narrative moves, in a passage that recalls the "rush of souls" through an evacuating city at the book's opening, through "[l]akes of light, portages of darkness," as "[e]ntrances to cross-tunnels slip by like tuned pipes with an airflow at their mouths" (303).

Here we have forecast many of the central themes and images that will come to define Franz Pöckler's textual reality, a reality in which the concrete technological imagery that is so pervasive in Pynchon is made to suggest an almost ghostly presence. In Franz's specific case, "the name you miss, love, and search for" could be either Ilse, his daughter, or Leni, his estranged wife, both of whom were taken by the SS soon after Franz himself had gone to Peenemünde to work under the historical rocket pioneer von Braun and the fictional Major Weissmann. When Weissmann arranges for him to see his daughter, Franz is never sure whether the girl he meets is really Ilse or some hired model, her "likeness" made to serve. This uncertainty becomes, as we shall see, one of the recurrent themes of the Peenemünde chapter. But what is more generally characteristic of Pöckler's story, and of the overall story of the research and development that lead to the V-2, is the powerful juxtaposition of the engineers' perfectly ordinary, workaday experience and a vacuous, ghost-like uncertainty that interpenetrates and quite often subsumes that experience.

One of Pynchon's primary images for this uncertainty is the wind at Zwölfkinder, the site of a decaying amusement park where Franz sits waiting at the start of the Peenemünde chapter. Thus early in the story, before Pynchon enters into his masterly description of the V-2's assembly, he introduces his subject with a musical image. Thomas Schaub has written eloquently of Pynchon's "Orphic Voice"--its elegiac concern with "the connections and continuities of loss and separation,"⁴ its intimations of wholeness in the relations among fragments--and this description applies to the sounds and voices that now impinge on Pöckler's consciousness. Like the Romantic metaphor of the correspondent breeze, the wind here represents a predominant theme of continuity and interchange between nature's outer motions and the interior life and emotions.⁵ But where the central mediating figure for the mind and nature in the greater Romantic lyric was the aeolian harp, Pynchon's mediating image is taken from the technology of organ pipes:

If there is music for this it's windy strings and reed sections standing in bright shirt fronts and black ties all along the beach, a robed organist by the breakwater--itself broken, crusted with tides--whose languets and flues gather and shape the resonant spooks here, the candleflame memories, all trace, particle and wave, of the sixty thousand who passed, already listed for taking, once or twice this way. (398)

Initially this sentence looks backward to find its referent, "this" motioning to the scene at Zwölfkinder which for Franz is suffused with mystery, its light "precarious to him as candles and goodnight cigarettes." The next word, "it's," does not lead to the anticipated description of the sort of music this scene might call to mind, but instead shifts the prose forward into an alternate description of the scene, a renewed vision of its elements. The rusted iron amusement park animals, "their heads jittering with air currents," turn into windy strings and reed sections; black snakes on a background of painted sunlight become, with a little imagination, the black ties over the players' bright shirt fronts; the breakwater, "itself broken, crusted with tides," at night after ebb tide may become the gathering flue pipe (the ambiguous "whose," like the shifting "it's" before, helps to bring about this transformation).

Pynchon is doing more here than simply introducing music imagery to complete his composition of the scene at Zwölfkinder. The music is less a part of the external landscape than it is created in a process of verbal transformation: "If there is music," if there is an order beyond the initial scene that remains unformed before Franz, then that music is at once called up by and heard in the gathering and shaping of the prose. Independent of any single perceiving consciousness, one world is transformed into a simultaneous, alternative world.

Pynchon uses wind and music imagery in *Gravity's Rainbow* to transform or shape not only the elements of the fictive landscape but also the substance of time. Impressions from Franz's personal experience are brought together as the sea wind at Zwölfkinder revives in him a collection of precarious "candleflame memories." These include: his arousal one night in the late twenties or early thirties watching "tonight's image" (397) from an erotic film, *Alpdrücken*, starring the languid seductress Greta Erdmann; his fantasy at home later that night when he steps into the role of Erdmann's leading man, "and Leni no longer solemn wife, embittered source of strength, but Margherita Erdmann underneath him" (397)--such is the effect of Franz's imagination; his six previous visits to Zwölfkinder with Ilse, the daughter he fathered that same "Alpdrücken night" (397); his "wasted time" (155) with Leni ("They fucked so seldom any more"[397]). Perhaps the story of Franz's years working to help develop the V-2 at Peenemünde (1937-44) and later at the Mittelwerke in Nordhausen goes through Franz's mind at this very moment as he waits for Ilse to return yet again. That Franz's experience is now converging all at once in his memory is expressed through the continuing use of the present tense, which blurs recollections from various times; but this temporal convergence is also expressed in the transitional image of the flue pipe, a mechanism that works by channelling a random and turbulent jet of air at the languet into one resonant current in the pipe body.⁶

Pynchon's image for an imaginative shaping form, the organist's languets and flues, is thus closely analogous to the transforming or shaping prose. Moving through this transitional passage, both the elements of the scene at Zwölfkinder and Franz's inchoate memories follow the random flow of air through a musical instrument, so that the scene and the memories, as if they were transformed into sound, are given a sense of presence, and the resonant spooks seem to exist literally on the page: "here."

