

Searching for Cyberspace: Joyce, Borges and Pynchon

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Introduction

The work of James Joyce, Jorge Luis Borges, and Thomas Pynchon spans the twentieth century, from Joyce's *Dubliners* in 1907 to Pynchon's *Mason & Dixon* in 1997, a century which started with scientific upheaval and ended with a communications revolution. The novels and stories by these three writers look in both directions, reflecting the new revelations in physics, and anticipating in various ways the advent of our connected society. The purpose of this thesis is to investigate the latter, to see exactly how three of the century's greatest writers might have been searching for cyberspace, though it is my contention that one cannot be understood without the other, that philosophical thought on quantum physics and philosophical thought on cyberspace are not unrelated. Undoubtedly, both quantum mechanics and cyberspace raise serious questions about our perception of reality, of the concrete world we inhabit, questions all three writers rigorously address.

Much has been made of the extraordinary speed with which the Internet has been adopted around the world, and why it has been so instantly successful. In many ways, cyberspace promises to satisfy so many of civilisation's goals and aspirations: the innate desire to communicate and connect with people all over the globe, and to contract physical space in the process; it offers us the universal library, the definitive collection of all learning and knowledge; it satisfies our desire to understand and control our world. It was this desire to understand, and even control, our world which has always driven scientists and thinkers.⁽¹⁾ Since Newton's *Philosophiae Naturalis Principia Mathematica* (1687), the universe was deemed to be a mechanistic, clockwork-like system, where every action has an opposite and equal reaction, where gravity is responsible for both the movement of planets and apples, and so on. We existed in a Great Machine, and hence, theoretically, everything was calculable.

However, the machine began to unravel when at the end of the nineteenth century Max Planck established that light, instead of consisting of light taking the form of waves as previously thought, actually consisted of discrete 'quanta' of energy. Einstein, in 1905, extended this to include all forms of radiation. By 1913, Neils Bohr demonstrated that it was not just radiation that was subject to this unreliability, but also the electrons in the atom, implying that "electrons perform the famous 'quantum leap' trick, jumping between different orbits around the atom's central nucleus without at any time being anywhere in between."⁽²⁾ This had serious repercussions, for it meant that in certain circumstances, particles behaved as a wave, and vice versa. Particles could not be described as existing in a certain position or traveling at a certain speed, but only by a 'wave function' determining the *probability* of the particle's position at any given time. In the words of the great physicist, Werner Heisenberg, particles existed in "a strange kind of physical reality just in the middle between possibility and reality,"⁽³⁾ and this led him to formulate, in 1927, his 'uncertainty principle' wherein he determined it was impossible to measure simultaneously both the location and momentum of a moving subatomic particle, only one or the other, and not through any limitations of the measuring equipment, but due to the very nature of subatomic particles themselves. At the same time, Bohr announced his 'complementarity principle', which states that an object can have complementary properties, but the knowledge of one precludes knowledge of the other. Both principles imply that the observer cannot observe without influencing that which he attempts to observe. The worlds' top physicists, including Bohr, Heisenberg, Max Born and Erwin Schrödinger, resolved to reach a definitive interpretation, and by 1930, they had formulated the 'Copenhagen Interpretation of Quantum Mechanics,' though Schrödinger was less enthusiastic than the others. The Copenhagen interpretation depended upon some extraordinary tenets, and essentially maintains that subatomic systems only exist when observed, that particles exist in a superposition of probability waves, or a 'tendency to exist', and only when observed do these waves 'collapse' into existence as we perceive it. Quantum mechanics, therefore, can describe only our perception of reality, rather than reality itself. Reality was unknowable,

or, in the sense of George Berkeley, reality depends on our observation of it, “all the choir of heaven and furniture of the earth, in a word all those bodies which compose the mighty frame of the world, have not any subsistence without a mind.”(4) Or, as James Jeans put it, the Great Machine became the Great Thought.(5)

In order to demonstrate the effect of the Copenhagen interpretation on our conception of reality, Schrödinger, in 1935, came up with a ‘gedankenexperiment’, a thought experiment, involving a cat and a sealed chamber. In the chamber, Schrödinger put a small piece of radioactive material, a Geiger counter attached to a trigger mechanism, which would release poisonous gas if set off, and the cat. The radioactive sample would have a 50/50 chance of emitting a particle, which would set off the counter and thus release the gas, killing the cat. According to our perception of reality, the cat will either live or die. But according to the Copenhagen interpretation, until the outcome is observed, the cat is neither dead nor alive, or it is both dead and alive. Technically, it exists in a superposition of both states, until we the spectator brings one or the other state into reality.(6)

Evidently, this is a huge premise to swallow, violently at odds with what we know to be reality, or rather, what we thought we knew. It reignited the realist vs. idealist antagonism, reality as the inherent existence of objects as opposed to our perception of them. It is Berkeley instead of Newton (or Plato), and it was suddenly posited as the fibre of our universe. Science and philosophy were suddenly united in their aims, and this had a tangible impact on twentieth century thinking, and literature.

Ironically, in 1959 Heisenberg himself rejected the ramifications of Copenhagen on the world of art when he said “There is little ground for believing that the current world view of science has directly influenced the development of modern art or could have done so.”(7) This after Joyce had strewn *Finnegans Wake* with references to Newton, Planck and Einstein, and Borges had elucidated so many of the philosophical ramifications of quantum mechanics in his stories. Typically, it was Umberto Eco, who will recur throughout this thesis as sage, prophet and

general 'fourth man', who wrote in *The Open Work*:

“Literature can also realise, in its structures, the image of the cosmos that is promoted by science... A literature that tries to express, in its openness and indeterminacy, the vertiginous and hypothetical universes perceived by the scientific imagination is still concerned with mankind, since it tries to define a universe that has assumed its present configuration thanks to a human process.”(8)

To what degree the configuration of the universe has been assumed by the human process of observation is surely indeterminable. Yet the implications of quantum physics are twofold, as Floyd Merrell has pointed out, “(1) the universe is an interconnected whole; dichotomies of space and time, matter and energy, gravity and inertia, become nothing more than different aspects of the same phenomena and (2) there is no such thing as observing this interactive whole from a neutral frame of reference. Necessarily and irrevocably, we are inside the dynamic cosmic web.”(9)

This interconnected universe, this 'cosmic web' is highly evocative of the Internet and hypertext, that “multidimensional network in which every point or node can be potentially connected with any other node.”(10) The 'memex' machine mooted by Vannevar Bush in the pages of *Atlantic Monthly* magazine, in 1945, is often heralded as the original conception of hypertext. “A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory... It affords an immediate step, however, to associative indexing, the basic idea of which is a provision whereby any item may be caused at will to select immediately and automatically another. This is the essential feature of the memex. The process of tying two items together is the important thing.”(11) It is the 'trails' between relevant documents, then, that constitute the 'memex'; the trails in effect become the document. Ted Nelson's Xanadu project, originated in 1960, was based on the same principles. Nelson has often been portrayed as a vaguely comic figure, not least because he has postponed Xanadu more times over the last forty years than most religious

cults have predicted the end of the world. The project, named after the palace of Coleridge's poem 'Kubla Khan', featured the coining of the terms 'hypertext' and 'hypermedia', in 1965. Hypertext for Nelson meant "Non-sequential writing with reader controlled links."⁽¹²⁾ The creation of jargon like hypertext is typical of Nelson, and more often than not it obfuscates the thrust of his vision, which is more concerned with creating a unified literature and copyright maintenance system than simply allowing pages to link to each other. The Xanadu website, for instance, says, "The World Wide Web trivializes our original hypertext model with one-way ever-breaking links and no management of version or contents."⁽¹³⁾ Whatever about the practical realisation of Xanadu, Nelson will always be remembered for his vision in the first place.

Cyberspace got a kickstart into existence because of the Cold War. The US Department of Defense created the Advanced Research Projects Agency in the late fifties to ensure they kept apace with Soviet technological advances. By the late-sixties, ARPA was developing a decentralised computer network to connect the various separate systems it had been involved in developing at various universities and defence institutes across the country. For ARPA, it was a way of fostering collaboration, but militarily, it was important the network was decentralised, so that any damage sustained during an attack would not debilitate the whole network. The network grew gradually, helped enormously by the development of Transmission Control Protocol/Internet Protocol (TCP/IP) allowed for greater flexibility in the types of network and information that could be connected, and to this day, the Internet technically refers to networks connected by TCP/IP. Cyberspace was already a reality when William Gibson coined the phrase in his futuristic novel, *Neuromancer* (1984). It caught the public imagination, this image of "All the data in the world stacked up like one big neon city, so you could cruise around and have a kind of grip on it, visually anyway, because if you didn't, it was too complicated, trying to find your way to the particular piece of data you needed. Iconics, Gentry called that."⁽¹⁴⁾ It was appealing to those aspirations mentioned above, the urge for a unified store of human knowledge, a public domain over which we had control, yet acknowledged the danger of too much information. Eco again displays his acuity when

he writes “The larger the amount of information, the more difficult its communication,”(15) a problem cyberspace was always going to face.

