SCIENCE & LITERATURE IN THE TWENTIETH CENTURY

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If the labours of men of science should ever create any material revolution, direct or indirect, in our condition, and in the impressions which we habitually receive, the poet will sleep then no more than at present; he will be ready to follow the steps of the man of science, not only in those general indirect effects, but he will be at his side, carrying sensation into the midst of the objects of the science itself. The remotest discoveries of the chemist, the botanist, or the mineralogist will be as proper objects of the poet's art as any upon which it can be employed. . . .[1]

IN THE LATE EIGHTEENTH CENTURY, the scientific era began. Steam engines hissed, foundries glowed, mines were dug — and nineteenth-century authors from Wordsworth to Whitman noted their arrival, pondered their meaning, and predicted a new direction for literature in the twentieth century. Yet today, in a generation that has seen the appearance of the jet plane, the Pill, the atomic bomb, plastics, Xerox, lasers, television, and men on the moon, our writers (in contrast to those of the nineteenth century) now rarely mention the word science. The tacit opinion has developed that Wordsworth — and Shelley, and Tennyson — were hopelessly wrong: that science and literature are incompatible, even enemies. Scholars such as C. P. Snow, Aldous Huxley, and P. B. Medawar noted the growing split between arts and sciences in this century, and found fault with writers for failing to mirror their worlds and for cutting themselves off from the rich and varied source material science has to offer.

But these critics to date have primarily been trained in science. In stressing content over form, such critics have failed to realize that the writers reflect their world all too accurately. They reflect a society whose points of reference have been swept away — one which has lost its sense of meaning and has turned inward in search of significance amongst absurdity; a society which as a whole has little understanding and a great deal of fear of the forces unleashed by its scientists. It is paradoxical that the explosion of science has not increased man's sense of order and logic in his universe, but instead questioned and disrupted it. "The theme of perplexity and terror before the surrounding world, which is seen as a kingdom

of chaos and absurdity, resounds with particular clarity."[2] Today man's sense of harmony is gone.

The Split Society

" 'I have got lost . . . ' sighs modern man."
"After us the Savage God . . . "
"Imagination of Disaster . . . "

These turn-of-the-century quotations from Nietzsche, Yeats, and Henry James, respectively, point us towards the central characteristic of the novel in the twentieth century: awareness of the loss of organizing structures — of hierarchies of religion, tradition, morality, class, and family. A new logic, that of science and its offshoots, had pushed man carelessly aside as it rearranged his world. Biology (Darwin, Mendel) removed man from his God-given position as monarch of the earth; geology reduced his part in earth's history to mere moments in vast time; astronomy shrank his position of power from the centre of the universe to a lost corner of infinity; Newtonian physics disrespectfully ordered him about. Technology and industrialization further reduced him to a pawn of massive forces beyond his control; resultant urbanization and emigration destroyed roots and sense of place and kinship; an explosion in population, and the development of a vast labour class, permanently altered the structure of society; communications, with information from around the world, opened up a dizzying wealth of alternative moralities and choices; the growing rapidity of change altered attitudes to time and permanence. Coming at a seminal time in the history of Canadian literature, this movement has had a profound impact. A useful way of summing up the collapse of faith in authority structures is to define it as the breaking — or at least, challenging — of the *logos* (J. Hillis Miller, Deleuze, Derrida), the line of meaning, authority, order: the Law.

The traditional literary text, like language itself, is linear — as is basic plot development and the establishment of the basis of judgment on which to recognize the significance of events or moments. Jakobson points out that the nineteenth-century novel is basically metonymical (i.e., linear): "Following the path of contiguous relationships, the realist author metonymically progresses from the plot to the atmosphere and from the characters to the setting in space and time."[3] The logic of a story or poem runs through it like a thread connecting the parts, and it is this thread which J. Hillis Miller has conveniently named the *logos* of the text. But Miller noted the appearance of a second logos, an "anti-logos," in the literature of the latter part of the nineteenth century. This anti-logos runs parallel to the linear text and is glimpsed at moments, allowing reverberations of spatiality, complexity, depth. Miller believes this anti-logos *is* present in earlier texts; but its appearance is usually minimal, its impact non-disruptive. But by the twentieth century, the line of logos itself is at times reduced to glimpses only, the

spatializing anti-logos fragmenting mere narrative moments with exploratory snapshots, or dreams outside of time.