The unique thing about this self-reflexive moment in Pynchon (which distinguishes it from other devices of reflexiveness as they are most often used by other modern and post-modern writers) is its suggestion of outward relations. We hear the narrative voice calling for a transitional music, and that music is the transition itself. The writing is neither wholly mimetic nor self-absorbed and insular. The referents never quite leave the surface of the text, although the effect is not to mire the prose in its own mechanisms but to gather and shape a reality that is external to them.

Pynchon extends the musical image to include not just Franz's memories but memories of "the sixty thousand who passed" through Zwölfkinder before him, and thus suggests a possible relatedness, beyond anything Franz is able to comprehend, of all human experience. The questions that follow the Zwölfkinder

transition reveal the depths of such an image of personal connection:

Did you ever go on holiday to Zwölfkinder? Did you hold your father's hand as you rode the train up from Lübeck, gaze at your knees or at the other children like you braided, ironed, smelling of bleach, boot-wax, caramel? Did small-change jingle in your purse as you swung around the Wheel, did you hide your face in his wool lapels or did you kneel up in the seat, looking over the water, trying to see Denmark? Were you frightened when the dwarf tried to hug you, was your frock scratchy in the warming afternoon, what did you say, what did you feel when boys ran by snatching each other's caps and too busy for you? (398)

Few readers will recall from some 250 pages back that Leni grew up in Lübeck. It is rather more likely that we experience Lübeck as one of several concretizing details in this passage that shift the prose away from mounting abstractions and into a vivid scene. This shift, along with the use of the second person, invites the reader herself to be gathered among the sixty thousand, "the other children like you," and perhaps enacts within the reader's response the perception, so rarely attained by Pynchon's characters, of interlinked human experience.

Franz himself, though he doesn't see it, is also gathered among the Zwölfkinder revenants. Earlier in the novel a brief parallel passage had described him as a child with his parents riding a train, not from Lübeck to Zwölfkinder, but to the Rhine falls, where he "held on to both their hands, suspended in the cold spray-cloud with Mutti and Papi, barely able to see above to the trees that clung to the fall's brim in a green wet smudge [. . .]" (160). The connections that the prose only hints at are never perceived by Franz. His own memories remain for him apart from the sixty thousand and from Leni, though he does at times think of her as "his own ghost" (399). Franz's childhood memory was called up in response, not to other people, but to a static test at the rocket field in Reinickendorf: "These were the kinds of revenants that found Franz, not persons but forms of energy, abstractions. . . ." (161).

The rare warmth at the start of the Peenemünde chapter depends largely on Pynchon's use of wind and music imagery to depict Franz's isolation from people, memories, and a precarious physical reality. From the reader's point of view, the musical figure suggests that an individual's isolated subjectivity and the haphazard elements of the world outside are to be reconciled to one another in an imaginative order of art. But even as Pynchon gathers the dual elements of the fictive landscape into a finely coherent unity, Franz's own relation to reality remains uncertain. Considering himself to exist independent of what is

outside him, he will be compelled to alternate between his accustomed sense of isolation in an emotional vacuum and, as during the static test at Reinickendorf, the sense that he is threatened by a wind of energy and abstraction.

As Pynchon elaborates Franz's uncertain relation to the fictive landscape, this character's incompatible experiences combine to form a single coherent image of human subjectivity. To a large degree, however, the construction of a perceiving subject or subjective identity in the Pöckler story has already been anticipated by the figure of the robed organist at Zwölfkinder: "whose languets and flues gather and shape [. . .] all trace, particle and wave." The scientific theme, though it is voiced quietly, constitutes a pervasive organizing motif in Gravity's Rainbow. The modern conception of the dual nature of light (particle and wave) admits two seemingly contradictory hypotheses within the scientific canon; the limitations of the concept of light as a particle are revealed by considering the concept of a wave, and vice versa. This "principle of complementarity," so named by Niels Bohr, is not restricted to the interpretation of light but applies to all forms of matter (electrons, protons, and other elementary particles) and to the description of particle interactions at the atomic level. (Although it is not intuitively obvious, a short derivation takes one from Bohr's idea of complementarity to Heisenberg's relation of indeterminacy between the position and momentum of a particle.⁷)

The scientific allusion at the start of the Peenemünde chapter, with all it implies for the interdependence of conflicting modes of description, may stand as a loose analogy for Pynchon's representations of complementary realities to be perceived by the self. So much should be apparent at the conclusion of this essay. The point I wish to stress here is that the ultimate vision in Gravity's Rainbow of human relatedness, as it is expressed early in the Peenemünde chapter's opening scene at Zwölfkinder, exceeds even the terms set in place by Pynchon's scientific analogue. That the controlling theoretical conception of complementarity should contain only a limited part of Pynchon's fictional reality should not be too surprising. In the words of Werner Heisenberg, the existing scientific concepts themselves will inevitably cover "only a very limited part of reality, and the other part that has not yet been understood is infinite." For Heisenberg, as for Pynchon in Gravity's Rainbow, "modern physics has perhaps opened the door to a wider outlook on the relation between the human mind and reality," but such an expanded outlook is irreducible to "the closed frame of scientific thought." The reading which follows, though it organizes itself through the Heisenbergian perspective, tries not to substitute this theoretical framework for the picture of reality that ultimately emerges in Pynchon's narrative. It is only through language, Heisenberg argues, that "we can be certain to touch reality"--not, to be sure, the idealized and technical reality

of particle physics, but that subjective, representational reality which human beings create in the very development of a natural, communal language.⁸ The final picture of the real in Gravity's Rainbow will likewise emerge only when the reader has experienced the imaginative force of Pynchon's own language.

