Merging Orders: The Shaping Influence of Science on "Entropy"

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At Cornell University, where Thomas Pynchon first submitted "Entropy" to an undergraduate writing class, one of his teachers can recall trying to get Pynchon to change the title to something that didn't sound so scientific.[1] Pynchon was quietly adamant, and when his story appeared a year later in The Kenyon Review, "Entropy" it was.[2] And rightly so, for the story certainly explores a world constructed from the scientific metaphor, and in retrospect the title seems even more appropriate, a sign of how much the idea of entropy was to inform Pynchon's later fictions. Yet the single objection of Pynchon's teacher was not altogether without foresight, for it has proven all too easy in many discussions of Pynchon to overlook elements of his narrative skill because of a preoccupation with the entropy theme. Thus, whereas nearly all of Pynchon's critics, recognizing the importance of ideas from science and the history of science in his work, have commented on the relation of entropy to Pynchon's thought, comparatively slight attention has been paid to the manner in which the narrative itself is structured by his scientific metaphors. In "Entropy" Pynchon is not simply using ideas from science for thematic effect; the more pervasive application is to be found implicit in the form of the narrative.

In his introduction to Slow Learner, the collection of Pynchon short stories brought out recently by Little, Brown and Company, Pynchon himself plays down the thematic aspects of science in "Entropy": "I happened to read Norbert Wiener's The Human Use of Human Beings (a rewrite for the interested layman of his more technical Cybernetics) at about the same time as The Education of Henry Adams, and the 'theme' of the story is mostly derivative of what these two men had to say."[3] The juxtaposition of these two works, however, was not wholly fortuitous. Both Wiener and Adams are writing about the implications for modern life of shifts in nineteenth-century scientific thought. Wiener summarizes the matter nicely:

> Newtonian physics, which had ruled from the end of the seventeenth century to the end of the nineteenth with scarcely an opposing voice, described a universe in which everything happened precisely according to law, a compact, tightly organized universe. . . . This is now no longer the dominating attitude of physics, and the men who contributed most to its downfall were Boltzmann in Germany and Gibbs in the United States.[4]

The overwhelming authority of classical physics was to a large extent derived from the ability of its theories to account precisely and elegantly for the events we are familiar with in our common experience, and the success of these theories encouraged both scientists and writers to consider the classical Newtonian picture as an image in miniature of a "compact, tightly organized universe." But this move from an empirically successful model to an absolute image for all of nature implicitly assumed that Newton's laws could be extended beyond experimental verification. That which was unknown was held to be knowable fully in terms of Newton's laws of physics. Boltzmann and Gibbs were among the first to take an opposed view, and to postulate an element of intrinsic uncertainty in our knowledge of natural events.

The work of these two men went more or less unnoticed until a series of discoveries in science around the turn of the century forced the implicit assumption of the Newtonian view into the open. At this point Adams was able to perceive that

> . . . man's mind had behaved like a young pearl oyster, secreting its universe to suit its conditions until it had built up a shell of nacre that embodied all its notions of the perfect. Man knew it was perfect because he made it, and loved it for the same reason.[5]

An increasing manifestation of random processes in nature had begun to upset this reductive unity. In 1900, for example, Ernest Rutherford concluded that radioactivity was grounded in the statistical decay of atoms, and the newly developed kinetic theory asserted that the random collisions of molecules determined the

behaviour of a gas. In the terms of Newtonian science, such startling hints of a chaotic nature "could be known only as unknowable" (EHA, 454).

While discussing writers at early stages of life, Pynchon drops a remark that could apply equally well to the physicists of the early twentieth century: " . . . we are often unaware of the scope and structure of our ignorance. Ignorance is not just a blank space on a person's mental map. It has contours and coherence, and for all I know rules of operation as well" (SL, 15-16). The very fact that Newton's laws failed to explain contingent elements that had become manifest in the texture of reality was for Adams an "admission of ignorance; the mere fact of multiplicity baffling science" (EHA, 456). After admitting their ignorance, however, scientists still had a recourse available in the prior work of Gibbs and Boltzmann, whose statistical laws promised to reveal the rules of operation governing chance and uncertainty. Wiener, speaking with the reticence his assertion demands, calls this incomplete determinism "almost an irrationality in the world" (HU, 19), while Adams emphatically locates the modern situation in the chaotic midst of a "supersensual multiverse" (EHA, 461).