The appearance of the anti-logos, or rather the alteration of its interference and importance from minor to profound, corresponds closely with the rise of science and technology in society. But here we have a paradox. Can the presence of science, that heir of rationality and natural laws, act as an "anti-logos" in the structure of a novel's thought? The concept is self-contradictory. No. Rather: science has been so successful in casting the traditional logos into doubt because it is *more* rigorous, *more* rational — it beats the logos at its own game and *usurps* it, taking it over together with its position of authority and power. Presenting a new definition for reason and fact, "that which can be experimentally repeated," science tested the hierarchies of society — religion, monarchy, class, family, morality — and found them lacking a purely rational basis. This narrowing of the logos to the rigorous standards of science forced a split; once capable of encompassing a balance of reason and imagination, the logos could no longer condone the unprovable, driving an anti-logos into (separate) existence, an anti-logos which comprises the non-rational: the artistic, the spatial, the metaphorical, emotional, mystical, and the insane.

Religion fought being moved from centre stage, choosing to fight science on the latter's own rules — physical, testable fact — where, by basic principles (proof *vs.* faith), it could not win. Now it was science that could move mountains, and by the end of the century, God was pronounced dead. Such was the sheer apparent physical *power* of science and technology to affect the world that its standards — rationality, objectivity, cool-mindedness, level-headedness — became judgments of value for the century to come.

Artists, too, including poets, sensed that the rules had somehow changed; but instead of fighting beside the priests to broaden and rebalance the logos, many responded to the perceived split by turning their backs on the mode that had rejected them, to embrace the opposite extreme. Culture became at its base radically polarized by the turn of the century. No longer were poets Renaissance men, or soothing purveyors of eighteenth-century decorum, or nineteenth-century mirrors of the external world about them. Perceiving the anti-logos as the rejected, neglected artistic dimension of life, poets embraced it as their true medium. It was narrow, but it was theirs, and many followed the lead given earlier by Blake and the Romantics, and gave up — or at least distorted — that balance between Reason and Imagination for which poets before them had striven.

Twentieth-century *novelists* have had a slightly different response but basically they, like the poets, have responded to this situation by recording the new meaninglessness and absurdity of events and external hierarchies, to turn towards the inner world of the self in a search for reality and meaning. Following Cartesian reduction, authors adopted the symbolist point of view that external reality is

(merely) a function of the senses, thus expanding the ego to creator of external reality, and enveloping God within the self. But awareness of the meaninglessness of external reality and of man's physical self as a component in that reality necessarily impinged on the consciousness, and in many authors we find a presentation of a resultant split within the self, a division variously perceived as nature/spirit, temporal/external, rational/irrational, Apollonian/Dionysiac, self/other, the conscious and the unconscious. By expanding the mind to include all, man has incorporated philosophy's dualism debate (the relation between mind and body, or between cerebral and physical worlds) into his own head. Paradoxically, the absorption of the division effectively destroys man's time-honoured sense of mental unity. Thus it is that, through knocking out the underpinnings of faith and hierarchy, science and technology have divided man's consciousness. Components of thought that once were viewed as coherent now line up in the form of incompatible *oppositions,* and the logic behind human actions seems to have vanished. Roles become questioned as their traditional meanings disappear. Perusing Western literature, Valentina Ivasheva states that "the influence of the modern sciences [results in] the identity crisis as a theme in Western literature," and notes "the ever-larger place occupied in Western literature by themes centring on personality disorders."[54]

We begin to see that the disintegration of faith in Authority is paradoxically both liberating and limiting for the artist. Liberating in that conventions of decorum — subject, place, time, setting, characterization, adherence to conventional reality and social modes — become fair game for free experimentation; and we observe a vigorous burst of originality of both form and content, especially in the early decades of the century. But this freedom is also limiting. If we look at the novel, for example, we see that turning from external reality to inner perspectives "reduces" the novel towards pure aestheticism and autonomy, often separated from a social role. Since reality and meaning are not to be found externally, the point of view narrows from omniscience towards one character's consciousness. Since time is no longer taken for granted to be linear *progress,* narrative time shrinks towards cyclical repetition, strings of static scenes, and eventually the spatialization of a single day or even moment. And plot accordingly diminishes towards examination of a near-static *situation.* Many twentieth-century authors have, like the Surrealists, seen language itself as an artificial, inhibiting construct which, by organizing our perceptions, disguises true reality; and in struggling to liberate their works from unwanted hierarchies, some dissolve into incoherence or stutter into silence.