For the purposes of this inquiry, I’ll more often than not use the catch-all moniker of cyberspace when referring to the world’s neural network, to avoid having to differentiate between the World Wide Web, Usenet, ftp, MUDs, e-mail and all the other services on the Internet. I will occasionally say the Internet, sometimes the Web, just for the sake of variety, but I am essentially discussing the same thing, that giant network of computers and servers linking the world and its data.

Canadian author Wade Rowland sums up the nature of this investigation when he writes, “The physics of quantum mechanics... tells us that nothing happens in the universe without in some way affecting everything else.”(16) The scientific exploration into the nature of the subatomic world affects the writing of James Joyce, Jorge Luis Borges, and Thomas Pynchon, whose work affects our understanding of cyberspace. Joyce’s work reflects the urge to map the universe, to write the book of books, to capture *all* meaning in creating *Finnegans Wake*. One aspect of his technique is not dissimilar to that of the Internet, for in his frantic compression of language and forging of words, he demands the reader make hyperlinks in his mind. Borges’ stories ask questions about the nature of knowledge and memory and reality that are also raised by the virtual world of our own creation. Borges above all, perhaps, addresses the philosophical significance of cyberspace. Pynchons’ novels are imbued with those feelings of alienation, helplessness and particularly paranoia that an overabundance of information can inspire. His is a particularly pessimistic, but perhaps justified, take on the profusion of communications media, and all the confused messages that come with it. Let us begin, then, our search for cyberspace.

The Hypertextual *Wake*: James Joyce

In the canon of literature, *Finnegans Wake* is unique. If it is a novel at all, it is in a category all of its own. It doesn't attempt to provide formal resolution, or even a conventional narrative. Instead, Joyce was attempting to create what Umberto Eco would later call an 'open work,' a text of unimaginable interpretive possibility, a system rather than a novel, a book that would span all of existence in its scope. For Eco it was the archetypal open work, "a network of limitless interrelations."(17)

It was this openness which led Jacques Derrida to describe *Finnegans Wake* as a 'hypermnesiac machine', and in doing so he became the first of many critics to explicitly associate Joyce's final work with computers and computer networks. The *Wake*, with all its vastly complex, newly coined 'lexemes' (words) continuously prompting the reader into fresh lines of thought, depended, as Derrida saw it, on "the quasi-infinite speed of the movements on Joyce's cables."(18) The sheer scale of the endeavour surpassed the ability of a computer to quantify it, because the prompts defy categorisation, they appear only to those minds lively to their possibilities:

How could you calculate the speed with which a mark, a marked piece of information, is placed in contact with another in the same word or from one end of the book to the other?... Counting these connections, calculating the speed of these communications, would be impossible.(19)

It is these 'marked pieces of information', the words and parts of words everywhere suggesting multitudinous meanings and connections with

other elements of the *Wake* and other texts, a sort of pre-digital hyperlink, if you will, which lends the *Wake* to inevitable comparisons with computer networks and the Internet in particular. But before analysing the technical effect of Joyce's 'allaphbed' and its implications, it is instructive to study an earlier example of Joyce's writing which also assumes the form of a network by virtue of its complex interrelationships.

'Wandering Rocks' is the tenth chapter of *Ulysses*, and its central episode according to Joyce's schema, occurring between three and four PM. Its nineteen sections offer us a panoramic view of Dublin, and an opportunity to examine most of the novel's minor characters in their own context, rather than that of Leopold Bloom or Stephen Dedalus. Throughout the chapter, brief interpolations, fleeting snippets of seemingly unrelated action from elsewhere in the city, continually occur, thirty-one in all. These interpolations act as reader traps, analogous to the wandering rocks of mythology, which troubled Jason and the Argonauts, and to the events which constantly stymie the characters in the chapter. The reader will soon realise the interpolations indicate simultaneities of action. For instance, a simple example arises in the second section: "Corny Kelleher sped a silent jet of hayjuice arching from his mouth while a generous white arm from a window in Eccles street flung forth a coin" (*Ulysses*, p.225). The arm, we judge from the address and the adjective 'generous', belongs to Molly Bloom. The next section confirms our conclusion, as we see a one-legged sailor make his way down Eccles Street, and the same generous white arm proffer him a coin. The interpolation allows us to make a temporal relationship between the two sections. However, the interpolations offer not only spatio-temporal relationships, but also causal relationships, via processes of association. In the above example, Corny Kelleher the undertaker is concerned with death, while Molly is the personification of feminine fertility.(20) The correspondences do not end there. Clive Hart's excellent analysis of 'Wandering Rocks' includes a timeline, a chart with the characters and sections listed along the top, or x-axis, and the minutes between three and four listed by the side, or y-axis. The completed chart allows us to perceive hidden relationships and synchronicities which have no interpolations to draw attention to them. It is only by unfolding in this way Joyce's meticulous vision that we are

privity to the “verbal echoes and thematic connexions which are, so to speak, potential interpolations to be made by the reader himself.”(21) A few examples will illustrate the point: while Fr. Conmee says his Pater noster (*Ulysses*, p224), Boody Dedalus says ‘Our father who art not in heaven’ (*Ulysses*, p227), referring to her aberrant father Simon; Lenehan moulds ‘ample curves of air’ (*Ulysses*, p234) exactly as Bloom reads how Rauol’s ‘hands felt for the opulent curves...’ (*Ulysses*, p236); just as Kernan thinks of Ben Dollard’s ‘Masterly rendition’ (*Ulysses*, p241), Dollard himself sings a note and thinks ‘Not too dusty? What?’ (*Ulysses*, p245), while at exactly that moment, Stephen Dedalus looks through an old shop window and ponders the dust everywhere inside, dust being symbolically suggestive of burial soil and death where Stephen is concerned (*Ulysses*, p241.). This extraordinary level of complexity and interconnectedness spawns countless examples of contemporaneous relationships across the city. Hart detects more than just contemporaneous echoes, however. As he puts it:

While in order to watch the synchronisms of the action we have imaginatively to raise ourselves to a God’s-eye viewpoint, looking down on to the city as on to a map, in order to apprehend the diachronic motifs we need to become still more God-like and enter the Eternal Now from which we may watch all events at all times happening ‘simultaneously’.(22)

From this exalted position, we can see associations and ironies free from temporal contiguity. One example involves Katey and Boody Dedalus arriving home in section four at what Hart calculates to be 3.25, and inquiring of Maggy what she is cooking. She is boiling shirts, which prompts Boody to cry ‘Crickey, is there nothing for us to eat?’ (*Ulysses*, p.226). Ten minutes earlier, in section nine, Lenehan relates to McCoy the story of a large dinner he had attended a few years before. ‘There was a big spread... The annual dinner you know. Boiled shirt affair,’ (*Ulysses*, p234). Where in one instance the boiling shirts imply food where there is none, in the other the boiled shirt indicates both a quality and quantity of food. It is another relationship, this time bound by no temporal synchronism. One need not be familiar with *Ulysses* to see from the above examples that we are left with a web of connections to be determined and

navigated by the reader, each further illuminating the other. In the words of Umberto Eco, “Wandering Rocks’ amounts to a tiny universe that can be viewed from different perspectives.”(23) Undoubtedly, if ‘Wandering Rocks’ is a tiny universe, *Finnegans Wake* is a vast one.

Creating a universal novel was certainly Joyce’s intention. While in *Ulysses* he used Homer’s *Odyssey* as a framework and inspiration, in *Finnegans Wake* he used the *New Science* of Giambattista Vico to similar effect. Vico posits a theory of the cyclical nature of history, with four segments. The Theocratic, or Divine, age, whereby man believed himself to be ruled by divine governments; the Heroic age, in which the rulers reigned in aristocratic commonwealths over the common man; and the Human age, during which men realised themselves as equals, thus giving rise to democracies and human government. The fourth segment is the Ricorso, a period of chaos which spells the end of the Human age, and a rebirth of the Theocratic age. This simplification is sufficient to appreciate the structure of *Finnegans Wake*, with its four sections corresponding to the different ages. Part I consists of eight chapters, two mini-cycles, while Parts II and III have four chapters each. Part IV corresponds to the Ricorso, and thus the final sentence is actually the beginning of the novel, as it turns back onto itself:

A way a lone a last a loved a long the ... riverrun, past Eve and Adam’s, from swerve of shore to bend of bay, brings us by a commodius vicus of recirculation back to Howth Castle and Environs. (*Finnegans Wake*, p628, p3)

Vico’s vision of history is with us from the very first line, in the ‘commodius vicus of recirculation.’ (So too is H.C. Earwicker, in the first of his many aliases, as Howth Castle and Environs). But the effect of the ‘millwheeling vicociclotometer’ (*FW*, p614) isn’t simply one of circularity, of ultimate repetition. As Eco has pointed out, we are faced with a book that is “molded into a curve that bends back on itself like the Einsteinian universe.”(24) And following the other great philosopher who looms large over *Finnegans Wake*, Giordano Bruno, who maintained that each thing contained the whole, Joyce strived to make *Finnegans Wake* that part of the universe which contained the whole, a truly universal novel.