2

In a moment of inspired paranoia, the narrator of Gravity's Rainbow asks us to consider the following possibility:

What if there is no Vacuum? Or if there is--what if They're using it on you? What if They find it convenient to preach an island of life surrounded by a void? Not just the Earth in space, but your own individual life in time? What if it's in Their interest to have you believing that? (697)

Although this remark is not specifically addressed to Franz, it suggests an appropriate consideration for understanding his condition: unable to penetrate the mystery behind a scene that moves him or to hear a music outside his range of imaginable frequencies, incapable of connecting his own individual experience with the experience of others, Franz lives most of his life as a self-contained consciousness embedded in a void. More than a simple case of alienation or spiritual depression, this is a condition that is rather well suited to the Reich's projects, for as Joachim Fest points out in The Face of the Third Reich, "the self-chosen isolation of the technological mind is one of the keys to its total readiness to serve."⁹

Yet even though Franz's subjective universe is empty of other people and lacking in imaginative substance, he cannot escape feeling threatened by "forms of energy, abstractions." At such moments of vulnerability the vacuum imagery that describes him is internalized to express his emotional hollowness. When he is confronted, for example, with the unsettling possibility of experiencing a selfless love for Ilse, Franz feels the void inside, and "[t]he vacuum of his life threatened to be broken in one strong inrush of love" (407). Franz maintains his internal vacuum, however, with seals of paranoid suspicion, inventing complications to insulate him from forces that threaten to subsume his isolated self. He imagines that the girl who after years of separation has appeared at his quarters in Peenemünde is not Ilse at all, but an Ilse look-alike sent by Weissmann for reasons he will never fully understand. Franz opts to wait out this game to see what variations Weissmann is going to try next, glad in the meantime to have his anger at Weissmann "to preserve him from love he couldn't really risk" (408).

But are the complications merely invented, or does Franz have cause for his suspicions? It is no matter; either way Weissmann and the Reich have an emotionally detached chemical

engineer they can count on for minor but crucial work on the V-2. We are never told outright to what extent Weissmann actually masterminds the plots Franz attributes to him, but we do learn that Franz has been saved for nothing more than the fitting of a plastic fairing "of a certain size, with certain insulating properties" (431), which is presumably the Impolex shroud lining Weissmann's Rocket 00000. There is a subtle irony, probably intentional, in the parallelism between Franz's emotional self-containment and the literal containment he helps to engineer. The irony becomes more pronounced at the end of Gravity's Rainbow, where, as if to suggest the disastrous consequences of putting up emotional barriers that only serve the Reich's destructive purposes, the doomed astronaut Gottfried is trapped inside the plastic shroud that Franz had helped to retrofit.

Franz thus resists losing himself emotionally in love for Ilse and Leni only to face the related threat of losing himself to the developing V-2. "Pöckler was an extension of the Rocket, long before it was ever built," and with this intriguing inversion of Marshall McLuhan's idea of technology as the extension of man, Pynchon insinuates the rocket into the very substance of Franz's perceptions. The emptiness that Franz recognizes in himself after Leni leaves him begins gradually to be replaced by the rocket's parameters: "Temperatures, velocities, pressures, fin and body configurations, stabilities and turbulences began to slip in, to replace what Leni had run away from." The rocket beckons Franz to shed his personal identity, calls him to enter a "monastic order" of sorts (402), and he does his best to control this "assumption" (405) of himself into the rocket by constructing with the aid of his engineering skill a "secular buffer." This construction involves planning and building cutaway models of the rocket to lay bare its logical working connections, converting the "terror" of exponential curves--swiftly nearing but never reaching infinity--into "the linear, the safe" representation of the logarithmic scale, and finding a specious safety "among the indoor abscissas and ordinates of graphs" (399). The graphical analogy is particularly appropriate to Pöckler because, just as data graphics are relational and not of necessity tied to coordinates of time or space, so too does Franz's personality shape itself abstractly, without sufficient regard for the concrete ends and applications his professional experience must imply.¹⁰

Useful as these engineering activities are in his job, Pöckler's immersion in them puts him out of touch with the emotional and human demands of life; instead of protecting him from the rocket's very real dangers, they draw him further into the service of its impersonal technological requirements. Feeling the rocket take hold of his subjective reality, Franz seeks refuge in fanciful analogies: the lines of his graphs resemble the grid of grooves between cobblestones in "the streets of Ant City," where Franz could move, "finding the

points he needed not by running the curve itself, not up on high stone and vulnerability, but instead tracing patiently the xs and ys, [. . .] moving always by safe right angles along the faint lines. . . ." (399).

Thus terrified by both life's moment-by-moment curve and the rocket's "obstinate and palpable mystery" (402), Franz in his work methodically replaces them with something less real, with artificial maps of reality on Cartesian grids. He dreams of the rocket, not as a literal, moving rocket with a payload, not as a weapon which could be used in the field to kill people ("That hadn't ever been the point"), but as "a street in a certain small area of the grid" (400). Franz associates the street with the anti-Nazi street actions that had terrified him before the war, so by translating the daytime image of safety in abscissas and ordinates into the dream vision of the street, Pynchon deftly evokes the fear that underlies and silently motivates the engineer's work.