The scientific metaphors in "Entropy" work along lines of opposition between the compact, isolated universe of the nineteenth century and the indeterminate one of the new physics, and the most important manifestation of this opposition is in the story's binary structure. ("Entropy" alternates between lyrical passages set in the hermetically sealed apartment upstairs and picaresque scenes of the party below, where revellers arrive at random from outside.) The character Callisto alerts us to the opposition as he defines entropy. He had known all along how "The theorem of Clausius," the classical formulation of the second law of thermodynamics, predicts for a heat engine or any other closed physical system a one-way, irreversible tendency to disorder. Dismal as this prospect might seem, it is not until he is faced with Gibbs's statistical interpretation of it that Callisto finds in entropy a comprehensive metaphor to apply to all sorts of cultural situations: ". . . only then did he realize that the isolated system--galaxy, engine, human being, culture, whatever--must evolve

spontaneously toward the Condition of the More Probable" (SL, 87).

Gibbs's idea was to postulate a universe in which not one, but several possible worlds might be consistent answers to a limited set of questions. In the methods of statistical mechanics, such "worlds" are known formally as "states," and are often associated with the distribution of speed and position characterizing the atoms or molecules in a system. In efficient systems, each available state will correspond in an orderly fashion to a distinct energy level, and the exchange of heat between levels will result in productive work. As the system succumbs to entropy, however, the number of states associated with one particular heat-energy level proliferates, this energy becomes increasingly more probable, and the system therefore becomes less able to encompass different energy levels in relationship to one another. Without this crucial difference, any transfer of heat between levels becomes impossible. This ultimate degradation of the system's usefulness is what Callisto calls the "Condition of the More Probable"--a situation where ordered differentiation resolves into a single, undifferentiated level. Pynchon constructs such a situation in the story by holding the temperature outside at a constant 37 degrees Fahrenheit "despite the changeful weather" (SL, 85).

Callisto takes the analogy further, and envisions the "states" of society--the conditions of culture, human beings, American consumerism in the late fifties, "whatever"--all moving towards a uniform intellectual level. "A pose I found congenial in those days," Pynchon writes in Slow Learner, ". . . was that of somber glee at any idea of mass destruction or decline" (SL, 13). Such a pose is adopted--albeit with more somberness than glee--by Callisto in the story. "Leery at omens of apocalypse" (SL, 85), Callisto fears that the current three-day cold spell signifies the imminence of a cultural heat-death, "in which ideas, like heat-energy, would no longer be transferred. . . . and intellectual motion would, accordingly, cease" (SL, 88-89). Yet this very obsession with cultural entropy forces Callisto to take part himself in a sort of entropic decline

towards sameness. He feels he must re-evaluate "all the cities and seasons and casual passions of his days" in the "new and elusive light" of his conception of entropy (SL, 87). And though he is "aware of the dangers of the reductive fallacy" (SL, 87), he does not escape them: Callisto's endless fund of literary and musical allusions and his rich remembrances of personal experience all merely give him more and more ways to sound the single, overwhelming theme of his obsession.

Callisto's thoughts of "cities and seasons and casual passions of his days" echo an earlier passage describing the season of "false spring" (SL, 82) in Washington, D.C. Though it is frequently overlooked by Pynchon's critics,[6] this passage is crucial to understanding his attitude toward the metaphor his character constructs. In it, Pynchon presents the wind as a mediator between order and contingency:

> . . . as every good Romantic knows, the soul (spiritus, ruach, pneuma) is nothing, substantially, but air; it is only natural that warpings in the atmosphere should be recapitulated in those who breathe it. So that over and above the public components--holidays, tourist attractions--there are private meanderings, linked to the climate as if this spell were a stretto passage in the year's fugue: haphazard weather, aimless loves, unpredicted commitments: months one can easily spend in fugue, because oddly enough, later on, winds, rains, passions of February and March are never remembered in that city, it is as if they had never been. (SL, 83)

A "stretto" is a tightened section of a fugue where component themes come together rapidly to reinforce each other, so that the music seems to generate a new energy from within itself. By introducing the figure from music, Pynchon suggests that the chance elements of the outside world and the vagaries of private experience--"haphazard weather, aimless loves, unpredicted commitments"--shall be gathered and shaped to form new meaning in their superimposition.[7] And yet if such imaginative music is shaped in this false spring in Washington, it is not heard by those whose

"private meanderings" make up a component strain: the "winds, rains, passions of February and March" are not present in an imaginative order of music, for they "are never remembered." The season is instead "spent" (wasted?) in a different kind of fugue, that which Webster's defines as a "state of psychological amnesia during which a patient seems to behave in a conscious and rational way, although upon return to normal consciousness he cannot remember the period of time nor what he did during it." "Fugue" in this second sense can be applied to Callisto, because by ordering the diverse "cities and seasons and casual passions of his days" into a too restrictive unity, Callisto has lost whatever alternative meanings these component memories and passions can have held for him; their distinctions blurred because of their inclusion in the closed structure of his entropy metaphor, "it is as if they had never been."