In his superb thesis on the *Wake*, Dan Weiss contends that “*Finnegans Wake* is diachronic, standing apart [from other novels] qualitatively as well as quantitatively with its project of presenting all that ever was, is, or shall be.”(25) He notes the relevance of Daniel Hofstadter’s notion of ‘isomorphism’, whereby “two complex structures can be mapped onto each other, in such a way that to each part of one structure there is a corresponding part in the other structure.”(26) The *Wake* is itself an attempted isomorphism of the world and universe, not unlike a hologram, wherein each piece, if broken from the entire hologram, will still contain the whole image.(27) However, Joyce was constrained by the limits of language, a potentially restrictive mode of representation that he deemed insufficient in his attempt to “imply the totality of space and time.”(28)

In response, Joyce engineered a new polyglot vocabulary, utilising over sixty-five languages, distorting words and syllables to cram as much potential meaning into each linguistic unit as possible. Each word, each part of each word, then, is a potential jumping board for the reader, a ‘portal of discovery’, as Stephen Dedalus might have had it. They are analogous to hyperlinks in that they offer the reader the opportunity to forge their own path through the text. But while hyperlinks are underlined and disrupt the linear reading process, the words in the *Wake* offer no such guidance, and demand to be consumed simultaneously, rather than sequentially. Were they to draw attention to themselves, the entire text would be underlined many times over. Umberto Eco, before the advent of hypertext, we must remember, offers this analysis of Joyce’s technique:

Each occurrence, each word stands in a series of possible relations with all the others in the text. According to the semantic choice which we make in the case of one unit, so goes the way we interpret all the other units in the text... Ambitiously, the author intends his book to imply the totality of space and time, of all spaces and times that are possible. The principal tool for this all-pervading ambiguity is the pun, the *calembour*, by which two, three, or even ten different etymological roots are combined in such a way that a single word can set up a knot of different submeanings, each of which in turn coincides and interrelates

with other local allusions, which are themselves 'open' to new configurations and probabilities of interpretation.(29)

Donald Theall, perhaps the most persistent cyber-Joycean, whose works include hypertextual versions of *Ulysses* and *Finnegans Wake* and numerous articles regarding Joyce's anticipation of hypertext, deconstructs these "networks of interlinkage"(30) by use of concordancing tools. In one example he searches for all words including the syllable m-(aeiou)-m, i.e. mam, mem, mim, mom, mum, whereby words such as mimesis, mimicry, memory, mathematics, silence (mum) are shown to be insistently related to the mother (mam, etc) and the self (me), among other possible connotations. This is just one, very evident, and easily calculable, example. Concordancing tools have yet to be developed which can detect all the subtleties and thematic ironies and relationships which Joyce implants in the text, as Derrida predicted. Or as Joyce himself put it, "So you need hardly spell me how every word will be bound over to carry three score and ten toptypical readings throughout the book of Doublends Jined..." (*FW*, p.20).

The result is a text which generates meaning as it is being read. Consider it as a textual probability wave. Of all the boundless number of possible interpretations, the reader while reading collapses the vast majority of them, and determines which interpretations survive, just as the observer determines whether Schrödinger's cat is dead or alive. Likewise, the net surfer, in the act of surfing, narrows the vast number of potential routes she or he may take in navigating the net, collapsing with every clicked link many million more latent journeys across cyberspace. Just as most of those latent journeys will never be traveled, Joyce recognised the nature of the journey he was requiring of his readers, for he writes at one point that the *Wake* is "Sentenced to be nuzzled over a full trillion times for ever and a night till his noddle sink or swim by that ideal reader suffering from an ideal insomnia." The notion of an ideal reader capable of traversing every possible link, a computer-like and flawless information interpreter redolent of a gedankenexperiment, is possibly present in 'Wandering Rocks' in the form of the omniscient narrator, and will be seen again and again in the work of Borges and Pynchon; the existence, or non-existence, of such an

interpreter is of palpable intellectual importance for the three writers. For our purposes, we shall christen this hypothetical interpreter the 'ideal insomniac'. Here it suffices to say that Joyce was well aware of the expansive, self-perpetuating network he was creating, one that while not actually infinite, certainly appears so for anyone other than the insomniac. And that includes himself.

In *The Middle Ages of James Joyce*, originally part of what became *The Open Work*, Umberto Eco asserts "many of the allusions, in fact, escape the author himself, who has prepared a machinery of suggestion which, like any complex machine, is capable of operating beyond the original intention of its builder." (31) This much is to be expected of any complex system, one supposes, although Joyce's fastidious, labour intensive work process means even the most tenuous of alleged readings may have been intentionally placed there. Eco's observation rings true, however, when we read "hriosmas, whereas take notice be the relics of the bones" (*FW*, p91), and later "Whatthough for all appentices it had a mushroom on it... nogeysokey first" (*FW*, p315). (32) Published six years before America dropped the atom bomb, we are nevertheless faced with something that suggests to us as readers that exact event, and we as readers are just as important for the determination of meaning as Joyce himself. This network is truly 'operating beyond the original intention of its builder.'

In filling *Finnegan's Wake* with such an excess of meaning, Joyce compromised the authority of the author while stamping his identity all over it, or as Seamus Deane wrote "Few works erase the author as individual and genius more effectively, none affirms that role more loudly and scandalously." (33) Roland Barthes would later famously pronounce the 'death of the author', but Joyce had much earlier given control to the reader, and in doing so, he democratised the consumption of literature, in a twist on the way that many claim the Internet is a democratising force by virtue of the fact that it liberates information and its movement.

That *Finnegans Wake* goes largely unread is perhaps indicative of the fact that the average reader wants literature to offer meaning, rather than the other way around. As Walter Benjamin wrote "...the history of every art

form shows critical epochs in which a certain art form aspires to effects which could be fully obtained only with a changed technical standard, that is to say, in a new art form.”(34) The old art form was obviously not prepared for *Finnegans Wake*. Three decades later, Marshall McLuhan, who famously claimed to have never heard of Benjamin, inverted the above observation when he wrote “every innovation must pass through a primary phase in which the new effect is secured by the old method, amplified or modified by some new feature.”(35) The innovation was inevitably hypertext, *Finnegans Wake* the modification of the old method. McLuhan, a dedicated Joycean, and subsequent guru to the Wired generation, had planned on calling both *The Gutenberg Galaxy* and *Understanding Media* by the alternative title *The Road to Finnegans Wake*.(36) Maybe the harbinger of the digital revolution is right, maybe the rapid development of the global village is all part of a journey to the middle of the *Wake*, perhaps the ‘information superhighway’ is leading us to the essence of the *Wake*, “a circular universe in which it is possible to establish multiple relationships among the various elements, and in which every element can assume different meanings and relational capacities depending on how we want to understand the context - and vice versa.”(37)

The Internet as Labyrinth: Jorge Luis Borges

Whereas *Finnegans Wake* called to mind the hypertextual nature of the Internet, and can therefore be said to have an affinity of technique or form with the Net, the stories of Jorge Luis Borges are of interest more as metaphors of cyberspace and the Internet. Many of his tales are preoccupied with the discrepancies between the ‘real’ world and ‘irreal’ worlds, with philosophical questions of perception and paradox, the perception of the infinite, or the seemingly infinite. Many of these questions were being tackled by the new physics, which had to deal with

apparent paradoxes with every new discovery. But these issues are also of philosophical importance in terms of our interaction with cyberspace; subconsciously, we are always being faced with these issues when online. By reflecting on the metaphor, we are pondering the reality, or as Borges himself once wrote, “Perhaps universal history is the history of a few metaphors,” (*Other Inquisitions*, p.9).

It is instructive to note how frequently the archetypal Borges story, ‘The Library of Babel,’ is invoked by cyber-theorists as a fitting metaphor of the Internet.(38) The story is a fascinating interpretation of the universal library, that age old desire for a collection of all human learning and writing, a desire that dates back at least as far as the library of Alexandria in 240 BC, and can count the Internet as its latest manifestation.(39) The narrator starts by telling us “The universe (which others call the Library) is composed of an indefinite and perhaps infinite number of hexagonal galleries...” (*Labyrinths*, p.78). Each gallery contains a certain number of books, each book consists of 410 pages, each page 40 lines, each line 80 symbols. There are 25 orthographic symbols, 22 letters, plus a comma, period and space. No two books are exactly the same, and thus:

The Library is total and its shelves register all the possible combinations of the twenty-odd orthographical symbols (a number which, though extremely vast, is not infinite): in other words, all that it is given to express, in all languages. Everything: the minutely detailed history of the future, the archangel’s autobiographies, the faithful catalogues of the Library, thousands and thousands of false catalogues, the demonstration of the fallacy of those catalogues, the demonstration of the fallacy of the true catalogue, the Gnostic gospel of Basilides, the commentary on that gospel, the commentary on the commentary on that gospel, the true story of your death, the translation of every book in all languages, the interpolations of every book in all books. (L., p.81-82).