In the drama we can see the poles of liberation-reduction by comparing the exuberance of Jarry with the despair of the absurdists; in the poem it is apparent in the juxtaposition of the explosive futurists with the blank pages at the close of Dadaism; in the novel it is visible in the contrast between the encyclopaedic, ener-

getic Joyce or Lowry, and the pruned leanness of the retreating Beckett. But since liberation and limitation are linked, they exist in varying degrees side by side within most contemporary works.

The twentieth-century novel has fewer characters than does the nineteenth-century "realistic" novel, and those characters are usually quite ordinary. But a more important characteristic of the character in modern fiction is a development of the Romantic idea of the *artist as hero*. Why is this so widespread in contemporary fiction? Because it is a concept that fits well with the celebration of the anti-logos. It is defiance, an assertion of the value of art in a world overrun by science and the debris of its inventiveness. Again and again (Proust, Joyce, Mann, Gide, Grass, Sarraute, Greene) this occurs. But usually this artist reflects the divided self, the split personality, mentioned earlier. Emphasis on the artistic nature of man can no longer be made authentically without there being a simultaneous recognition that it is but one extreme, and that the scientifically rational is at the other. Artistic innocence is gone: the two modes bring each other, their opposites, into compromised existence. In Thomas Mann's work after *Buddenbrooks* (*Tonio Kröger* and *Tod in Venedig*, for example), the main character is an artist who is aware, or becomes aware, of the polarity of Apollonian and Dionysiac within himself. In *Venedig*, Aschenbach cannot assimilate or unite the two sides of himself, which results in his death. *Tonio Kröger*, however (notice the symbolism of the two types in his name), recognizes the duality of his northern rational, practical bourgeois self and his other "dark" bohemian-Mediterranean tendencies, and transcends them successfully. This Hegelian dialectic is clearly visible in Hesse also. In *Siddhartha*, the protagonist tests both ascetism and physical pleasures before working his way towards transcendence. In *Steppenwolf*, the same process is presented quite differently. Instead of the calm narrative of *Siddhartha*, we find a tortured mix of action and morbid self-doubt as Haller tries again and again to solve the battle between his bourgeois spirit and his disruptive wolf-self, the Appollonian and the Dionysiac, the rational and the untamed.

One of the major techniques in this struggle within the artist-self is the fragmentation of a character into several people, each corresponding to a facet of that character. Hesse points this out explicitly within *Steppenwolf*, and Hermine and Pablo, as well as the bourgeois landlady, are parts of modern man in his multiplicity. The technique is also central to Frisch's *Homo Faber* where the technological Faber must accept the irrational life which includes Sabeth and Hanna. Joyce uses this technique, too: Steven and Bloom are father/son, spirit/nature, etc. By far the most common representation of this split in the self in the contemporary novel is the novel with two main characters. Beckett uses this duality in *Mercier et Camier* (and, of course, in *En Attendant Godot* with Vladimir and Estragon forming complementary characters, and Pozzo and Lucky as

Hegel's master and slave). It is central also in Böll's *Und Sagte Kein einziges Wort* where the practical Kate must cope while Bogner dreams, and is to be found in Lawrence's *The Rainbow* and *Women in Love* (Ursula and Berkin, Gerald and Gudrun), as well as Hawkes's *The Blood Oranges* (Cyril and Fiona, Hugh and Catherine), and Greene's *The End of the Affair.*

In all of these examples and so many others, the division (which can be seen as either *complementarity* or *opposition*) of the two characters is based on a rational/emotional polarization. This basis for the division of human nature has become so predictable in our literature that we have come to accept it without question. But such a division was until the last century and a half or so not just uncommon, but actually rare — until the reality of the technological revolution had become commonplace to the citizen. The alacrity and decisiveness with which this split occurred are particularly noteworthy. What is it about this particular polarity which, once adopted, has struck us as so profoundly satisfactory and indeed, so *natural*?

The Split Brain

The rapidity and thoroughness of the usurpation of the logos by science, and the resultant creation of an opposing anti-logos, were so sudden and profound that the truth could almost be guessed: the divided consciousness, the sensation of self and the other, of emotion contradicting reason, has at its base a metaphor — the split brain — which is literally true. The human brain has two lobes, one of which — the left lobe, controlling the right side of the body — excels at linear, logocentric thought; the other, the right hemisphere (controlling the left side) is metaphoric (imaginative), seeing patterns and the overall picture. And it appears possible that one mode of thought, or hemisphere of the brain, can come to dominate the other. The resulting potential for ambivalence has always existed, but has remained potential only, until the balance of reason and imagination became radically upset by the startling growth of reason's physical power via technology.