In an earlier passage, Leni embraces the street as a place to shed one's sense of self and time in the midst of violent political action. She tries to get Franz to come out of his protective self-enclosure by explaining to him about

[. . .] the level you reach, with both feet in, when you lose your fear, you lose it all, you've penetrated the moment, slipping perfectly into its grooves, metal-gray but soft as latex, and now the figures are dancing, each pre-choreographed exactly where it is [. . .] (158).

Here, as in the Zwölfkinder passage cited in Part 1 above, an abstract and difficult idea finds its concrete verbal expression in Pynchon's remarkably sensuous prose. Leni imagines entering the moment like a stylus first moving into a long-playing record, and Pynchon enacts the merging process in the prose by first returning periodically to the subject, "you," and then, after an unobtrusive shift of tense, quietly dropping it. With the grammatical subject thus effaced, we can imagine Leni being drawn by the balletic action centrifugally outside her oppressive center of consciousness, remaining alive to change and yet smoothly embedded in a continuing present.¹¹

In pre-war Berlin, when the German Society for Space Navigation had just begun accepting Army funding to go forward with its experiments in rocket propulsion, Franz's rationalist discipline and an engineer's "deep conservatism" (239) equipped him with reasons enough for rejecting Leni's revolutionary mysticism. Moreover, he simply didn't possess the intense subjectivity demanded by the intuitive moment. Leni's street is a locus of intuitive experience that cannot be mapped, but that can be expressed only through a subtle language of transformation. But Franz, to protect his own island of consciousness from being subsumed in either the street-moment or

the street-rocket, continues to build models, trying to locate the rocket early in its development at a certain street on the Cartesian grid. And yet, despite all his attempts at rationalistic de-mystification, the image of the street would come to dominate his nighttime consciousness. In his dreams, the rocket resists positive location by a static, objectifying language: "The coordinates were clear in his mind, but the street eluded him" (400).

As another barrier to place between himself and the rocket's inner, threatening mystery, Franz uses that most powerful tool of the secular positivist's world, the engineer's limiting calculus, which cares nothing for "the penitentials of the moment, or last mysteries" (426). To hold back what must appear to be the most absurd of all this mystical rocket's strange powers--the culminating blast at the end of its airborne arc--Franz uses calculus to create the illusion of stilled change. He integrates twice to convert acceleration to velocity, velocity to the paper safety of static distance: "The moving vehicle is frozen, in space, to become architecture, and timeless. It was never launched. It will never fall" (301).

In practical, technical discussions, when engineers or scientists need not really understand the subtle inner workings of a device but need only know its functional characteristics at the outputs, they will often refer to such a device as a "black box." It is hardly possible to move for long in any engineering environment (and Boeing Aircraft in Seattle, where Pynchon worked while writing *V.*, is probably no exception) without hearing this generic phrase occasionally tossed about. The engineering term is a good one for describing Franz's perception of the rocket: to avoid understanding it (physically and symbolically, to avoid "getting inside" its working mechanisms) Franz constructs models that keep back the rocket's mysteries and restrict it to a rational, narrowly functional status. But these empirical, reductive models tell the engineer nothing about that which is still functional and "black" inside. Pynchon is very likely playing on the mysterious overtones carried by this common engineering term by calling the elusive Rocket 00000 the "Schwarzgerät."¹²

Despite the protective workaday buffer of his engineering craft and language, at the outermost edge of Franz's senses and emotions remains the fear of losing himself entirely to the rocket. During an early test rocket blast at Reinickendorf, there was "no way for the moment of knowing if he was still inside his body" (161). During a later test at Blizna, although "[c]hances are astronomically against a perfect hit," Franz can't help imagining that Weissmann has provided for a cooperation of all flight tolerances, the collapse of the ballistic Ellipse of Uncertainty onto Pöckler's center of observation, to obliterate for good "his own personal ass whose quivering sphincter is centered right on Ground Zero" (425).

Though usually able to suppress the cold knowledge that all of his work and many of his actions will ultimately contribute to human death on a vast scale, Pöckler does have a moment when he senses the full implications of his "guiltmaking craft":

Because something scary was happening. Because once or twice, deep in the ephedrine pre-dawns nodding ja, ja, stimmt, ja, for some design you were carrying not in but on your head and could feel bobbing, out past your side-vision, bobbing and balanced almost--he would become aware of a drifting-away . . . some assumption of Pöckler into the calculations, drawings, graphs, and even what raw hardware there was . . . each time, soon as it happened, he would panic, and draw back into the redoubt of waking Pöckler, heart pounding, hands and feet aching, his breath catching in a small voiced hunh--Something was out to get him, something here, among the paper. The fear of extinction named Pöckler knew it was the Rocket, beckoning him in. If he also knew that in something like this extinction he could be free of his loneliness and his failure, still he wasn't quite convinced. . . . So he hunted, as a servo valve with a noisy input will, across the Zero, between the two desires, personal identity and impersonal salvation. (405-06)

Alternation between a sense of self embedded in a silent and lonely void and a sense of self lost in an overwhelming aether (not of sound and imaginative warmth--the "Soniferous Aether" [695]--but of energy and abstractions [161]) sets up a fragile tension at the nighttime edge of Franz's perceptions.