The alacrity with which Borges describes the implications of such a library is typical, the precisely imagined and concisely rendered images of all possible combinations of letters inspires awe at the scale of the Library.(40) That he can picture, never mind portray, such scale is astounding, and perhaps accounts for why the story appeals to those

seeking a metaphor for the Internet, which displays a similarly intimidating scale, a human defying expanse. The narrator goes on to describe the initial elation of the inhabitants of the Library, or librarians, at the realisation that all knowledge existed in some hexagon or other. This elation quickly turned to despair when they finally comprehended that the odds of finding such knowledge can 'be computed as zero.' The vast majority of books in the Library are gibberish. To be surrounded by useless information, a veritable white noise of text, is the fate of the librarians, and to offer themselves hope, they fantasise about 'the Man of the Book,' "On some shelf in some hexagon... there must exist a book which is the formula and perfect compendium *of all the rest*: some librarian has gone through it and he is analogous to a god," (L., p83). The desire for there to be some order, such as an isomorphistic 'compendium,' even if it is not to be revealed to the librarians themselves, is overpowering. Just the belief in a knowledgeable being is enough to provide relief from the intolerable fate of existing in such disorder. The narrator offers us his own hope, his own imaginary respite from the despair:

If an eternal traveller were to cross it in any direction, after centuries he would see that the same volumes were repeated in the same disorder (which, thus repeated, would be an order: the Order). My solitude is gladdened by this elegant hope. (L., p.86).

The overriding craving for order, then, is the mark of the librarian. Without it, life is unbearable. Considering 'The Library of Babel' as a metaphor of the universe, as it explicitly pronounces itself to be in the first line, we can see this as a defining human characteristic. We long for understanding, and for there to be understanding, there must be information, and that information must be ordered for it to be of any use.

It is important to note the two manifestations of the impossible being who alone can reveal the order that is lacking, the Man of the Book, and the eternal traveller. In many ways, they are redolent of Joyce's 'ideal reader with the ideal insomnia,' creations which exhibit none of the limitations which prevent us from answering the eternal questions about our place in the universe. These 'eternal travellers', these 'ideal insomniacs' are

required to be flawless interpreters of information. They are creatures straight out of an Einsteinian thought experiment, restricted by none of the laws which stymie our perception of reality, for as Max Planck himself has noted, “in the last analysis, we ourselves are part of nature and, therefore, part of the mystery that we are trying to solve.”(41) For great thinkers like Joyce and Borges, not to mention Einstein, Schrödinger, Bohr, Heisenberg, Russell and others, that is as frustrating as being in an eternal library with no catalogue, and demands a creative response.

Borges once noted “The practice of literature sometimes fosters the ambition to construct an absolute book, a book of books that includes all the others like a Platonic archetype,” (OI., p.66). This, we have already seen, was the ambition behind *Finnegans Wake*. It was also the reasoning behind the works of Aristotle and such momentous encyclopedias and histories of the world as those of Pliny and later Diderot, or natural histories of Britain like that of Michael Drayton, the universal library in one volume. Interestingly, Borges twice describes infinite books, with infinitely thin leaves, first in a postscript to ‘The Library of Babel’, and also in ‘The Book of Sand’. They are both those absolute books that contain all others, they are what the *Wake* strives to be, they are the ultimate textual isomorphs, as Hofstadter would have it, corresponding faithfully to the structure of the universe, as well as including all other textual possibilities.

A desire to produce such an isomorphism lies at the centre of ‘The Aleph.’ The narrator, called Borges, visits the cousin of his deceased and unrequited beloved every year on her birthday. Her cousin, Carlos Argentino Daneri, is a poet, like the narrator, and is engaged in writing just such an isomorphic poem, called ‘The Earth.’ “Daneri had in mind to set to verse the entire face of the planet,” (The Aleph, p.19), the narrator tells us. Daneri had never left Buenos Aires, and he reveals to Borges the means by which he accumulates his richly detailed vision of the planet. In his basement there exists the Aleph, “The only place on earth where all places are - seen from every angle, each standing clear, without any confusion or blending,” (The Aleph, p.23). Borges attempts to give us an essence of the Aleph, of what it is to see everything in the universe at once, while acknowledging that “All language is a set of symbols whose use

among its speakers assumes a shared past. How, then, can I translate into words the limitless Aleph, which my floundering mind can barely encompass?" (The Aleph, p.26). This is the exact problem which forced Joyce into his elaborate word play (and here we must not neglect to make the hyper-intertextual connection to Joyce's '*allaphbed*'). Borges's attempt is rather more conventional, yet as a bravura stylistic achievement, it beats even his portrayal of every book in the Library. Its conclusion runs thus:

I saw the circulation of my own dark blood; I saw the coupling of love and the modification of death; I saw the Aleph from every point and angle, and in the Aleph I saw the earth and in the earth the Aleph and in the Aleph the earth; I saw my own face and my own bowels; I saw your face; and I felt dizzy and wept, for my eyes had seen that secret and conjectured object whose name is common to all men but which no man has looked upon – the unimaginable universe. (The Aleph, p.28).

The narrator here becomes an 'ideal insomniac'; he reaches that point of ultimate and flawless perception. Daneri's attempted isomorphism is exposed as a sham, it can never hope to emulate the Aleph in its perfect presentation of the universe. Daneri is at fault, for he is a buffoon, at least in the eyes of the narrator, but so is language itself. Any system of representation is forced to compress, forced to elide reality to make it conveyable. It happens as we form memories, at the moment of perception even, and it is why the narrator loses gradually the insight offered to him by the Aleph, "I was visited once more by oblivion" (The Aleph, p.29). The 'ideal insomniac' must overcome this further limitation of human nature to become the ideal interpreter of information.

Two observations before we leave the Aleph and move onto another 'ideal insomniac.' First, the story is inspired by Cantor's sets. Georg Cantor, a nineteenth century mathematician, dealt with infinite sets, he represented them with the first letter of the Hebrew alphabet, Aleph, and established that all infinite sets, even if seemingly only part of another infinite set, are equal. For example, a set of all whole numbers is equal to a set of all even numbers, whereas logic would dictate that all even numbers

plus all odd numbers would equal the set of all whole numbers. The conclusion? That all infinite sets contain themselves and everything else, a premise that fascinated Borges (and Joyce), and led to the Aleph, the entire universe contained within itself.

Second, it is worthwhile noting a certain premonition in 'The Aleph.' Early on, Daneri expounds on his theory of modern man:

'I view him in his inner sanctum, as though in his castle tower, supplied with telephones, telegraphs, phonographs, wireless sets, motion-picture screens, slide projectors, glossaries, timetables, handbooks, bulletins...' He remarked that for a man so well equipped, actual travel was superfluous. Our twentieth century had inverted the story of Mohammed and the mountain, nowadays the mountain came to the modern Mohammed. (The Aleph, p.17).

Considering we have reached a stage where museums are charging people to look at the digitized versions of their collections (Baudrillard must be proud!), where the daily paper from any country in the world is instantly accessible around the world, where we can watch near real time images of the planet earth from satellites orbiting above us at the click of a mouse, all courtesy of the Internet, the quote above looks remarkably prescient. This, perhaps, is where metaphor-before-the-fact slips into prophecy.

Ireneo Funes, the titular protagonist of 'Funes the Memorious', is a variation on the 'ideal insomniac' we keep encountering. Above, we noted how the narrator in 'The Aleph' briefly achieves flawless perception, but is unable to maintain such knowledge because the act of perceiving requires discernment rather than total capture, or as John Sturrock puts it "the simplification of reality starts at the moment we perceive it, for if we saw things in all their glory our minds would be swamped." (42) Memories, then, are a form of lossy compression, if you will, Borges the narrator tells us "Our minds are porous and forgetfulness seeps in," (The Aleph, p.30). Funes, however, exhibited lossless memory. In his childhood, his memory was normal, though he had told the time with exceptional accuracy, and always knew everyone's full name. After being thrown from a horse and suffering paralysis, however, his memory and perception became

infallible. Again, Borges displays his meticulous imagination in delineating the full repercussion of a perfect memory, where existence is “almost intolerable in its richness and sharpness,” (L., p.91). “He knew by heart the forms of the southern clouds at dawn on 30 April 1882, and could compare them in his memory with the mottled streaks on a book in Spanish binding he had only seen once,” (L., p.92). His memory, of course, was not merely visual or aural, but also thermal, smells and touch were all stored with everything else, so while recalling those clouds, he would also recall how hot it was, and what he was thinking at the time. Funes, then, would seem to have some of the makings of an ‘ideal insomniac’, some of the requirements of some gedankenexperiment somewhere. But as he tells the narrator, “My memory, sir, is like a garbage heap,” (L., p.92). Stripped of the ability to discern between that which should be remembered and that which can be forgotten, he is akin to one of the librarians in the Library, surrounded by white noise, bombarded by information with no means of putting it in order. Funes’s memory means existence for him is little more than one of Zeno’s paradoxes writ large. Zeno proposed that if you look at a flying arrow at any given instant, it occupies “its own space and no more, so it is not moving but stationary. But what is true of the arrow at each moment is true of it throughout the entire period; hence during its flight it is never moving but stationary.”(43) If Funes discerns one dog at three fourteen, he discerns a different dog at three fifteen, because he is aware of all the subtle changes that have occurred, and for him the dog is no longer the same dog. He perceives life in the discrete time periods that the paradoxes of Zeno depend on, and the reality he perceives make as much sense as those paradoxes. Far from being an ‘ideal insomniac,’ his memory serves him no purpose, indeed it prevents him from interpreting, from thinking, for to think is “to forget differences, generalize, make abstractions. In the teeming world of Funes, there was only details, almost immediate in their presence,” (L., p.94). Information overload, then, is not just the preserve of the net surfer unable to determine which of many thousand potential sites is the most relevant.

