

Laws of Media

THE NEW SCIENCE

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Preface

Before you have gone very far in this book, you will have found many familiar themes and topics. Be assured: this is not just a rehashing of old fare dished up between new covers, but is genuinely new food for thought and meditation.

This study began when the publisher asked my father to consider revising *Understanding Media* for a second edition. When he decided to start on a book, my father began by setting up some file folders – a dozen or two – and popping notes into them as fast as observations or discoveries, large or small, occurred to him. Often the notes would be on backs of envelopes or on scraps of paper and in his own special shorthand, sometimes a written or dictated paragraph or two, sometimes an advertisement or press clipping, sometimes just a passage, photocopied from a book, with notes in the margin, or even a copy of a letter just sent off to someone, for he would frequently use the letter as a conversational opportunity to develop or ‘talk out’ an idea in the hope that his correspondent would fire back some further ideas or criticism. We began with some thirty or so folders, one for each chapter of *Understanding Media*, and added a number for the new technologies that had appeared in the interim, such as computers, video recorders, and cable tv. Simultaneously we began to review all the criticisms of *UM* that might be helpful in revising it, and found they were of two kinds – matters of fact (e.g., ‘it was 1830, not

1842') and what you might call matters of frustration. The latter category was by far the largest and though voiced in dozens of ways – by serious readers who claimed the book 'difficult' or 'impossible to read' or who objected to the style or organization – seemed to form a chorus of 'that's all very well for you, but it's NOT scientific.'

Of course, there was rigour and science in it aplenty, but not conventional science. How then could we reconcile the two: satisfy the one without subverting the other? There began the search that led to the present book. The style of *UM* had been deliberately chosen for its abrasive and discontinuous character, and was forged over many redraftings. It was designed deliberately to provoke the reader, to jar the sensibilities into a form of awareness that better complemented the subject-matter. This is poetic technique (science, if you will) of a high sort – satirizing the reader directly as a means of training him. Now we were faced with the question of how to make it 'scientific.' It took my father nearly two full years of constant inquiry to find out 'what constitutes a scientific statement.' He asked everyone he encountered – colleagues, students, friends, associates, visitors. Finally, one evening, he found the answer in Sir Karl Popper's *Objective Knowledge* – that it was something stated in such a manner that it could be disproved.

That was it. The next day he began asking: 'What statements can we make about media that anyone can test – prove or disprove – for himself? What do all media have in common? What do they *do*?' We expected to find a dozen or so such statements. By the first afternoon we had located three with relatively little difficulty – all present in *UM*. First, extension, as an 'extension of man' (the subtitle), every technology extends or amplifies some organ or faculty of the user. Then, the attendant 'closure': because there is equilibrium in sensibility, when one area of experience is heightened or intensified, another is diminished or numbed. Feverish search: Do they hold in every case? – Yes. Can anyone, anywhere, any time, verify them by direct observation? – Yes. A couple of hours later, a third, with a chapter to itself in *UM* ('Reversal of the Overheated Medium'): every form, pushed to the limit of its potential, reverses its characteristics. (His most recent book, *Take Today*, was built around reversals.) Again, in every case? – Yes. And there, to our surprise, matters rested for about three weeks; then the fourth appeared – retrieval. It was quite a long time before we realized that this too had been the subject of a book, *From Cliché to Archetype*. At first we thought retrieval entailed only the recasting of whatever formed the content of the new form. That it does (the content of any medium is an older medium), and considerably more. We found these four ... and no more. He spent the rest of his life looking for a fifth, if there be one, and simultaneously trying to find a single case in which one of the first four doesn't apply.

Tentatively, then, these became the first 'Media Laws.' Certainly, it was not what was expected – or wanted – by way of 'revisions.' And that was just as well, for much was yet to come. The study of the senses and of the ways in which media extend and modify sensibility needed systematic attention. Accordingly, we embarked on a full-scale study of visual and acoustic spaces and their development by alphabetic and by electric technologies. It quickly expanded to more than 150 pages and only with the greatest difficulty was condensed to its present size, here included as chapter 1. I won't claim that the study is now complete, but surely this is at least a good beginning. There are still all the other senses to consider, and their interpenetrations, for what happens to one affects each of the others.