Everyone is aware that humans go through puzzling variable modes of consciousness from one day — no, from one moment to the next. We vacillate between conditions: concentration and restlessness, goal-oriented activity (problem-solving) and daydreaming, linear and "roundabout" thinking, planning and memories. It is almost as if we had *two* brains, not one, and couldn't decide which we preferred to inhabit.

It has been known since the first autopsy, long before Hippocrates, that man's brain is composed of two almost totally separate lobes, mirror images of each other. The first medical man of the modern era to relate this doubleness of the organ to the thinking it produces was Dr. A. L. Wigan who, in 1844, published a book entitled *The Duality of the Mind.* In 1861, the Frenchman, Paul Broca,

published the first of his papers on language and the brain. He had discovered that damage to a specific area in the front left side of the brain (in the third frontal gyrus of the cerebral cortex, now called Broca's Area) caused speech disorders (aphasia). In 1865, he added a very significant finding: damage to the corresponding area on the right side of the brain did not affect language capacity. Language is localized in the left brain. For the first time, it was realized that the two halves of the brain are not literally symmetrical in operation and that one side may have "cerebral dominance" over the other for any given function. (It should be pointed out here that the location of speech in the left brain is not universal among left-handed people. For simplicity, the observations made here concern right-handed individuals.)

Broca's work was immediately joined by that of the eminent English neurologist, John Hughlings Jackson. In 1864, Jackson wrote:

> If, then, it should be proved by wider evidence that the faculty of expression resides in one hemisphere, there is no absurdity in raising the question as to whether perception — its corresponding opposite — may not be seated in the other.[5]

Attention to the more visually oriented right-brain was shunted aside, however, in the haste to explore the verbal, powerful, left brain.

It was in recent work with epileptics that the next breakthrough came. The two brain hemispheres are joined by the *corpus callosum*, a thick band of 200 million neural fibres through which electrical impulses move constantly. Four billion impulses a second (20 per fibre per second) connect the two hemispheres. In the severest, most incapacitating forms of epilepsy, the level of activity across this bundle is greatly increased from the norm, the seizure moving from one side to the other to involve the whole brain. Roger Sperry and his colleagues, Michael Gazzaniga and Joseph Bogen at the California Institute of Technology, found success in halting seizures in monkeys by severing the corpus callosum. Bogen and Philip J. Vogel tried it on humans — and it worked.

Many of the patients treated were to all intents and purposes cured of the disabling seizures and could go back to their normal lives after having their brains cut in half. It is remarkable to note that on the surface they appeared normal. One nine-year-old boy, for example, retained his sense of humour and his outward personality, joking with the doctors the morning after his operation that he had a "splitting headache." But Sperry and Gazzaniga *et al.* devised systems of testing the patients. These involved flashing images onto the retina of one visual field. As in normal people, a cross-over effect was found: information from the *left* side of the body is processed in the *right* side of the brain, and vice versa. But when the corpus callosum is cut, if the image of, say, a horse, is flashed only to the left visual field, the right brain, being speechless, cannot respond. When asked what he saw, the patient says "I don't know." Yet the patient is not blind in the

right visual field. The left hand, if given the opportunity, will point to a picture of a horse.

> The minor hemisphere also triggers facial expressions, grimacing, and wincing when an error is made by the vocal hemisphere and where the correct answer is known only to the minor hemisphere. The minor hemisphere seems definitely bothered in the situation.[6]

Clearly, there are two separate brains at work here. When disconnected, they can function on their own — simultaneously.

> The minor hemisphere can also spell on a very low level. . . . It is not the major hemisphere that is doing the spelling here, because it vocalizes a running commentary on the progress of the left hand, like "This is A" when it really is "T," and so on. This vocal commentary is entirely off on the progress of the left hand, except for accidental coincidences. This in itself is of some interest here, namely, that the minor hemisphere can concentrate and carry on tasks of its own, ignoring the erroneous and distracting chatter of its better half.[7]

As long as the right brain has no access to speech, outward conflict is rare. An exception is the famous case where an angered husband, attempting to strike his wife with his right hand, found that his left hand reached out and held the right arm down.

Further such experiments show that calculation is very clearly localized in the left brain, while facial and pattern recognition is found in the right, and so on. Many have been tempted to jump to grand conclusions from the resultant data, and others are now calling for restraint. It is important to keep clear what is fact and what is wild surmise, and to remember that hemispheric lateralization is relative, a matter of degree. Nevertheless, it cannot be denied that it is in their *implications* that these data hold their most profound fascination.