‘Tlön, Uqbar, Orbis Tertius,’ is of particular interest when considering cyberspace philosophically. The story relates the discovery by Borges and

his friend Bioy Casares of the eleventh volume of *A First Encyclopedia of Tlön*, which describes the history, art, architecture, mythology, theology etc. of an unknown and imaginary world, from *Hlaer to Jangr*. Borges hypothesises that a secret society, consisting of “astronomers, biologists, engineers, metaphysicians, poets, chemists, algebraists, moralists, painters, geometers... directed by an obscure man of genius,” (L., p.32) invented the planet Tlön, and that the full encyclopedia exists, though exhaustive searches are fruitless. The discovery of the volume becomes public, and people are fascinated by the imaginary planet, sparking debate as to why it was created, by whom, and so on. Tlön is ‘congenitally idealist’, in the Berkeleian sense of existence as a projection of the subjective mind. Indeed, Berkeley is revealed as one of the original members of the society that invented Tlön. Since Tlön exists in the mind of its inhabitants, materialism is impossible; objects exist only when perceived, implying otherwise necessitates sophisms not unlike those of Zeno. This Berkeleian planet is deeply evocative of the implications of the Copenhagen Interpretation of quantum physics. A world dependant on the perception of the inhabitant was one of the more audacious ramifications of Heisenberg and Bohr’s theories, and in light of it, Tlön looks to be not too many steps down the road to logical conclusion. Moreover, Borges tells us that Tlön begins to interpenetrate our ‘reality’, “already the teaching of [Tlön’s] harmonious history (filled with moving episodes) has wiped out the one which governed in my childhood; already a fictitious past occupies in our memories the place of another. The world will be Tlön,” (L., p.41-42). A passage of particular interest in this exercise goes as follows:

How could one do other than submit to Tlön, to the minute and vast evidence of an orderly planet? It is useless to answer that reality is also orderly. Perhaps it is, but in accordance with divine laws – I translate: inhuman laws – which we never quite grasp. Tlön is surely a labyrinth, but it is a labyrinth devised by men, a labyrinth destined to be deciphered by men. The contact and the habit of Tlön have disintegrated this world. Enchanted by its rigour, humanity forgets over and over again that it is a rigour of chess masters, not of angels. (L., p.42)

Substitute ‘cyberspace’ or ‘the Net’ for ‘Tlön’, and you have a dystopian McLuhanesque vision of the perils of our networked society, warning

against the increasingly blurred boundaries between the 'real' and the 'virtual'. The argument can also be made for seeing the Internet as an idealist, Berkeleian sphere, for the pages we see are otherwise only HTML code on a distant server, which we call into 'existence' at the typing of a URL. Without our observing them, they never 'exist', as such. If everyone logged off tomorrow, would the Internet still 'exist'? Yet another question common to both the quantum world and the 'virtual' world we create before us.

The final Borges story to concern us is the elegant 'The Garden of Forking Paths.' Ostensibly a spy thriller, it features a Chinese professor, Yu Tsun, spying for Germany during World War 1, faced with the task of letting his German superiors know the location of a British artillery park in the town of Albert. He can't communicate directly with the German's, for an Irishman at the service of England, Captain Madden, is close to capturing Tsun. He resolves to kill a man called Albert, the resulting press publicity alerting his superiors to the location of the artillery park. He looks up the telephone book, and finds only one man named Albert, a Dr. Stephen Albert. The heart of the story consists of the dialogue that occurs between the two men, Tsun and Albert, for it transpires that Albert is a Sinologist, and the only expert on the work of Tsun's great grandfather, Ts'ui Pên. Centuries before, Pên had resigned his position as governor to write a novel and construct a labyrinth. Upon his death, there is no sign of a labyrinth, and the novel defies reading, so disorganised does it appear to be. Albert reveals he has determined the true nature of Pên's novel, for it is also the labyrinth, "a labyrinth of symbols, an invisible labyrinth of time," (L., p.50). Despite the debt Tsun feels towards Albert for having rehabilitated the name of his ancestor, he shoots him, allows himself to be captured by Madden, and thus ensures the Germans can bomb Albert, the town.

It is the inner layer of 'The Garden of Forking Paths' that is of real interest here. Pên's novel 'The Garden of Forking Paths' is a close relation of *Finnegans Wake* in many ways, (not least its critical reaction) in that it aspires to be what novels are not, it aspires to be "an incomplete, but not false, image of the universe as Ts'ui Pên conceived it," (L., p.53). It also demanded a dedicated reader, an 'ideal insomniac' like Stephen Albert, to

piece together the mystery of the novel, and he does so diligently:

“I had questioned myself about the ways in which a book can be infinite. I could think of nothing other than a cyclic volume, a circular one. A book whose last page was identical with the first, a book which had the possibility of continuing indefinitely... I imagined as well a Platonic, hereditary work, transmitted from father to son, in which each new individual adds a chapter or corrects with pious care the pages of his elders.” (L., p.51).

The cyclic volume suggests nothing so much as the *Wake*, with its ‘commodius vicus of recirculation.’ The Platonic work calls to mind Umberto Eco’s vision of the hypertext; “We may conceive of hypertexts which are unlimited and infinite. Every user can add something, and you can implement a sort of jazz-like unending story.”(44)

Albert’s conclusion is that the forking refers not to space, but to time, hence “In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others; in the fiction of Ts’ui Pen, he chooses – simultaneously – all of them. *He creates*, in this way, diverse futures, diverse times which themselves proliferate and fork,” (L., p.51). The proliferation allows for events and characters to reoccur, to parallel and correspond. In this way we have two foreigners, Tsun and Madden, fighting for countries other than their own, we have both Albert and Pên killed by strangers in their homes, while in the novel, a character kills a stranger who visits him. It is a notion of time and history that Borges shared with Joyce and Vico, and in ‘The Garden of Forking Paths,’ this recirculation is insistent.(45) One of the less remarked upon incidents is when Tsun, walking towards Albert’s house, begins to muse on his ancestry, and thus “I thought of a labyrinth of labyrinths, of one sinuous spreading labyrinth that would encompass the past and the future and in some way involve the stars... I felt myself to be, for an unknown period of time, an abstract perceiver of the world,” (L., p.48). Tsun ponders time-consuming labyrinths before he even meets Stephen Albert, let alone finds him to be a Sinologist expert in the work of his great grandfather. The phrase ‘abstract perceiver of the world’ implies that he subconsciously endeavours to be the ‘ideal insomniac’ of our

nomenclatural system, yearns to read and interpret as successfully as Albert has done, and of course as Ts'ui Pên has done, for he has read and interpreted the universe.

It was the task of reading and interpreting the universe that caused so many physicists so much difficulty in the first third of the twentieth century. The repercussions of the Copenhagen interpretation were still being felt when Borges wrote these stories in the early forties. The anomaly of Schrödinger's imaginary cat was still being tackled. Ironically, in 'The Garden of Forking Paths,' Borges seems to have given preemptive expression to one of the most daring interpretations of quantum mechanics, the 'many-worlds interpretation' by Hugh Everett III in 1953. Addressing Schrödinger's experiment, he proposed that instead of the cat's two possible states collapsing into one, either dead or alive, upon observation, the cat in fact exists in two distinct universes, dead in one, alive in the other. Each particle event, then, causes a bifurcation in the universe. It is admittedly the sort of theory that even Borges would have struggled to pull off, yet it appears to have scientific merit, at least in an era where science is reduced to Berkeleian idealism to account for the behaviour of subatomic particles. A passage from 'The Garden of Forking Paths' was quoted in the published edition of Everett's dissertation, in 1973:

"He believed in an infinite series of times, in a growing, dizzying net of divergent, convergent and parallel times. This network of times which approached one another, forked, broke off, or were unaware of one another for centuries, embraces *all* possibilities of time. We do not exist in the majority of these times; in some you exist, and not I; in others I, and not you; in others, both of us. In the present one, which a favourable fate has granted me, you have arrived at my house; in another, while crossing the garden, you found me dead; in still another, I utter these same words, but I am a mistake, a ghost," (L., p.53).

In terms of cyberspace, 'The Garden of Forking Paths' is reminiscent of potential hypertextual journeys, branches and bifurcations at every underlined link, every particle event. Yet it also serves to demonstrate a beloved theme of Borges, his peculiar and timebending conception of

intertextuality.

Borges never quite accepted the chronological succession of literature and writings as valid. In his eyes, Kafka can influence Cervantes as much as Cervantes can influence Kafka. Three brief quotes from *Other Inquisitions* demonstrate the point:

“The fact is that each writer *creates* his precursors. His work modifies our conception of the past, as it will modify the future.” (OI., p.108).

“Shelley expressed the opinion that all the poems of the past, present and future were episodes or fragments of a single infinite poem, written by all the poets on earth.” (OI., p.10).

“In the sphere of literature as in others, every act is the culmination of an infinite series of causes and the cause of an infinite series of effects.” (OI., p.11).