But these are edges that Franz only rarely glimpses--"in the ephedrine pre-dawns" when vision penetrates the illusions of waking reality--and the alternative to his loneliness and failure is uncertain. Does the rocket promise transcendence or extinction? Franz draws back from the vision in fright and lives most of his days using "the gift of Daedalus," the first engineer, to fortify his labyrinthine redoubt against the rocket.

Franz engineers his emotional life with the same care. His bursts of love for Ilse are renewed at each of the yearly summertime visits the Reich allows. Franz, whose engineer's training alerts him to analogies and correspondent models, is quick to find images that imply "his own cycle of shuttered love." The nearest at hand is the wind-tunnel at Peenemünde, where Franz would stand "listening to the laboring pumps as they evacuate the air from the white sphere, five minutes of growing void--then one terrific gasp: 20 seconds of supersonic flow." By an act of will comparable in its exertion only to the force of the pain it holds back, Franz broadens his time base to a year, and so builds the "illusion of a single child" (422). The

key thing for him is always to perceive his daughter's identity as an illusion, and he is willing to go so far in this as to allow that the child he sees may not be the same child every year, but one of several thousand acceptable Ilse's available to the Reich. For as long as Franz suspects Ilse's status as a single identity, his periodic bursts of love can be dampened out by suspicion to safe, controllable levels. The vacuum of the wind-tunnel represents for him the subjective void surrounding and preserving his lonely center of personal identity, and if it is to remain intact, he can't risk an unrestrained emotional contact with another person. Franz attenuates his perceived reality of a daughter's single identity so that he can preserve the constructed, daytime reality of his perceiving self.

The ontological status of Franz's perceptions is made yet more uncertain by another analogy for his relationship with Ilse. A great movie buff, Franz thinks of the persistence of vision that holds between successive frames as they flash from the screen to create for the viewer an illusion of continuous movement. Back in Berlin before the war, he would "[nod] in and out of sleep" as he watched ordinary movies, using not the physical connective of persisting vision but extraordinary powers of cause-and-effect thinking to bridge "the fragments he saw while his eyes were open" (159). By thus threading occasional glances of moving pictures, he would construct his own rarefied but continuous story.

The film metaphor expands to include other, less bizarre ways of constructing artificial continuities: the technicians at Peenemünde, for example, use cinetheodolite photographs--pictures of the rocket taken at discrete points along the continuous arc of its movement--to "counterfeit" an image of the rocket's flight. Using a related analytic technique, which was to result in the invention of calculus, Leibniz had broken up the trajectories of cannon balls in flight, imposing artificial divisions in time to bring the infinitesimal moment into the realm of rational analysis. At one point the narrator asks whether this is not "every paranoid's wish? to perfect methods of immobility?" (572), and this characterization is well suited to Franz's dissection of motions, for he employs the technique to help fight his growing fear that Weissmann and the rocket are "out to get him."

The movie analogy, then, as it is used in the Peenemünde section to describe Franz's relation to Ilse and the rocket, is one of Pynchon's devices for calling into question our insistence on framing experience according to traditional mechanistic (i.e., Newtonian) notions about causal connections. It seems reasonable to conclude, with Mark Siegel and others,¹³ that Franz and the other paranoid or scientific analysts, because of their insistent imposition of artificial causal connections onto the flux of experience, compromise reality. Robert Nadeau adopts something resembling this view when he writes that "Pöckler as a rationalist is incapable of intuiting

that all human activity is interconnected and also that much of that activity is irrationally motivated."¹⁴

And yet, if Pynchon portrays Pöckler and the other Peenemünde engineers as compromising reality, he makes it difficult for readers to go beyond this accusation and determine just what, in the context of Gravity's Rainbow, this violated reality might be. For if Franz's perception of Ilse as a single identity is illusive, ours is apt to be little better should we attempt to construct for her a stable and coherent identity as a character in fiction. We are never told, of course, how valid Franz's suspicions are, but the uncertainty about Ilse's identity is even more deeply ingrained in the narrator's presentation of her. At one point, for example, her identity is commingled with that of Gottfried, Weissmann/Blicero's catamite; for just as Ilse once delighted her father with dreams of building a house overlooking the "seas" of the moon (410), so would Gottfried whisper Blicero to sleep "'with stories of us one day living on the Moon'" (723). Franz and Blicero each laments his child's abandoning of the dream.

This connection is not an isolated coincidence, but part of a large and bizarre complex of analogies stemming from film director Gerhardt von Göll's erotic thriller Alpdrücken.¹⁵ Greta Erdmann, the star of that movie, conceived a daughter, Bianca, during the filming of the eminently realistic gang-rape scene, and Franz, as was noted above, had Erdmann's image in mind when he fathered Ilse on Leni. The narrator suggests that Franz wasn't the only viewer so affected ("How many shadow-children would be fathered on Erdmann that night?"); perhaps the film spawned an entire generation of German children.

At one level, then, Ilse and Gottfried are linked to each other as versions of Bianca on this side of the screen. But the analogies keep proliferating. The Alpdrücken scene, far from being the "real" source underlying the creation of illusive characters, is itself patently illusive, because in filming it von Göll, who was experimenting at the time with gnostic symbolism, used a double lighting technique that gave each actor two shadows, one for Cain and one for Abel. At this point Pynchon has sufficiently undermined the usual distinctions between film and reality to halt the profusion of layers and invite us into a world grounded in analogical correspondences, insisting that above all of von Göll's expressionistic imagery the connections between the living shadow-children are real; the children persist on this side of the mediating screen beyond the film's end, "not out of any precious Göllerei, but because the Double Light was always there, outside all film, and that shucking and jiving moviemaker was the only one around who happened to notice it and use it" (429). The double connections between characters that exist "outside all film" are then adopted as a disorienting but consistent analogical construction of reality inside Gravity's Rainbow. It is thus possible, when

working under such a conception of reality, for the narrator to make a comment like this: "Ilse, fathered on Greta Erdmann's silver and passive image, Bianca, conceived during the filming of the very scene that was in his thoughts as Pöckler pumped in the fatal charge of sperm--how could they not be the same child?" (576-77).