John Eccles's summary of the findings from the experiments[8] is representative and can be used as an initial list: the *dominant* (left) *hemisphere* has a liaison to consciousness, and is verbal, analytic, sequential (linear), detailed, arithmetic and computer-like, and temporal (i.e., tied to linear time); the *minor* (right) *hemisphere* has no such liaison to consciousness, is almost non-verbal but is musical, synthetic (i.e., synthesizing), holistic, coherent, geometrical and spatial, and is simultaneous, that is, unconscious of linear flow of time. Past and present are interchangeable and this is the world of memory, fantasy, and dream. The left brain appears to be the site of logical thought, step-by-step reasoning, mathematics. Because it has control over speech and voluntary muscles and therefore interacts with the external world because (as Robert Ornstein[9] would say) of the bias of our science-oriented society, it has been labelled "dominant." The right or so-called "minor" hemisphere grasps spatial relations — it allows us to recognize faces, for example — and understands patterns in a thought, seeing it not piece by piece, but as a whole. It is thinking in the AHA! mode, where one

realizes "now I see the picture." It is the realm of complex multifaceted ideas, or "Gestalts," which are holistic, or unified, modes of thinking. These modes are not goal-oriented.

The left brain controls muscular activity and is closely concerned with the external world. The right brain tends to emerge, therefore, when the body is relaxed and goal-oriented activity suspended: Archimedes in his warm bath, for example, or Kekule's famous drowsing before the fire when he envisioned the structure of the benzene ring and ushered in the new science of organic chemistry. The words he used in announcing this new branch of science were telling: "Gentlemen: we must learn how to dream!" Meditation techniques appear to put the left brain into neutral by giving it a task it cannot complete logically (as in contemplating the Zen Koan "what is the sound of one hand clapping?"), thus releasing the intuitive, inconcrete, synthesizing right brain functions. This is the state Keats called Negative Capability, "which Shakespeare possessed so enormously . . . that is when man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact or reason. . . ."[10]

A few important thinkers have noted the great split in our mental processes. Each has devised a schema to deal with the rupture, and these schemas are at heart homologous. The mention earlier of Apollonian and Dionysiac, for example, foregrounds the fact that Nietzsche faced the growing left-brain, right-brain polarization straight on, viewing the dichotomy as rational-sensual. Lévi-Strauss, too, was aware that two great modes of thought exist. He named them primitive ("sauvage"), and civilized. They involve different uses of minds which are at root comparable. The "untamed" or primitive mind, for Lévi-Strauss, "is neither the mind of savages nor that of primitive or archaic humanity, but rather mind in its untamed state as distinct from mind cultivated or domesticated for the purpose of yielding a return"[11] (i.e., goal-oriented). Its approach is "timeless"; it grasps the world as both a synchronic and diachronic totality; it "totalizes . . ." refusing "to allow anything human (or even living) to remain alien to it,"[12] and it is dominated by the symbolic function, "a consuming symbolic ambition such as humanity has never again seen rivalled."[13] All these characteristics duplicate those of the right brain, implying that tribal society profits and results from a different balance of cerebral dominance (i.e., right brain) than does our left-brain civilization. In a further passage of *La Pensée Sauvage*, Lévi-Strauss confirms the homology between his system and ours, writing that there are enclaves within civilized society where these "primitive" thought processes are still to be found. "This is the case of art," he writes, "to which our civilization accords the status of a national park. . . ."[14]

Julian Jaynes, in his *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, independently reaches very similar conclusions, namely that pre-civilized thought involved far readier access to the right brain — indeed

exhibited a kind of "normal" schizophrenia — which gradually became lost with the development of consciousness and the suppression of the voices and inspirations of the right brain.

Another who recognized and explored the two modes of thought operative in our brains was, of course, Sigmund Freud. The homology between the split brain and Freud's schema is inescapable. In Freud, we find that the unconscious is characterized by lack of language (it is the pre-linguistic *source* of language, without ego and subjectivation: there is no "I" or "he," but a flux of subjectivity, and no connection between signifiers and referents: such correlations are conventions established by the conscious mind). Instead, signification results from relations between signifiers. Secondly, the "reality principle" is not in effect: there is no distinction between what the conscious mind would label "real" and what it would call "imaginary." Similarly, the unconscious is pre-logical: we do not find adherence to continuity or coherence. Instead, concepts, objects, ideas swarm in a kind of chaos. Fourthly, socio-symbolic orders governing concepts of right and wrong are suspended. And finally, Freud tells us, "the time-factor . . . has no application to unconscious processes . . . the Kantian proposition that time and space are necessary modes of thought may be submitted to discussion today in the light of certain knowledge reached through psychoanalysis. We have found by experience that unconscious mental processes are in themselves 'timeless'."[15] All of these characteristics coincide with those of the right brain as summarized by John Eccles, while the distinguishing features of the left brain correspond with those of consciousness.