Extending the scope of these observations somewhat, if we were to suggest that Borges was inspired by Hugh Everett and his many-worlds theory, we would be merely ascribing to Borges’s own vision of the nature of intertextuality, which doesn’t necessarily follow a linear timeline. Likewise, if we were to contend that Borges was obviously influenced by the Internet and cyberspace, we would still be adhering to his own exegesis on such matters. Strictly speaking, of course, it is not true, nor could it be. But it is impossible to read Borges and not notice such similarities as there are between his Library and the Internet, to not see Internet Explorer as a quasi- Aleph, to not observe the creation of a virtual world and its interpolation into our real one, to not draw parallels between Pên’s forking paths and Everett’s bifurcating universes. Our reading will always now be mediated by these similarities, and that is part of what Borges has become: influenced by the Internet.

Information versus Entropy: Thomas Pynchon

The work of Thomas Pynchon is patently preoccupied with notions of communication and media, unusually so for such an infamous recluse. Both *The Crying of Lot 49* (1966) and his 'magnum opus' *Gravity's Rainbow* (1973) deal to varying degrees with aspects of information theory and modern communications, and the ability of modern society to cope with the profusion of information available. His is a peculiarly paranoid take on the information revolution, and it is this distinctive paranoia which

makes him so essential a prognosticator of cyberspace. The implications of an overabundance of information are delineated in *The Crying of Lot 49*, on which we will concentrate here, but first we will consider the intriguing elements of *Gravity's Rainbow* which in retrospect demand to be read as anticipating the worldwide network we have established around us.

Gravity's Rainbow is an immense novel, difficult and epic and resistant to interpretation. Edward Mendelson, one of Pynchon's most perspicacious critics, has classified it as an encyclopedic narrative, along with *Don Quixote*, *Moby Dick* and *Ulysses*, and that company is indicative of the scope it possesses.(46) Set at the end of World War II, with the V2 bomb acting as a monstrous signifier throughout the book, the novel is underpinned by the view that the earth itself is a connected organism, if you will, that all phenomena are interconnected, prefiguring James Lovelock's Gaia hypothesis of 1979, which says the pretty much the same thing. But whereas in Lovelock's vision, Gaia is a benign revelation, for Pynchon the realisation invites only paranoia: "Like other sorts of paranoia, it is nothing less than the onset, the leading edge, of discovery that *everything is connected*, everything in the creation," (GR p.703). Brian Stonehill, in a rather perfunctory look at Pynchon and cyberspace, suggests that "if the planet is growing itself a nervous system, that global neural web might well resemble the Internet."(47) That is straw-clutching and barrel-scraping combined, but he is accurate when he later points out Pynchon's suspicious depiction of the binary. Ned Pointsman, the Pavlovian villain, is a dedicated believer in the law of the excluded middle, "In the domain of zero to one, not-something to something, Pointsman can only possess the zero and the one. He cannot... survive anyplace in between. Like his master I.P. Pavlov before him, he imagines the cortex of the brain as a mosaic of tiny on/off elements... Each point allowed only the two states: waking or sleep. One or zero," (*Gravity's Rainbow*, p.55). He is mechanistic, and therefore inhuman. Even his name is a typical Pynchon signifier, for pointsmen are the switchers on the railway, making trains go one way or the other. And Pynchon, the arch-purveyor of ambiguity, is loathe to reduce matters to a definite yes or no. Binary is bad, that is the message (48).

Where *Gravity's Rainbow* can truly lay claim to anticipating global networks is in the bizarre fantasy sequence, 'The Story of Byron the Bulb,' that occurs in the novel's final section, 'The Counterforce.' Byron is an immortal bulb, defying the Phoebus, the international light bulb cartel, by not burning out and therefore raising the average longevity of a bulb beyond what the cartel determine to be desirable. Byron's immortality is secondary here, what concerns us is the existence of the Grid, a network through which all bulbs communicate. Byron's immortality is recognised by other bulbs, but "it's never discussed except in a general way, when folklore comes flickering in from other parts of the Grid, tales of the Immortals." Later, when the cartel sends an agent to transfer Byron, "The other bulbs watch, in barely subdued terror. The word goes out along the Grid. At something close to the speed of light, every bulb, Azos looking down the empty black Bakelite streets, Nitalampen and Wotan Gs at night soccer matches, Just-Wolframs, Monowatts and Siruses, every bulb in Europe knows what's happened," (*GR*, p.650). A communication network spanning a continent, allowing information to travel at the speed of light, such a fantasy is the closest any of these three writers comes to predicting the Internet, and can't help but raise an eye when read in this wired day and age. He even uses the phrase 'on the line', just in case we could miss the analogy. And Byron survives all attempts at curtailing his life, only to end up as a Funes like figure, full of knowledge, and not able to do anything with it.

The Crying of Lot 49 is a fraction of the size of *Gravity's Rainbow*, and offers us a more distilled narrative from which to pick our metaphors. Instead of the vast array of themes that suffuse the later novel, here we are presented with comparatively few. But the nature of the novel dictates that meaning is ambiguous, clues proliferate, signs are overdetermined.

The plot is exceedingly complex, intentionally so. Oedipa Mass, a Californian housewife, finds that a former lover, real estate tycoon Pierce Inverarity, has died and named her co-executor, or executrix, she presumes, of his large estate. She travels to San Narciso, Inverarity's home city, meets her co-executor, Metzger, and begins to find that Inverarity owned, or partially owned, pretty much everything there. She

quickly happens upon an underground mail service, called W.A.S.T.E., with the symbol of a muffled postal horn or bugle. She also discovers a cigarette filter company owned by Inverarity made its filters from human bones, including the bones of an American battalion massacred in a lake in Italy in World War II. This was similar to the plot of a Jacobean revenge tragedy being performed in San Narciso, called *The Courier's Tragedy*, which Oedipa goes to see in an information gathering expedition. But the play raises more questions than it answers, introducing the concept of an illegal mail system in renaissance Europe, called the Tristero. Oedipa begins to investigate variant texts of the play, digging up more related information about the Tristero. It becomes Oedipa's shorthand for the conspiracy she detects all around her, the ever increasing spiral of related clues, all tied by the Tristero symbol of the muted horn and Pierce Inverarity, "these follow-ups were no more disquieting than other revelations which now seemed to come crowding in exponentially, as if the more she collected the more would come to her, until everything she saw, smelled, dreamed, remembered, would somehow come to be woven into the Tristero," (*The Crying of Lot 49*, p.56). Inverarity's stamp collection contains many forgeries containing the muted horn and other Tristero symbols featured in the play, and on a long night in San Francisco, she perceives the symbol of the muted horn repeatedly. Finally 'saturated' by the information she keeps uncovering, she attends the auction of Inverarity's stamp collection, including the forgeries, which are lot 49. A mysterious bidder appears who might be an agent of the Tristero attempting to buy back the evidence of their existence. The auctioneer raises his arms, as if an angel offering revelation, and Oedipa sits back to await the crying of lot 49. The end.

Integral to the novel, though, is the concept of entropy and Maxwell's Demon. James Clerk Maxwell conceived of a thought experiment which would defy Rudolf Clausius's second law of thermodynamics, the law which states that an enclosed system will tend towards disorder, with entropy being the measure of that disorder, or as Ludwig Boltzmann defined it, a measure of the dispersal of energy. For example, a sealed container with molecules inside is the system. If at the start all the molecules are bunched in one corner, the system is highly ordered. But

gradually the molecules will disperse around the system until randomly distributed, in which case the system has no order, the energy has dissipated to uniformity, and the system has reached a state of maximum entropy. The molecules might, perhaps, return to a corner and order may be return, just like a hundred coins might land heads up, but it is statistically unlikely. The second law is a bedrock of science, and has never been proven wrong. Maxwell's thought experiment imagined a sealed system with two chambers, with a frictionless door in between. Now, "if we can conceive of a being whose faculties are so sharpened that he can follow every molecule in its course, such a being, whose attributes are still as essentially finite as our own, would be able to do what is at present impossible to us..."(49) i.e. determine fast particles from slow ones, and isolate one from the other by opening and closing the door. The hotter, faster particles would accumulate in one chamber, the slower, colder ones in the other, order would be restored, and no energy would be expended. Thus, the second law would be contravened, you'd get something for nothing, the fabled perpetual motion machine would be born. The 'being' of the thought experiment became known as Maxwell's Demon, the only possible way of contravening the law, except of course it's not possible. Maxwell's experiment was also important in that it established a relationship between thermodynamics and information theory, perhaps only a metaphorical relationship, rather than a scientific one, but a relationship nonetheless.(50) In sorting the particles, the Demon is interpreting information. It wasn't until the work in information theory by Claude Shannon that the relationship between the two became finally apparent, that "Shannon's and Boltzmann's equations are formally similar... an entropy unit equals $-k \ln 2$ bit... Information thus becomes a concept equivalent to entropy, and any system can be described in terms of one or the other. An increase of entropy implies a decrease of information, and vice versa."(51) Thus when the Demon has finished sorting, the entropy is low, and the organised information is high.