The relation between reader and character in this new mode of reality is, in effect, the inverse of the relation between Franz and his daughter: whereas Franz connects multiple year-to-year images of a child with a single name, Ilse, we are led to blend into the same person a series of characters with different names. For us Ilse's stability is no less illusive, her identity no more particular or coherent than it is for Franz.

3

"Not produce," she tried, "not cause. It all goes along together. Parallel, not series. Metaphor. Signs and symptoms. Mapping on to different coordinate systems, I don't know . . ." She didn't know, all she was trying to do was reach. (159)

Leni's image of a single parallel movement represented on "different coordinate systems" is a good one for describing Pynchon's analogical treatment of character whereby two characters with different names may appear simply to be different representations of the same person. As Leni suggests, such a world of analogy and metaphor cannot be apprehended by following a linear unfolding of narrative sequences bound together by causal relations. It is not possible, for example, to explain the coincidence of speech between Ilse and Gottfried--who may pass by each other but never meet (see 429)--in terms of one utterance causing the other.

Leni's argument thus places opposing modes of constructing reality and character identity in direct confrontation. We have seen in some detail how Franz, using the rationalist mode to create comprehensible structures, protects himself from the risk of love for his daughter and from the threatening aether outside. Pynchon devotes a chapter to another character, Miklos Thanatz, who is plunged into a world constructed from the second, metaphorical mode. The chapter opens with the narrator's weary submission to our rational expectations:

You will want cause and effect. All right. Thanatz was washed overboard in the same storm that took Slothrop from the Anubis. He was rescued by a Polish undertaker in a rowboat, out in the storm tonight to see if he can get struck by lightning (663).

The narrator's conciliatory gesture, however, is merely gratuitous, for although Thanatz's story is told in a narrative

that sticks to a linear and sequential pattern of causal connections, everything in this world works against such connections. The Polish undertaker, for example, who is the vehicle for one of the first causal links, is out looking for a point of discontinuity along the accustomed curve of life, a vanishing instant outside the grasp of all rational calculation and only approached by the methods of calculus, which only the lightning-struck (the enlightened? "Those who know, know") have experienced. Thanatz has been thrown overboard into a sea of metaphor and accident, and "[t]here's no counting on any positivism to save him" (668). We can think of this sea-world as another image for the subsuming, non-rational aether which Franz, in that ephedrine pre-dawn, draws violently back from.

In this disorienting world, analogical relations become for Thanatz a reality, and through a moment of precarious insight when Thanatz understands the implications for human identity that such a reality holds, we can get some sense of how we are to take this strange counter-world to the rational. Thanatz knows that he has lost both Bianca and Gottfried, but he is not sure "even if they aren't two names, different names, for the same child . . .":

but then in the crash of others' flotsam, sharp edges, and high-spin velocities you understand, he finds he can't hold on to this thought for long: soon he's floundering in the open water again. But he'll remember that he held it for a little, saw its texture and color, felt it against the side of his face as he woke from a space of sleeping near it--that the two children, Gottfried and Bianca, are the same. . . .
(671-72)

Thanatz's uncertain insight, like the ambivalent insight that comes to Franz at the threshold of sleep, is only momentary, and then he returns, not to an isolated waking vigilance, but to a life "floundering in the open water again." And once again we return to the inverse image of Franz's island of isolation: is Thanatz's sea of shadows and accident a more valid or humane reality?

Thanatz escapes the insular world that Franz makes for himself, but he does not approach anything like the intense intersubjective connection with others, the communion with "the other children like you," posited at the start of the Peenemünde episode. His connections with other people merely place him lost amidst the flotsam of an indistinguishable and lost humanity. This condition is no better than Franz's; where Franz maintains a suspicion about Ilse that attenuates his own love, Thanatz feels himself suspended before Bianca in "perpetuate doubting of her love--" (672; note the inversion of their situations in even this detail). Thanatz is not isolated; he is never in doubt as to his own self-consistent reality, but he does question the reality of the indistinguishable others:

"when mortal faces go by, sure, self-consistent and never seeing me, are they real? Are they souls, really? or only attractive sculpture, the sunlit faces of clouds?" (672; my emphasis in each of the last two quotations).

Taken alone, either of the two modes of representation in Gravity's Rainbow, causal connection or analogical integration, will ultimately reveal characters in perpetually uncertain relations to their world. And since the novel never explicitly denies or sanctions either mode, but simply presents both, this uncertainty extends to the relation between the reader and the text. As Franz chooses between personal identity and impersonal salvation, so we are left choosing between a world and its inverse; but rather than encourage us to settle at last on one or the other, Gravity's Rainbow sustains our uncertainty. Its representations of reality require a dual reading in which the inverse constructions are held together, not as separate truths, but in mutual dependence, to describe an unnamed truth that is different from either mode of description.