Our society, then, is a split-brain society. The rise of science and its enormous physical power has caused a dominance of left-brain thinking, causing many artists (and numerous citizens, as evidenced by the rise in fascination with UFO's, astrology, ESP, etc.) to retreat to the right brain, pulling up the drawbridge. Or to use another metaphor, this polarization has severed the *corpus callosum*, and we are left with precious little communication between the two worlds. Yet, as we have seen, if writers reject science as a specific subject, they are nevertheless aware of the great division in society and in themselves. This rupture concerns them deeply, and is in fact the subject of our era's literature.

An example is one of the best novels to be written in Canada this century, Malcolm Lowry's *Under the Volcano*. Like many other contemporary novels, it takes the form of a mental conflict within a hopelessly divided "hero," a character now so representative of modern man that George Woodcock writes that "Geoffrey Firmin . . . can well be considered the representative of much more than his own inner conflict — in fact as an aspect of Every-

man. . . ."[16] Behind Lévi-Strauss and Freud, and even Nietzsche, stands one of the most helpful philosophers of rupture, namely Georg Wilhelm Friedrich Hegel, analyst of the modern divided consciousness. A study of *Volcano* according to the Hegelian dialectic of the stages of the Unhappy Consciousness in Hegel's *Phenomenology of the Mind*—through Ansucht, despair, fragmentation, resignation to the existence of both the immutable self or essence and the physical nature, and eventual transcendence into unity — is very rewarding; space unfortunately precludes its appearance here, other than to summarize that Lowry's novel is the search for the absolute, unchangeable, by a man who finds a gulf both within himself, and between himself and the world. The Consul exemplifies the failure of this search due to fatal isolation into one self of a divided consciousness, rather than acceptance of the necessity of both selves for the total individual. The Consul is a classic study of gradual immersion in the right-brain state of mind, where the practical left brain loses hold.

A few words on Lowry's handling of language are pertinent here. At the extreme of his inner battle, the Consul struggles to retain control of language, that last left-brain lifeline, to prevent total control of his physical body from slipping away. (Only when he begins to lose control of language, in Cervantes' cafe, do we know the battle is lost. The Consul loses his ability to talk, and with it all connection to left-brain reality. Within moments he is falling into the ravine, the barranca — dead.) Significantly, that control of language has been challenged throughout the novel, and ultimately destroyed, by usurpation by science and technology. The Consul's spiritual struggle (and his half-brother Hugh's) is a twentieth-century one: the attempt to reconcile the impotence of the individual with the enormity of events, an enormity the horrors of which are brought into consciousness by the radio, the telephone, the movie newsreel, machines which speak of the dehumanization of battles in which machines replace, direct, and kill men. The individual seems capable of ridiculously little — Hugh's ideas of fighting in Spain, for example, are depicted as naively idealistic — in the world of machines; yet by his machine-brought knowledge of injustice, the individual nevertheless becomes responsible, and in doing nothing he is guilty. "They are losing the battle of the Ebro. Because of you, said the wind."[17] The Consul, finding the outer world of uncontrollable powers terrifying, its language a threat, withdraws into alcohol to drown his conscience. But his own mind, in its guilt, recreates the division and strife of that other, outer-world reality. Mentally the Consul "kills" himself by drinking; physically he is ensnared by the fascist police and executed as a Jewish spy: Lowry draws a careful parallel between the Consul as individual and the Consul as representative of Western civilization. The same telegram reappears at the end of the novel, no longer separated from the flow of the text since the language of the Consul's environment has become as terrifying, impersonal, and urgent as that of the outer world. Its harsh language, ostensibly

"misinterpreted," condemns the Consul to death. The telegram and its language are symbols of power "towards unseen high events" against which the "little man" is helpless.

Lowry also uses newspaper headlines to similar effect. In the Consul's nightmares, accusations of his existential guilt come from impersonal sources, and are expressed in the terse and merciless language of the printing press. Even his death is predicted to him by this impersonal voice of the headline: "Es inevitable el muerte del Papa."[18]

Similarly, the Consul cannot speak the language of the telephone. Terrified of the machine, he is incapable of using it to call for help. He cannot dial; the emergency number 999 turns upside down to 666, and instead of stating his message he shouts: "Who do you want ... God!"[19] The Consul is simply incapable of holding on to the *logos* in the face of its usurpation by technology.