The figure of the fugue, in the first sense, represents an imaginative order in music that is sustained not in continual conflict with the world of chance, but in a continual weaving of its haphazard elements. The fugue thus represents a possibility of using art to merge in the bewildering "supersensual multiverse" imagined by Adams a shaping of the random and accidental connections of the modern world into music. This possibility of merging orders might seem hopelessly abstract were it not actualized in the prose itself, where Pynchon picks up a chance connection in a pun to compose here a fugue of his own, setting in rapid alternation the ideas of fugue as (counter-entropic) music and fugue as (entropic) forgetting. But this is only one instance of an underlying musical structure that apparently shapes the binary, contrapuntal development of the story, where thematic statement and counter-statement are voiced on the upper and lower "registers" of the apartment-house, imparting a tension that carries the story steadily forward. Thus the fundamental dichotomy between compact, rationalist unities and a threatening multiverse is mediated even as the story's structure blends the "improvised discords" of Meatball's lease-breaking party with the "arabesques of order" (SL, 92) that Callisto and his lover Aubade struggle to sustain upstairs.

This dichotomy is more closely defined in the lyrical passage describing the isolated "hothouse jungle" upstairs: "Hermetically sealed, it was a tiny enclave of regularity in the city's chaos" (SL, 83). Callisto attempts to detach himself from the decline towards death that surrounds him by withdrawing into a physically contained order--an "enclave of regularity" that corresponds to his solipsistic frame of mind. The word "enclave" comes from Wiener, who uses it to describe islands of decreasing entropy, but stresses that such islands only come into being by drawing on the ocean of chance that surrounds them. This notion of "non-isolated islands" (HU, 52) returns us to a situation where order and vital possibilities obtain only in communication with the world of increasing entropy outside. Callisto's enclave of regularity is contrived, artificial: it is no doubt a highly organized island in the midst of chaos, but whereas real enclaves of life come into being only through constant contact and exchange with the outside world of chance and accident, Callisto's (physical and mental) enclave is withdrawn from its surroundings. Callisto and Aubade occasionally take from, but they never give anything back to their environment ("What they needed from outside was delivered. They did not go out"[SL, 84]),and this one-way flow only speeds up the overall decline of energy. As the isolated and forgotten months of February and March constitute a false spring, so too is Callisto's isolated hothouse a false enclave.

In counterpoint to the falsely coherent world upstairs is the party downstairs, which draws its life through doors and windows that are open to the disordered world outside. There is in the field of communication theory a complement to the entropy of thermodynamics--its details are analogous to those of the first kind, but informational entropy describes an inevitable increase of noise and randomness in communication--a mixing up of initially unmixed messages that destroys information.

In accordance with informational entropy, Pynchon makes Meatball's party the scene of countless false signals and instances of communication breakdown. The most serious case of failed communication is that of

the disaffected computer engineer, Saul. His marriage has just fallen apart because of "a kind of leakage" in the communicative circuit between him and Miriam, his wife of late:

> "Tell a girl: 'I love you.' No trouble with two-thirds of that, it's a closed circuit. Just you and she. But that nasty four-letter word in the middle, that's the one you have to look out for. Ambiguity. Redundance. Irrelevance, even. Leakage. All this is noise. Noise screws up your signal, makes for disorganization in the circuit." (SL, 90-91)

The closed circuit is perhaps the earliest of Pynchon's major scientific figures--earlier even than entropy. In "The Small Rain" (which appeared in the March, 1959 issue of The Cornell Writer), the character Levine describes a failure of perception which is

> "something like a closed circuit. Everybody on the same frequency. And after a while you forget about the rest of the spectrum and start believing that this is the only frequency that counts or is real. While outside, all up and down the land, there are these wonderful colors and x-rays and ultraviolets going on." (SL, 42)

The closed circuit is like the fugue, in the second, psychological sense discussed earlier, another image of a forgetting, or a decline into terminal sameness. The epigraph of "Entropy" from Henry Miller again expresses this drab mental landscape: "Not the slightest indication of a change anywhere. . . . We must get in step, a lockstep, toward the prison of death. There is no escape. The weather will not change" (SL, 81; Pynchon's ellipsis). This intrinsic connection between the closed circuit and death militates against Saul's valorization. Life and communication in a closed circuit, with everybody a whole self and no noisy love passing in between, is never a favored alternative in Pynchon. Though this condition may seem to offer safety or exemption from the anarchy of the world outside, it in fact only deadens perceptions to a whole range of imaginative and vital possibilities.

But Pynchon is not suggesting we move exclusively in a world of chance and chaos--there can be no communication or life in a sea of static, either. Pynchon has incorporated the two extremes, enclosed, artificial unity and random multiplicity, into his early stories as antithetical poles of a recurrent symbolic axis, and his characters engage in a continual project of reconciliation or mediation. Both Meatball and Saul thus recognize the need to forge some workable basis of compromise between the two extremes, and the scenes from downstairs never quite come to a stable conclusion. We last see Meatball working to keep things "from deteriorating into total chaos" as the party trembles "on the threshold of its third day" (SL, 97).

