

SOFT ROCK STRING BAND

ALL GEOLOGY, says *Sarah Binks* somewhere, is founded on a rock. Words to live by. Science education has so changed in a hundred years — and perhaps the familiarity of Scripture has altered, too — that Hiebert’s phrase now reads more like a rocky pun than a sendup of a fundamental scientific principle. Yet several recent works of popular science writing have begun to refer back to the nineteenth-century fascination with geology — to the work of William Paley, Mary Somerville, Charles Lyell, and (in Canada) Lyell’s student, Sir William Dawson — in order to probe the sources of many ongoing assumptions about the world and to expose the presumptions in the vocabulary we still bring to descriptions of it. J. A. V. Chapple’s *Science and Literature in the Nineteenth Century* (Macmillan), for example, offers a good place to start. In a “context and commentary” series, it concerns itself with relations between history and literature and traces not only the growth of science and of a vocabulary relating to science in the nineteenth century but also the accompanying growth of a set of mind. Scientific ideas permeate the social attitudes of any period in history — Victorian and Modern no less than Renaissance and Medieval — and the nineteenth-century faith in geological strata and botanic taxonomies describes both a world tangibly “out there” and a set of attitudes that can now more easily be recognized as anthropocentric, governed by reference to empirical “fact,” and impinging on expectations of behaviour insofar as such attitudes also define an “order” of races, languages, and “historical” stages of “progress.”

George Levine’s *Darwin and the Novelists* (Harvard) covers overlapping ground, examining science (“a shared, cultural discourse”) less than the *patterns* of science espoused within Victorian fiction. Reading Darwin’s work itself as a series of metaphors — a “cluster of ‘stories,’” a “response” to particular issues that Victorian writers and thinkers found important — Levine argues that Darwin (and by extension Darwinism) has to be read as a kind of collective imaginative gestalt, influencing how we now tell stories and convey meaning, and why at the same time we distrust words. For the Victorian position (arguing for change and also for stability, trying to find a way of making Darwinian “survival of the fittest” prove the moral superiority of those then living) was inconsistent. And could an incon-

sistent language of “authority” be trusted? There’s the question. The “rock” was soft, apparently. And where would an argument founded on such inconsistencies lead? For some, “chaos” was the only answer; and one response to chaos was to reassert order, perhaps in more disconcerting or even frightening ways.

William Barrett’s *Death of the Soul* (Doubleday) can be read in such a context. Surveying attitudes to consciousness from Descartes to the computer, the book is one (of several we should expect over the current and coming decades) that is reacting to the millennium, the year 2000, as much as it is surveying history. Here the computer — or at least the idea of machine intelligence — is the demon cast as danger (the consequence of some form of evolution?), and the book asserts that if a machine consciousness is ever to exist it will still be without sensitivity, intuition, or a capacity for pathos, and will continue therefore to be less than human. Philip N. Johnson-Laird’s *The Computer and the Mind* (Harvard) — an “introduction to Cognitive Science” — densely raises related ethical issues: how can one study the mind acceptably? can one computerize personality? Such questions seem diffuse, and they are; but they also rest on the old desire for categories, and they worry about the ramifications of introductory layman’s guide categories when it comes to ordering persons. Are they acceptable? Stephen Hawking is quoted, in John Boslough’s *Stephen Hawking’s Universe* (Gage): “People are not quantifiable.” Anyway, what does “acceptable” mean?

Within the confines of research, “acceptable” sometimes defines as “objective,” as though objectivity were possible; but increasingly the subjectivity of observation and discovery are becoming not only apparent in science but also recognized as part of scientific process. The much-vaunted “scientific method,” in other words, founded on the rock of nineteenth-century empiricism, is opening to question. Martin Gardner’s collection of essays by Darwin, Dewey, Einstein, Freud, and numerous others, *The Sacred Beetle and Other Great Essays in Science* (New American Library), reveals as one might expect that subjectivity has always motivated and shaped scientific enquiry, and that it expresses itself in a variety of ways: Rachel Carson was not required to agree with Bertrand Russell, or vice-versa. And two recent collections of reprints from *Scientific American*, for which Gardner (and subsequently the Canadian computer commentator Alexander Dewdney) has frequently written, probe the subjectivity of vision, perception, and language acquisition. The title “scientific American” is itself an example of the cultural shape of language, the subjective character of apprehension, though it does not constitute an overt subject in either of these reprint collections, *The Mind’s Eye and Language, Writing, and the Computer* (Oxford). What the journal title implicitly asserts is a particular cultural claim to scientific rationalism, which in turn reiterates the long-standing hierarchy that grants greatest cultural value to the empirical, the concrete, the technologically demonstrable, “therefore” the pragmatic. Yet a “Victorian inconsistency” remains. North American society (and in this respect

Canada is included) repeatedly validates itself in terms of the empirical but claims to act according to metaphysical rules and aspirations. Nowhere is this dichotomy clearer than in recent popular writing on the subject that goes ambivalently by the name of “natural history.”