Volcano presents a search for meaning that failed. And in the cynical twentieth century, one would be excused for assuming that most novels must reflect the pessimism of the times by consistent such failures. But according to Hegel, the state of rupture is most fruitful when transcended. We find the same message in Nietzsche's Socratic and Dionysiac and in Lévi-Strauss, with his concept of the basically binary thought processes. Robert Ornstein concurs: "our highest creative achievements are the products of the complementary functioning of the two modes." Albert Rothenberg[20] arrives at the same conclusion through his study of the differences in thought-processes between creative achievers and ordinary people. He concludes that genius, or at least the "Eureka" process, stems from an ability to consider opposite sides of a thought, and to leap to a higher level of thought to unite the polarities. He calls the process Janusian Thinking, in a tribute to the twins of opposing vision. Arthur Deikman[21] also notes a combination of the two "brains" in the highest creativity. L. Ponomarev concurs:

> Both points of view are equally valid, but, taken separately, are incomplete ... the art of ballet requires mathematical accuracy and, as Pushkin wrote, "Inspiration in geometry is just as necessary as in poetry ..." We cannot assess the degree of damage we undergo from a one-sided perception of life.[22]

And indeed we do begin to find such literature appearing. It is literature of balance once more, but with a new maturity: taking little for granted now, its treatment of the struggle is thoroughly self-conscious; and its right-brain development, thanks to vigorous exercising earlier this century, is greater and more experimental and experienced than before. It still sets up the terms of the debate in the format of an opposition; but the *corpus callosum* is beginning to be rebuilt. *Volcano*'s Geoffrey Firmin recognizes the duality but cannot bridge or transcend it, and shows us the price of failure: we fall into the gap, the barranca, Malebolge. In novels such as *Homo Faber* by Max Frisch, or *Zen and the Art of Motorcycle Maintenance* by Robert Pirsig, however, we find deliberate, self-conscious recog-

nition and reconnection of the severed elements. These are novels which face the fact of rupture head-on and in so doing they begin deliberately to involve technology and science into their subject matter. The impact of science on the *content* of the novel is, ironically perhaps, coming long after its effect on novel *form* (including language) has been established.

Canadian writers are peculiarly well-suited to join this movement. A long history of dealing with the left-brain/right-brain opposition in the terms of the-great-Canadian-wilderness *vs.* controlled-European-pastoral, and later of Western (and now Northern) frontier-freedom *vs.* Eastern conventionality and order, has given Canadian authors from Moodie to Atwood first-hand experience at grappling with the intricacies of the hemispheric conflict and the complexity of its resolution. In the process, Canadian writers have coloured that literary polarization with a particular Canadian tint, that of expertise in landscape metaphor; and like Lowry with his Malebolge (the barranca) and Paradise (British Columbia) they now use it adeptly to present the geography of mental conflict. William New goes further:

> what is vital about both of them [Canadian identity and the essence of artistic experience] is expressed when order somehow interacts with generation, east with west, Calvinist-Jansenist reality with visionary "pagan" myth. And the points where the "Eastern" forces of civilized restraint and the "Western" ones of free growth meet are the moments when artist and reader alike tune in to the tension at the heart of the Canadian experience they are trying to render and realize.[23]

The best of Canadian literature is beginning to face, encompass, and transcend the division between order, the rational, scientific mode, and the right-brain mythic mode which is our legacy for coming of age culturally in the Age of Science.

For its part, science already, if involuntarily, began the rapprochement long ago. Earlier we noted the value of the underrated right-brain's "Eureka function" to scientific thought; it is not really surprising that the new left-brain logos should prove too narrow. It is ironic that even while artists rebelled against the cold logic of science, physicists found themselves in the midst of a revolution. It began in 1900 with Max Planck and Einstein, though by 1927 the scientific community had still only *begun* to sense the philosophical ramifications of the new world of *quantum mechanics*:

> The Copenhagen Interpretation (of quantum physics) was, in effect, a recognition of the limitations of left hemispheric thought although the physicists at Brussels in 1927 could not have thought in those terms. It was also a *re-cognition* of those psychic aspects which long had been ignored in a rationalistic society. After all, physicists are essentially people who wonder at the universe.[24]

It turns out that the classical physical laws we've accepted simply can't account for the way things are after all. Even logic gets false results in the realms of intense

cold, high speed, extreme smallness. Now science has left its moorings in the left brain, finding that the rational logos is simply inadequate to deal with physical phenomena. It was an immensely useful tool in such forms as Newtonian physics; but like its opposing extremes, such as surrealism, it eventually ran dry. Its version of the truth was exposed to be limited. The trend towards a new balance is becoming visible in the very titles of science books: *The Dancing Wu Li Masters* or *The Tao of Physics* come very close in tone to *Zen and the Art of Motorcycle Maintenance*. The same recognition is being made from both sides: deliberate exclusion of one of the two time-honoured dimensions of thought can be immensely productive, but only in a limited arena. Outside that arena, the truth which seemed so satisfyingly evident simply ceases to be valid.