Upstairs, the dichotomy finds its point of dynamic but unstable equilibrium in the character Aubade, who strives to reconcile Callisto's hothouse coherence with the haphazard intruding strains from outside. Aubade, like the musical fugue at the start of the story, creates her changing order from randomness, but since she is constrained to reconcile all random intrusions into the pre-set harmony of her isolated world, the exchange is nowhere near as easy: "The architectonic purity of her world was constantly threatened by such hints of anarchy: gaps and excrescences and skew lines, and a shifting or tilting of planes to which she had continually to readjust lest the whole structure shiver into a disarray of discrete and meaningless signals" (SL, 88).

The architectural image catches attention, and implies that Aubade's order is essentially and foremost a structure of the mind, wholly unified but developing through additions and extensions to that which already exists. Those "hints of anarchy" which cannot be made to conform with the unchanging whole structure constantly threaten its predisposed stability. In its ceaseless exertion to exist in this order of its own creation, Aubade's architectonic purity derives from the same process that Adams describes:

> . . . the mind had thus far adjusted itself by an infinite series of infinitely delicate adjustments forced on it by the infinite motion of an infinite chaos of motion; dragged at one

> moment into the unknowable and unthinkable, then trying to scramble back within its senses and to bar the chaos out, but always assimilating bits of it, until at last, in 1900, a new avalanche of unknown forces had fallen on it, which required new mental powers to control. If this view was correct, the mind could gain nothing by flight or by fight; it must merge in its super-sensual multiverse, or succumb to it. (EHA, 460-61)[8]

The order that Aubade constructs does not shape and recapitulate the motions of the atmosphere: unlike the fugue which merges winds and passions from inside and outside into the same gathering movement, or the enclaves of life which merge with the outer world of increasing entropy, Aubade and Callisto exhaust their creative energies in trying to preserve the delicate balance and self-enclosure of their isolated world.

Pynchon as a writer, however, incorporates these motifs of merging orders into the structure of his narrative,and in so doing avoids the kinds of static and enclosed perception that Adams so thoroughly criticises. Pynchon at the outset was working to create an imaginative order in art that could engage randomness and indeterminacy in modern life and in the changing physical world. The project would continue to occupy him throughout his novels.

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Notes

[1] Personal interview with Baxter Hathaway, Ithaca House, 23 July, 1982. Professor Hathaway taught Pynchon's senior writing seminar in 1958-59.

[2] Pynchon submitted both "Entropy" and "Mortality and Mercy in Vienna" to Epoch in 1959. Professor James McConkey and the rest of the staff at Epoch decided to publish "Mortality and Mercy in Vienna" (the earlier story), and "Entropy" appeared in The Kenyon Review, 22 (1960).

[3] Thomas Pynchon, Slow Learner (Boston: Little, Brown, 1984), 13. Subsequent references to Slow Learner will be noted parenthetically in the text as (SL, page).

[4] Norbert Wiener, The Human Use of Human Beings (Boston: Avon, 1967), 13-14. Subsequent references will be noted as (HU, page).

[5] Henry Adams, The Education of Henry Adams (New York: Modern Library, 1931), 458. Subsequent references will be noted as(EHA, page).

[6] Robert Redfield and Peter L. Hays, in their very useful essay, "Fugue as a Structure in Pynchon's 'Entropy'" (Pacific Coast Philology, 12 (1977), 50-55), suggest that this passage be applied to the protagonists of the tale, and David Seed was the first to do so in his comprehensive essay on "Order in Thomas Pynchon's 'Entropy'" (Journal of Narrative Technique, 11, no. 2 (1981), 135-53).

[7] The wind imagery in "Entropy" is something like the imaginative linkage between inner passions and outer winds that the Romantic poets embraced in their recurrent figures of the wind harp and the correspondent breeze. Pynchon took a course with M. H. Abrams the year his essay, "The Correspondent Breeze: A Romantic Metaphor," came out in The Kenyon Review (19, [1957], 113-30). Although Professor Abrams does not recall teaching that essay in the course Pynchon attended (the subject was the 18th century), it can be presumed that Pynchon was familiar with the review he was later to submit material to, and that he was eager to check out what his teacher was publishing.

For a further discussion of Pynchon's use of the Romantic metaphor, see my piece "Pynchon's 'Entropy'" in The Explicator, 43, no. 1 (1984), 61-63.

[8] This and the previous quotations from Adams' Education are taken from the chapter called "The Grammar of Science." For a discussion of the importance to "Entropy" of an earlier chapter, "The Dynamo and the Virgin," see Seed, 140-42.