Maxwell's Demon figures prominently throughout Pynchon's work. In *The Crying of Lot 49*, Oedipa stumbles across a man, John Nefastis, who believes he has created Maxwell's machine. In order to get the Demon to sort the particles, he needs a 'sensitive', someone to absorb the Demon's

memories so he can continue to identify one type of particle from another. Oedipa attempts to act as a sensitive, but fails. It is in keeping with her inability to sort the information she is constantly receiving, and it is in this context the Demon must be seen. He is Pynchon's ideal information interpreter, he is the 'ideal insomniac' of *The Crying of Lot 49*. Such a vastly complex system as Oedipa is facing requires an information processor of 'sharpened faculties' to stave off the entropy, or else the whole thing will wind down to thermodynamic equilibrium, the heat death to which the universe is doomed. Indeed, Oedipa's unwillingness to follow leads by the final chapter is analogous to this equilibrium being reached. David Seed writes "The more connections Oedipa makes, the more information she receives, hence further connections have to be made, and so on... it becomes proportionally more difficult for Oedipa to organize the information she receives."(52) Amidst the flow of clues and information, she must "Keep it bouncing," as Pierce once told her, "that's all the secret, keep it bouncing," (COL49, p.123).

The image of the pointsman which was to reoccur in *Gravity's Rainbow* surfaces here, and was actually used first by Maxwell in his *Theory of Heat* (1871) as a metaphor for the role of the Demon. "She moved through [Berkeley] carrying her fat book, attracted, unsure, a stranger, wanting to feel relevant but knowing how much of a search among alternate universes it would take... Along another pattern of track, another string of decisions taken, switches closed, the faceless pointsmen who'd thrown them now all transferred, deserted... impossible to find again," (COL49, p.71). Oedipa is here subject to the decisions made by the pointsman, she is a particle rather than the Demon, if you will. The Demon, and the 'ideal insomniac', are fictions, designed to make us think we can understand and perhaps control this system, the universe, of which we are a part. Oedipa's desire to usurp the Demon's role and put order on her own system can only end in failure.

Throughout the novel, we are faced with examples of communication without meaning, distorted meaning, and deliberately ambiguous meaning. The act of communication itself, though rampant, is devoid of content, or at least corrupts content. The symbol of the muted horn is

symbolic of this phenomenon. In chapter three, Oedipa receives a letter from her husband, Mucho. “It may have been an intuition that the letter would be newsless inside that made Oedipa look more closely at its outside,” this after musing on their “inabilities to communicate,” (COL49, p.30). Shortly afterwards, they meet Mike Fallopian, member of a right-wing historical society, which operates its own mail service, not W.A.S.T.E. To keep their mail service viable, they must send at least one letter a week. Mike has therefore also just received a letter with no information. It is communications for the sake of it, because the system exists. The communication is all surface, and no content, or as Marshall McLuhan, a recognised influence on Pynchon, famously put it, ‘the medium is the message.’(53) And by the end Oedipa is surrounded by media; post, radio, telephone, she is bombarded by information which ostensibly coheres but finally confuses. All attempts at using media for communication fail. The realisation that all this information doesn’t equate knowledge breeds confusion and paranoia, that most regular of Pynchon’s tropes, in Oedipa. Her “predicament consists of being caught between fear of the absence of order and of a total but malevolent order.”(54) Kathryn Hume has pointed out that this is the same process the reader goes through, particularly in *Gravity’s Rainbow*, as “our attempts at interpretation are discredited as a form of paranoia, as an open admission of the terror we feel when confronted by chaos.”(55) That the chaos derives from that which should inform is crucial, and integral to *The Crying of Lot 49’s* role in anticipating cyberspace.

The great Malcolm Bradbury wrote of *The Crying of Lot 49* “Language, sign and cipher work in the book, as in cybernetic America itself, towards mystery which is redundancy, towards sophisticated forms containing insignificance.”(56) This rather neatly takes us onto cybernetics itself, or rather the signification *The Crying of Lot 49* holds for readers of the cyber-generation. If looking for strict one to one correspondences, the underground mail service bears a strong resemblance to the early Usenet groups, bulletin boards and chat rooms, all those elements of cyberspace which encourage and foster communities to form and interact. W.A.S.T.E. (We Await Silently Tristero’s Empire, by the way) allows societies outsiders, those people caught in the ‘excluded middle’ to function as a

community, as Oedipa discovers during her night in San Francisco. Intriguingly, these societies, the Inamorati Anonymous, the network of bungled suicide survivors and others, only exist because of the existence of an illicit mail service. They don't meet in any other way, the clandestine letter is what binds them. It is technological determinism without the high technology. But with the advent of technology, the new type of mail system allowed for exactly the same sort of communities to arise as did W.A.S.T.E., offering exactly the same advantages, anonymity, security. Now it is technological determinism in the purest sense, an aspect of technology creating social groupings and communities.

Obviously, the frustration and anxiety Oedipa experiences at the overabundance of information and proliferation of meaningless signifiers is often shared by the Internet user. The vast majority of the information on the Internet is insignificant to the vast majority of users, a lot of it is insignificant to all the users. For the purposes of this thesis, for instance, it would have been impossible to restrict my research merely to the material available on the Internet, the definitive criticism on these three writers all still resides in a library of paper and shelves, and this despite the vast quantities of data on the web. That leaves a lot of information to be sorted and interpreted for only modest reward. Oedipa experiences an exaggerated version of the same syndrome, the more information she sorts and interprets, the more profound becomes her confusion, and the more intense her paranoia. As Warren Weaver once said, "information and uncertainty find themselves to be partners."(57)

The experience of web browsing puts us in the role of Oedipa, when ideally we would like to be the Demon. We are constantly required to sort information, yet the impossibility of being that 'ideal insomniac' poses us with the new Oedipal difficulty, we are unable to comprehend the whole, ultimate knowledge and understanding eludes us. Browsing can be disorienting because it lacks a predefined endpoint. One can browse and browse, clicking from hyperlink to hyperlink, and never reach any form of closure or resolution, finally being forced to log off due to the relentless pressures of time. By deferring closure in leaving Oedipa awaiting the final revelation, awaiting the crying of lot 49, Pynchon forces us to

acknowledge that there can never be a mastery of information. When Oedipa first reaches San Narciso, it reminds her of circuit card from a radio, she detects “a hieroglyphic sense of concealed meaning, of an intent to communicate. There seemed no limit to what the printed circuit could have told her (if she had tried to find out); so in her first minute of San Narciso, a revelation also trembled just past the threshold of her understanding,” (*COL49*, p.15). This sense of imminent revelation hangs over the novel, and by leaving us at the moment the auctioneer, with his arms outstretched as if a ‘descending angel’, promises revelation, Pynchon is denying Oedipa, and more crucially the reader, a conclusion, as if saying we will never answer those questions, we can communicate, but we can never know, we are faced inexorably with ambiguity and entropy. Uncertainty, Heisenberg called that.

The Universal Isomorph: Conclusion

Is the Internet an information organiser? Does it stave off entropy? Or, alternatively, is it a disordered system, in which the particles of information, the bits of data, float randomly, approaching an intellectual and cultural heat-death? If the latter, should it inspire paranoia, should it evoke despair, as Pynchon implies? That seems to be the reaction, too, in Borges’s Library, despair at the overload of inscrutable signification. For Funes, also, the relentless overload of perception spells intellectual stagnation. Only Joyce seems capable of rejoicing in this surfeit of meaning, and that is perhaps indicative of “the quasi-infinite speed of the movements on Joyce’s cables,” as Derrida saw it.

Throughout this exploration, we have encountered the ‘ideal insomniac,’ in the form of Joyce’s ideal reader and omniscient narrator, the Man of the Book, the eternal traveller, Ts’ui Pên, Maxwell’s Demon. The insomniac’s constant presence is indicative of the human urge to understand that which is beyond our comprehension, the obstinate desire to discern the infinite. Rather than admit the impossibility of such a

desire, an impossibility confirmed by the Copenhagen interpretation, we would rather imagine, as the librarian demonstrates, a being for which discerning the infinite was possible. But whereas the librarian takes solace in imagining these hypotheses, Oedipa is oppressed by her inability to emulate the sorting power of the Demon.

Another reoccurring trope was of the isomorphism or universal book, and it serves largely the same purpose as the 'ideal insomniac,' for it too offers the possibility of infinite understanding. Hence the isomorphism of the *Wake*, the Book of Sand, the one volume alternative to the Library, the universe in a nutshell. The Internet is a universal isomorphism of our making. It is our universal text, our 'compendium of all books,' our *Finnegans Wake*, our Library of Babel, our Aleph and our circuit-like city of San Narciso, full of revelation 'just past the threshold of [our] understanding.' Our urge to map the universe, and in doing so control and comprehend it, is innate.

Humanity has always asked the big questions about existence; Aristotle's attempt to name and classify all areas of human understanding probably wasn't the first, and certainly wasn't the last. To satisfy our desire to understand we have consistently weaved ourselves fictions that have sustained us until they become untenable. Mythology, religion, philosophy, Newtonian science are all examples of such fictions, all attempts to grasp the infinite in the finite, in the vein of the insomniac and the universal book. All periods of transition between these fictions are turbulent. Witness the reaction of the Roman Catholic Church to the conclusions of Copernicus, Kepler and Galileo. When quantum physics rendered the existing tentative answers to those big questions null and void, another period of transition was initiated. Compound that by the experience of two world wars, and you have a world that urgently required an order to be imposed, a mechanistic structure, a clockwork order, a model that follows our previous notion of the cosmos. We crave a new fiction, and quantum mechanics, with its central admission of uncertainty, of the impossibility of knowing, won't suffice. The Internet, I propose, is the inevitable culmination of our twentieth century desire for a fiction that gives the impression of ultimate control over our existence.