Louise B. Young’s *The Unfinished Universe* (General), for example, asks if the order we see in the universe is just a reflection of our own minds — and wonders if everything aesthetically pleasing is simply a construction of order where none existed before — but she goes on to argue that the universe has to be understood as a Masterpiece of Form whose “final lines” are yet to be “written.” The assumption of finality, together with the mixed visual and verbal trope (*written lines*), underlies the book’s attempts to reconcile notions of time, death, religion, and science. The persistently passive rhetorical structures, however (“It has been argued that . . .”) and the grandiloquent apostrophes (“What awe-inspiring powers . . . !”) undermine the argument, for they stylistically translate observation into cliché. A related problem afflicts Tim Fitzharris and John Livingstone’s *Canada: A Natural History* (Viking Penguin/Royal Canadian Geographical Society), a book of beautiful photographs of “representative” Canadian flora, fauna, region, and scene (though there’s no beaver, no arbutus, and no loon) that is burdened by its accompanying text. An enthusiasm for nature turns repeatedly to adjectives here in order to try to convey the virtues of subjectivity; and trope substitutes for feeling. The surf doesn’t just pound, it does so with a “fearsome pounding”; an eaglet can’t just feed, it has to spot “with keen eyes” *her* mother’s “regal silhouette flashing against the blue”; the west coast’s rocky islands don’t just exist, they are a “myriad” created by “the thunderous hammer of Thor,” they’re the “Norse god’s legacy.” The Eurocentric bias, at least, is clear; it constructs a paradigm, reaching for a learned eloquence in the service of “natural history,” but in the process ignoring the social and cultural history, in this case, *in place*.

A different dimension of scientific enquiry into cultural practice is represented in *The Serpent & The Rainbow* (Stoddart), by the Canadian Harvard ethnobiologist Wade Davis. In its own way a footnote to the ongoing tale of Ewen Cameron, the researcher involved with the CIA experiments in Montreal who is alluded to in passing, the book is primarily a dynamic personal narrative about Davis’s attempts to discover which drugs are involved in the zombie rituals of Haiti. Encounters with vodoun priests, episodes of grave-robbing, theories about seasnakes and pufferfish, and other activities reminiscent of *Dr. No* lead Davis ultimately toward the identification of tetrodotoxin and to reflections on the practice of premature burial, both in Haiti in the present and in the 1890s in Europe. But they also lead him to reflect on the way in which a scientific “observer” is swept into a world view — which culminates in an ethical dilemma: to what degree does participating in an enquiry (or a ritual, to focus the terminology in a different way) have consequences? And of what kind? and on whom?

Inevitably, the observer creates. The “science poems” of John Allman, *Curve Away From Stillness* (New Directions), shape a love poem out of the structures of physics, chemistry, and biology, observing at one point: “Proximity / itself / determines / shape / / substance / a reservoir the curved crystal of a watch / refracting / the instant of looking / because we are / looking.” But as well as probing the ethics, aesthetics, and emotional engagement of “scientific” connection, the poem further asks why physicists speak of “elegance and symmetry” in their equations and “resort to metaphor to explain their facts.” The verb “resort” carries its own hierarchical message, of course. But the question itself epitomizes a continuing disparity between understanding and communication, one which certainly marks the form of contemporary popular science writing and which perhaps also characterizes contemporary theories (i.e., “perceptions”) of the science of physics.

Joseph Campbell’s *The Inner Reaches of Outer Space* (Methuen) argues that metaphors are often misread because they are accepted as references to tangible facts when they are better understood as attempts to speak “poetically of that which cannot be told.” Maybe so. The trouble is that a phrase such as Campbell’s “epiphanies of the rapture of being” is more likely to take a reader back to Fitzandrew and Young than forward (is it “forward”?) into clarity. How, then, can people collectively understand anything? Campbell is at pains to explain that even number, much claimed as an “objective” or “neutral” medium of explanation, is just as susceptible to cultural manipulation as words are — witness the superstitions surrounding threes and nines, fours and sevens, binaries and snake-eyes. Do the “objective” techniques of historical record and scientific mapping fare any better? Not at all. Jean Audouze and Guy Israël, editing the revised edition of *The Cambridge Atlas of Astronomy* (Cambridge), include all the latest data on Venus, Halley’s Comet, and Uranus, but construct visual metaphors (paper equivalences) in the process of representing their findings. Richard Jarrell attempts to record a factual history of Canadian astronomy in *The Cold Light of Dawn* (Univ. of Toronto), but Francis Graham-Smith and Bernard Lovell, in their personal account of their work at Jodrell Bank, *Pathways to the Universe* (Cambridge), emphasize even in their title how much a manner of perception depends upon the paradigm of conception. Introducing the subject of astronomy, Graham-Smith and Lovell break rapidly from the mythological sky designs of the ancients into the versions of space that contemporary physics constructs — but the *terms* of contemporary physics (binaries, clusters, variables, pulsars), as the authors are perfectly aware, also resonate with metaphoric effect, refract what’s seen, and circumscribe one shape of meaning.