Perhaps it is too early yet to say whether literature of rupture is beginning to give way to literature of rapprochement. But the hope is there.

NOTES

[1] William Wordsworth, "Preface" to *Lyrical Ballads*, 1801.

[2] Valentina Ivasheva, *On the Threshold of the Twenty-First Century: The Technological Revolution and Literature* (Moscow: Progressive Publishers, 1978), p. 47.

[3] Roman Jakobson, "The Metaphoric and Metonymic Pole," in his *Selected Writings II* (The Hague: Mouton, 1971), pp. 254-59.

[4] Ivasheva, p. 13.

[5] J. Hughlings Jackson, quoted by J. Taylor, ed. *Selected Writings of John Hughlings Jackson* (New York: Basic Books, 1958), p. 220.

[6] R. W. Sperry and M. S. Gazzaniga, "Language Following Surgical Disconnection of the Hemispheres" in *Brain Mechanisms Underlying Speech and Language*, eds. Charles Millikan and F. L. Darley (New York: Grune & Stratton, 1967), p. 115.

[7] Sperry and Gazzaniga, p. 114.

[8] John C. Eccles, *The Understanding of the Brain* (New York: McGraw-Hill, 1973).

[9] Robert Ornstein, author of *The Psychology of Consciousness* (San Francisco: W. H. Freeman, 1972) and *The Nature of Human Consciousness: A Book of Readings* (San Francisco: W. H. Freeman, 1973).

[10] John Keats, "Letter to George and Thomas Keats" (December 21 or 27, 1817), in *Norton Anthology of English Literature*, M. H. Abrams, gen. ed. (New York: W. W. Norton, 1962), p. 1274.

[11] Claude Lévi-Strauss, *The Savage Mind* (Chicago: Univ. of Chicago Press, 1966), p. 219.

[12] Lévi-Strauss, p. 245.

[13] Lévi-Strauss, p. 220.

[14] Lévi-Strauss, p. 219.

[15] Sigmund Freud, "Group Psychology and the Analysis of the Ego" (1921). *A General Selection from the Works of Sigmund Freud*, ed. John Rithman (New York: Doubleday, 1957), p. 203.

[16] George Woodcock, *Odysseus Ever Returning* (Toronto: McClelland & Stewart, 1970), p. 66.

[17] Malcolm Lowry, *Under the Volcano* (Toronto: Signet, 1966), p. 180.

[18] Lowry, p. 269.

[19] Lowry, p. 238.

[20] Albert Rothenberg, "Creative Contradictions," *Amer. Journal of Psychiatry,* June 1979, pp. 55-62.

[21] Arthur J. Deikman, "Bimodal Consciousness" in *The Nature of Human Conciousness,* ed. Robert Ornstein (San Francisco: W. H. Freeman, 1973).

[22] L. Ponomarev, *In Quest of the Quantum,* trans. N. Weinstein (Moscow: Mir Publishers, 1972).

[23] William H. New, "Introduction" to *Articulating West* (Toronto: New Press, 1972), p. xxv.

[24] Gary Zukav, *The Dancing Wu Li Masters: An Overview of the New Physics* (New York: Bantam, 1980), p. 40.

SHELF LIFE

Mick Burrs

I'm greeted by a constellation of grain bugs,
some pulsing their wings against the cabinet's dark,
others asleep, stationary as cold stars.
On the shelves above my warm stove
their casings hang like beads.

They rest inside plastic bags of oats and wheat
and crawl between long grains of brown rice
and wait to hover over all my future breakfasts.
I grab a newspaper and roll up
the violent headlines, my poised club.

Method of extermination: the printed word.
It takes one hour to spatter the kitchen walls
with blood, tiny eyes, crushed wings.
I throw away the food they've infiltrated,
black raisins glistening with white grubs.

No longer hungry, I admit my guilt, await my verdict:
should I be shot, hung, or burnt at the stake?
Is there really any difference now
between the prolonged life of a prosaic dictator
and the brief career of an exterminating poet?