4

if the web were perfectly pre-set,
the spider could
never find
a perfect place to set it in: and

if the web were
perfectly adaptable,
if freedom and possibility were without limit,
the web would
lose its special identity¹⁶

Pynchon sets simple, binary possibilities into intricate patterns indeed. Relying on causal connections blinds Franz to real connections between himself and other people and leads him to build a fragmentary image of his daughter's identity--though neither can tracing a proliferation of analogies lead of itself to a stable perception of reality. Franz in his rigid solitude heads toward that precarious state of paranoia in which gaps take substance along rarefied lines of continuity; long years of absence cling to the brief periods of Ilse's visits; blanks between movie frames fill with a persisting vision; the trajectory Franz charts along points of the rocket's flight stands motionless in space. For Franz as for many other characters in Gravity's Rainbow, this state of mind is "nothing less than the onset, the leading edge, of the discovery that everything is connected, everything in the Creation." It may be a valid and necessary insight into the novel's world--the discovery of a certain operational method that seeks out connections under the assumption that there is a pre-set, all-encompassing master-plot; but this insight is only "a secondary illumination--not yet blindingly One, but at least connected" (703). Franz's paranoid construction of

deterministic connections is what enables him to sustain his sense of a personal identity.

The alternative state of mind, in which one envisions analogical relations and character doublings in such proliferation that psychological particularities begin to blur, is not a saving alternative to paranoia. In the section of Gravity's Rainbow just following the Peenemünde episode, the narrator gives this alternative state a name: "If there is something comforting [. . .] about paranoia, there is still also anti-paranoia, where nothing is connected to anything, a condition not many of us can bear for long" (434). Such infinitely adaptable fictions of continuity in Pynchon's novel, as in Ammons's poem, are associated with a loss of all distinctions. One such plastic fiction causes, for example, the shadow-children Ilse, Bianca, and Gottfried each to lose her "special identity."

Pynchon's dual symbolism is similar to the dual images embodied in Ammons's web:

the row-strung garden web
keeps order at the center
where space is freest (interesting that the freest
"medium" should
accept the firmest order)

and that
order
periphery diminishes toward the
allowing at the points of contact
entropy equal to entropy.

This is no simple dichotomy, but a complex and multifaceted description of reality. The web exists neither in the firm order of its center nor fully in the infinite adaptability at its periphery. But even these equations of center with order and periphery with adaptability break down, because, paradoxically, "space is freest" at the ordered center, and disorder and order coexist at the periphery, "entropy equal to entropy."

Just such a coexistence and interaction between inner, constructed orders and a mysterious, accidental space of possibilities has infused Pynchon's fictions from the outset. His very first published story, "The Small Rain," sets in opposition to a monochrome mental landscape "these wonderful colors and x-rays and ultraviolets going on outside."¹⁷ And Pynchon had already sought to merge the two orders in "Entropy," where at certain significant points of contact--between Callisto's enclosed order and the random happenings in Meatball Mulligan's open apartment--the binary elements of the story are juxtaposed in a fugal consonance.¹⁸

The inverse relations I have traced through Gravity's Rainbow are similarly constructed to suggest, not a binary, irreconcilable opposition, but a situation in which opposite modes of perceiving the self and reality partake of each other. Pötkler's binary consciousness (personal identity as a substance-in-vacuum and impersonal salvation as a death-like void-in-aether), the novel's dual integrating constructions (causal connection and analogical integration), and the complementary states of paranoia and anti-paranoia: each pair is shaped by a pervasive and internally consistent pattern of inverse imagery.

The interpenetration of opposite states of awareness is beautifully pictured in one of Franz's earlier dreams. Seeking safety among the rational coordinates of a Cartesian grid, Franz finds himself kneeling in prayer on "the lavatory floor of his old rooming house in Munich":

He wore a robe of gold and orange brocade. It was the only light in the room. Afterward he ventured out into the house, knowing people slept in all the rooms, but feeling a sense of desertion. He went to switch on a light--but in the act of throwing the switch he knew the room had really been lit to begin with, and he had just turned everything out, everything. . . .
(400)

Franz attempts to make sense of his dreamy situation by applying the kind of logical thought processes that serve him in his daytime engineering activities, polar conceptions of reality that exclude a coexistence of opposites; yet at the precise point where logical connections ought to yield a luminous insight into his solitary being, "in the act of throwing the switch," his logic fails and he returns to the void.

Franz's dream of the deserted rooming house in Munich, like the image two pages earlier of the robed organist at Zwölfkinder, may serve as a symbol of Gravity's Rainbow's pervasive complementarity, a symbol that can help to illuminate both Pynchon's mode of characterization and his representation of the relations between language and reality. Pynchon derives from the new physics an internally consistent structure of complementarity that reveals the intrinsic limitations and artificiality of fiction constructed from a linear, causally related narrative, and that also reveals as artificial any mode of characterization that relies exclusively on threading disconnected images of individuals. Yet, although a deterministic causal model of personal identity proves inadequate to Pynchon's project, neither can the alternative analogical approach of itself create stable fictions. The narrative form of Gravity's Rainbow is the result of Pynchon's merging the two approaches, just as a character's psychological awareness finds expression through a superimposition of

seemingly irreconcilable states (as in Pöckler's "two desires, personal identity and impersonal salvation").