Hence Nick Herbert’s initial premise in *Quantum Reality* (Anchor/Doubleday) comes as something of a surprise. Herbert observes the “absence” of an overriding metaphor for contemporary science (in contrast to Newton’s clockwork universe, for example — one of the subjects raised in the Spring 1988 issue of *Queen’s*

Quarterly, a tercentenary tribute to Newton's *Principia*). He goes on to challenge the message his own teachers conveyed to him (to the effect that it's pointless for physicists to ask what quantum theory means — i.e., to seek a reality behind the mathematics — and only functional to stick to the math itself) by tracing modern physics from Bohr and Planck to Feynman and Bell. Bell's Theorem (i.e., that "reality must be non-local" because an event is affected by something apparently distant from it) asks of course to be demonstrated, by scientific method. But how? Herbert answers with music: a composition of his own. Blues. But is this history or sine waves? Or another metaphor? While he may be right that there is as yet no *overriding* metaphor, there are plenty of suggestions in popular science to choose from. There's *Cosmic Code* (Heinz Pagels), *Stalking the Wild Pendulum* (Itzhak Bentov), *The Sphinx and the Rainbow* (David Loye): all articulating a *quest* for order in the face of a *conundrum*. John Gribbin's lucid *In Search of Schrödinger's Cat* (Bantam) runs a variation on this theme, explaining paradox through a theory of the simultaneity of many worlds. And Gary Zukav, in *The Dancing Wu Li Masters* (Bantam), reminiscent of Fritjov Capra's *The 'Tao' of Physics*, tries to transform physics, through Feynman diagramming, into Eastern Philosophy. To which one responds with one of the iterative phrases that have punctuated these comments several times already: "Of course," or "Maybe so." The signs of doubt and consequence, these phrases speak of the way people deal with paradox. Is uncertainty susceptible to ordered understanding, ask Gribbin and Zukav and the rest. Or is order always just another form of metaphor to deal with the uncertain, the inconsistent, and the unsayable?

Queen's Quarterly no. 95, on Newton, provides a clear survey of world-views from Copernicus and Kepler to Feynman and black holes. ("Most working scientists are notorious for their lack of interest in history," writes Stephen Jay Gould, in *Time's Arrow, Time's Cycle* [Harvard], adding that science is nonetheless a Whiggish enterprise, fascinated by the idea of progress and constantly arguing about how things have *developed* since geologic time. Richard Dawkins's effectively written *The Blind Watchmaker* [Longman/Thomas Allen] — which draws its title from Paley's adaptation of Newton's clockwork universe, coupled with a notion of chance rather than foreordination — argues for a Darwinian reading of physics, and so reworks history yet again in metaphoric terms.) But the *Queen's Quarterly* contributors go on to postulate the relation between Newton (operating in the macro-universe) and contemporary string theory (postulating a way of reconciling the quantum mechanics of the submolecular world with the contradictory rules of a Newtonian world). To formulate equations that work, goes the argument, is to demand much of mathematical elegance, because we believe that the mathematical elegance *that must exist at the root of things in nature* has to be mirrored at the level at which we're operating. Again those metaphors recur: *elegance, mirror, field, string*. At the base of string theory, moreover, lies the suggestion that particles

are not points but minuscule lengths or loops of “strings” of dimensions, involving “a range of possible symmetries.” P. C. W. Davies and Julian Brown, editing *Superstrings: A Theory of Everything?* (Cambridge), take up this possibility, and the nine contributors (including John Schwarz, who promulgates the idea, and Richard Feynman, who was disputing string theory before his death) discuss in interview how space has to be rethought as motion, in terms of time, and how strings (working in a ten-dimensional space-time, with some sixteen internal dimensions as well) either construct a unifying theory of everything (an explanatory form for motion and being) or explain nothing at all. There’s a certain finality in this distinction. But what does it mean?

Margaret Atwood’s *Cat’s Eye* hazards a kind of answer. It *uses* string theory, as a running metaphor, a process of motion in space-time, to articulate the central character’s shifting perception, hence her shifting sense of history, self, reality, and value. The conclusion to the novel tries to make sense of this process of understanding — in speech, in metaphor. Perhaps “only” in metaphor: it is, after all, something of an act of faith. The conclusion reads this way:

Now it’s full night, clear, moonless and filled with stars, which are not eternal as was once thought, which are not where we think they are. If they were sounds, they would be echoes, of something that happened millions of years ago: a word made of numbers. Echoes of light, shining out of the midst of nothing.

It’s old light, and there’s not much of it. But it’s enough to see by.

Of course, we say. Or maybe so. There’s only a thin band between uncertainty and belief.

W.N.

MISSING PERSONA REPORT

Mick Burrs

(A Document of Secrets, Part III)

Of Blood and Bones and Barbed Wire

these missing persons this missing persona these
 missing shadows from the life of one body
 the body of one life