By the end of the century, we had our new fiction, or hyperfiction, in this case. As Borges so perspicuously anticipated, we have turned to “a labyrinth devised by men, a labyrinth destined to be deciphered by men... Enchanted by its rigour, humanity forgets over and over again that it is a rigour of chess masters, not of angels. (*L.*, p.42). And this world, too, demands to be known and comprehended. As mentioned above, in the act of browsing, we are Oedipa, but we want to be the Demon. Certainly, we are not plagued by the indeterminacy that Oedipa was surrounded by, the Internet functions perfectly, we have Google to act as a surrogate Demon, leading us to what he determines we want or need. But the desire is there, when we see the number of returned matches out there in cyberspace, the desire is there to know them all, simultaneous with the realisation we will know only the few. The constant sorting of information cyberspace demands is adequate merely, we know, for practical use of the Internet. But the scale begs us to imagine our own Demon’s and ‘ideal insomniacs’, capable of making each and every one of those latent journeys through cyberspace. The paradox, and it is quite Borgesian, is that we have created one fiction to satisfy our lust for control, but in doing so we have been forced to imagine another. It is truly Tlönian in its realisation.

It should be quite apparent that the search for cyberspace in Joyce, Borges and Pynchon was a tad disingenuous. These three writers merely reflected various of the intellectual preoccupations of the twentieth century, preoccupations which are consistent with a philosophical interrogation of cyberspace. Nevertheless, all the works discussed appear rather prescient, and despite what Borges might claim, as an ‘exercise of the intellect’, it is not, ‘in the final analysis, useless.’(58)

And finally, to close this investigation into literary metaphor, we must turn our attentions once more to the blind librarian Borges. In ‘The Library of Babel’, he writes of his universe, “The Library is a sphere whose exact centre is any one of its hexagons and whose circumference is inaccessible,” (*L.* p.79). In the short essay, ‘The Fearful Sphere of Pascal,’ he elucidates the source of the above metaphor, starting with Xenophanes, 600 BC, then to Plato. A third century manuscript discovered by twelfth

century French theologian Alain de Lille ran thus ‘God is an intelligible sphere, whose centre is everywhere and whose circumference is nowhere,’ (L. p.225). The medieval world embraced this conception of God, and in 1584, Giordano Bruno, that man again, joyous after the discoveries of Copernicus, wrote that the world is the infinite effect of an infinite cause, and ‘We can assert with certitude that the universe is all centre, or that the centre of the universe is everywhere and the circumference nowhere,’ (L. p.226). Finally, Borges notes, the French mathematician Blaise Pascal, before his death in 1662, adapted the metaphor, writing that ‘nature is a *fearful* sphere, whose centre is everywhere and circumference nowhere,’ (L. p.227). What was a joyous affirmation for Bruno became a ‘labyrinth and an abyss’ for Pascal. Whatever the chosen emphasis, of Joyce-like liberation, or Pynchon-like paranoia, it seems an apt metaphor for cyberspace also, indicating that perhaps the Internet is merely a continuation of our intellectual inquiry into the nature of the universe.

“I hope that these hasty notes I have just dictated do not exhaust this book and that its dreams go on branching out in the hospitable imagination of those who now close it”

Jorge Luis Borges, *The Book of Sand*, p.125.

ENDNOTES

Intro Endnotes

- 1) The following account of the development of quantum physics is based on Wooley (pp.218-235), Merrell (pp.155-171), Gribbin, *Schrödinger's Kittens* (pp.1-30) and Duszenko.
- 2) Wooley, p.219.
- 3) Quoted in Wooley, p.219.
- 4) Berkeley, quoted in Duszenko.
- 5) Duszenko.
- 6) For excellent accounts and investigations into the experiment, see Gribbin, *Schrödinger's Kittens* (pp.19-22 and 28-30) and *In Search of*

Schrödinger's Cat, passim.

- 7) Heisenberg, quoted in Cooper, p.110.
- 8) Eco, *OW*, p.156-157.
- 9) Merrel, p.183.
- 10) Eco, 'From Internet to Gutenberg.'
- 11) Bush, 'As We May Think'.
- 12) Ted Nelson, quoted in De Kerckhove, p.78.
- 13) Project Xanadu' at: <http://www.xanadu.net/>
- 14) Gibson, *Mona Lisa Overdrive*, p.16.
- 15) Eco, *OW*, p57.
- 16) Rowland, in De Kerckhove, p.xvi.

Joyce endnotes

- 17) Eco, *The Open Work*, p4
- 18) Derrida, 149
- 19) *Ibid.*, 149.
- 20) For a comprehensive assessment of the relevance of each interpolation, see Clive Hart's peerless chapter on Wandering Rocks in Hart, Hayman (eds.).
- 21) Clive Hart in Hart, Hayman (eds.), p193.
- 22) Hart, in Hart, Hayman (eds.), p194.
- 23) Eco, *The Open Work*, p10.
- 24) Eco, *The Open Work*, p.10.
- 25) Weiss, Chap 11A
- 26) Hofstadter, p49.
- 27) See Merrell, p.186, and Wooley, p.231.
- 28) Eco, *The Open Work*, p.10.
- 29) *Ibid.* p.10.
- 30) Theall, 'Joyce's Practice of Intertextuality'.
- 31) Eco, *The Middle Ages of James Joyce*, p.67.
- 32) For an extensive discussion of the *Wake's* prognostications, see Weiss, chap29A, and Theall, 'Beyond the Orality/Literary Dichotomy'.
- 33) Deane in Joyce, *Finnegans Wake*, p.vii.
- 34) Quoted in Weiss, chap1C.
- 35) McLuhan, *Media*, p.292
- 36) Theall, McLuhan and Joyce.
- 37) Eco, *Open Work*, p.175.

Borges Endnotes

38) Just some of the myriad examples on the Internet include:

<http://members.tripod.com/ClintonGreen/universal.html>, which talks about the notion of the universal library and Borges's interpretation of it.

http://www.themodernword.com/borges/borges_papers_rollason2.html, an article by Chris Rollason on the similarities and dissimilarities between the Internet and 'The Library of Babel'

<http://www.salon.com/books/feature/1999/12/06/borges/index.html>, an amusing article at Salon.com, again comparing cyberspace with Borges's stories

<http://www.pretext.com/oct97/features/story1.htm>, a discussion on the theory of the universal library which invokes Borges and his Library.

<http://www.scholars.nus.edu.sg/writing/ccwp10/shi'an/main.html>, a site by Tai Sh'ian, a Singapore doctoral student, who draws a parallel between searching for definitive meaning on the Internet and the search for the 'Book of Books'.

<http://www.scholars.nus.edu.sg/writing/ccwp10/shi'an/p3/main.html>, "Uses and adaptations of 'The Library of Babel'", featuring a comprehensive list of sites dealing with Borges's Library in various forms.

39) See Berners-Lee, and Kitchin pp.26-53, for a full account of the Internet's initial development, particularly as an academic resource tool for pooling information between universities.

40) The Library has been calculated as holding $10^{2,000,000}$ books, which is more than the number of atoms in the universe, (Merrell, p.127).

41) Max Planck, quoted in Merrell, p.162.

42) Sturrock, p.109.

43) Merrell, p.44.

44) Eco, 'From Internet to Gutenberg'.

45) For an excellent account of Borges's use of the double, see Shlomith Rimmon-Kenan in Bloom, (ed.).

Pynchon Endnotes

46) See Mendelson, introduction.

47) Stonehill, 'Pynchon's Prophecies of Cyberspace.'

48) I like to imagine that Pynchon takes great delight in the knowledge that the Internet grew out of the ARPANET, creature of the cold war, which Pynchon would see as the great binary opposition, USA and USSR,

East and West, one and zero personified.

49) Maxwell, quoted in Loewenstein, p.5.

50) “The Second Law has had a life of its own in intellectual realms far removed from science, taking the blame for the disintegration of societies, economic decay, the breakdown of manners, and many other variations on the decadent theme. These secondary, metaphorical incarnations of the Second Law now seem especially misguided. In our world, complexity flourishes, and those looking to science for a general understanding of nature’s habits will be better served by the laws of chaos.” Gleick, p.308. Gleick was trying to push his own theories of chaos at the time, but he has a point, and Pynchon’s use of entropy is definitely of the metaphorical incarnation.

51) Loewenstein, p11.

52) Seed, p.119.

53) McLuhan, *Understanding Media*, p.7.

54) Frank Kermode, quoted in Seed, p.128.

55) Hume, p.xi.

56) Bradbury, p.177.

57) Weaver, quoted in Eco, *OW*, p.57.

Conclusion Endnote

58) Borges, *Labyrinth*, p.69. “There is no exercise of the intellect which is not, in the final analysis, useless.”

„Davin O’Dwyer, 2002.