In The Physical Principles of the Quantum Theory, Werner Heisenberg maintains that light and matter are both objectively real and unified entities, but that "the apparent duality arises in the limitations of our language."¹⁹ This formulation corresponds well with Pynchon's dual mode of symbolic characterization, for while he retains the premise that Pöckler has a coherent identity grounded in the fictive reality, he abandons the assumption that this identity can be reconstituted by following any one psychological or mimetic model within the text. (In the case of Slothrop, it would appear that even the premise that he has a coherent fictive identity is dropped.) The structural application of this principle also defines the texture of language in perpetual difference from that which it describes: the duality is a condition of language, not of its subject. Pynchon's structural complementarity thus reflects an awareness that reality is not commensurable with any single narrative form, but will inevitably take to itself opposed forms of verbal apprehension. In terms of Ammons's web imagery, the shape of reality is only discerned in the interstices, never appropriated to the material texture of the web that is language.

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Notes

¹ Thomas Pynchon, Gravity's Rainbow, (New York: Viking, 1973; Penguin, 1987) 395. Subsequent references are to these identically paginated editions.

² The accurate exposition in recent Pynchon criticism of concepts from modern science has shed light on Pynchon's difficult narrative technique. Robert Nadeau, who was among the first to notice the central role of ideas from the new physics "in the determination of both design and meaning" in Pynchon's novels, claims that these ideas underlie a "radically new conception of the nature of human identity and societal organization" (Readings from the New Book on Nature: Physics and Metaphysics in the Modern Novel [Amherst: U of Massachusetts P, 1981] 135). Following Nadeau's lead, Carolyn S. Pyuen calls for a critical approach to Gravity's Rainbow that will treat Pynchon's narrative, not as a "closed linguistic system describing a Newtonian universe," but "as an extension of reality embodying interdependency and indeterminacy" ("The Transmarginal Leap: Meaning and Process in Gravity's Rainbow," Mosaic 15.2 [1982]: 35-36). I am also indebted to a paper by Molly Hite

entitled "The Center Did Not Hold: Heisenberg's (Meta-) Physics and Some Postmodern (Meta-) Fictions," presented at the February 1983 Long Island University Conference on Science, Technology and Literature.

3 Alan J. Friedman, "Science and Technology," Approaches to Gravity's Rainbow, ed. Charles Clerc (Columbus: Ohio State UP, 1983) 71.

4 Thomas Schaub, Pynchon: The Voice of Ambiguity (Urbana: U of Illinois P, 1981) 128.

5 M. H. Abrams discusses the wind motif in the greater Romantic lyric in "The Correspondent Breeze: A Romantic Metaphor," Kenyon Review 19 (1957): 113-30. I note the early influence of Abrams's essay on Pynchon in "Pynchon's 'Entropy,'" Explicator 43.1 (1984): 61-63.

6 See Neville H. Fletcher and Suzanne Thwaites, "The Physics of Organ Pipes," Scientific American 248.1 (1983): 94-103. The illustration on page 96 nicely summarizes the pipe's transformation at the languet.

7 Bohr goes through the derivation in Nature 121 (1928): 580ff.

8 Werner Heisenberg, Physics and Philosophy: The Revolution in Modern Science (1958; New York: Harper and Row, 1962) 201ff.

9 Joachim Fest, The Face of the Third Reich: Portraits of the Nazi Leadership, trans. Michael Bullock (New York: Random House, 1970) 199.

10 Edward M. Tufte discusses the relational aspect of data graphics in his excellent book The Visual Display of Quantitative Information (Cheshire, CT: Graphics P, 1983) 46.

11 George Levine notices that Pynchon imagines the moment "as a kind of long-playing record" in "Risking the Moment: Anarchy and Possibility in Pynchon's Fiction." Mindful Pleasures: Essays on Thomas Pynchon, ed. George Levine and David Leverenz (Boston: Little, Brown, 1976) 127.

12 David Cowart suggests a quite different interpretation of the engineering term in Thomas Pynchon: The Art of Allusion (Carbondale: Southern Illinois UP, 1980) 43.

13 Mark Richard Siegel, Pynchon: Creative Paranoia in Gravity's Rainbow (Port Washington, NY: Kennikat, 1978) 82ff.

14 Nadeau 144.

15 Brian McHale's discussion in "Modernist Reading, Post-Modern Text: The Case of Gravity's Rainbow," Poetics Today 1.1-2 (1979): 85-110, is the first to treat the subject of Pynchon's analogical correspondences. McHale concludes that Pynchon's proliferating analogies constitute a parody of the modernist device of analogical integration. Leo Bersani, in an article that appeared after the present essay was completed, demonstrates how the commingling and replication of identities in Gravity's Rainbow not only undermines the notion of a unique personal identity, but also ruins "the very notion of Real Texts." ("Pynchon, Paranoia, and Literature." Representations 25 [1989]: 112.)

16 A. R. Ammons, "Identity," Collected Poems 1951-1971 (New York: Norton, 1972) 114-15: 51-59. Lines 60-70 are quoted below.

17 "The Small Rain" was first published in the Cornell undergraduate writing magazine, The Cornell Writer, 6.2 (1959): 13-32.

18 "Entropy" first appeared in Kenyon Review 22 (1960): 277-92.

19 Werner Heisenberg, The Physical Principles of the Quantum Theory, trans. Carl Eckart and Frank C. Hoyt (New York: Dover, 1949) 10.