Gradually, as we searched for the fifth law, other discoveries and implications began to emerge. The single largest of these was that of an inner harmony among the four laws – that there are pairs of ratios among them – and of the relation between that and metaphor. All the while, my father was exhorting colleagues, visitors, and students – especially those at his Monday-night meetings at the Centre for Culture and Technology – to use the four laws to explore media, and to test the laws. Suddenly (I forget exactly when or with whom) we learned that they applied to more than what is conventionally called media: they were applicable to the products of all human endeavour, and also to the endeavour itself! One colleague at the university tried them on remedies for cancer, and found they worked. With another, my father tried business procedures; with another, Newton's laws of motion. They worked! The floodgates burst.

There were weeks and months heady with discovery and excitement. Manuscripts of parts of this book underwent several drafts and began to circulate among friends and colleagues for comment. Finding the link to metaphor led to one of the farthest-reaching realizations, which itself tied directly back to the subtitle of *UM*, 'the extensions of man.' Utterings are outerings (extensions), so media are not as words, they actually are words, and we had stumbled upon the key to their verbal structure. That is, providing that the number of dimensions, or 'laws,' remained at four. Back we went to eliminate one or to find a fifth; forward we went into the language of media. With the help of a grant to my father from SSHRC, I was able to devote myself full time to assisting him during one crucial year (1979) when we extended the application of the laws to the arts and sciences. We found that everything man makes and does, every procedure, every style, every artefact, every poem, song, painting, gimmick, gadget, theory, technology – every product of human effort – manifested the same four dimensions.

I don't consider it any exaggeration to say that confirming and detailing this tie, between speech and artefacts, constitutes the single biggest intellectual discovery not only of our time, but of at least the last couple of

centuries. Yet the four laws are dazzlingly simple. They must have the most profound significance for the arts and the sciences, and not simply because they erase the distinction between them. They also provide both with a common set of tools for forging ahead and backward – much the same thing in any case – for constantly mining and revitalizing the tradition each has, and for using each other as resources. As we show (and as anyone can test), the laws apply only to human utterances and artefacts: they reveal nothing about animal products, such as webs or dams or nests, except perhaps thereby confirming the ancient observation that it is chiefly speech that makes us human and distinct from the rest of creation.

Many times over the years we worked on this book my father would refer to the works of Bacon or Vico, rather as one would consult colleagues. He knew them much better than I do, who learned all I know of them from him. He realized that they and other grammarians had been steering courses parallel to his (or vice versa), bringing the tools of literary training to bear on understanding the world and our part in it. Several times a year he would return to Francis Bacon's doctrine of the four Idols as holding a key to the bias of communication – the forms of blindness imposed by media. It was much the same with Vico, who, while ploughing away at etymology and interpretation, was quite conscious of the forms of bias of sensibility, as revealed in the language. Vico had his 'fours' as well – grammarians (interpreters and etymologists) are intensely sensitive to patterns and resonances. Of course, when the four media laws appeared, we quickly reviewed the Idols again to see if they showed the same pattern, hoping for quick confirmation, as it were, from another quarter. But our four seemed to be new, and only loosely related even to the classic 'big fours,' the levels of exegesis and the four causes. Independent confirmation is always rewarding to have. For many years, for example, when my father made some large discovery about media or about sensibility he would pop open *Finnegans Wake* and within a few pages (seldom more than three or four) find that Joyce had been there before him and had gone both farther and faster, and infallibly because navigating by the lines of force in the language: Joyce usually flew in style where Vico and the rest of us could no more than walk or jog. Still: this time, no independent confirmation (other than Joyce – but that's another book). My father died before we could work out in detail how his new discoveries related to the labours of Vico and Bacon. He knew the relations were there, and his intuitions had never played him false. It fell to me to do the tidying-up and to ready the book for the press.

The key to the whole business is sensibility, as the serious poets and artists (and grammarians) have always maintained. Vico in particular targeted 'the modification of our own human minds' as the crucial area, while he cast about for a way to read and write the 'mental dictionary.' Then

the relation between Bacon's Idols and Vico's axioms surfaced – bias of perception – and the job was near done. Bacon called his book the *Novum Organum* (or *Novum Organon*, as a swat at Aristotle's followers), the *New Science*; Vico called his the *Science Nuova*, the *New Science*; I have subtitled ours *The New Science*. On reflection, I am tempted to make that the title and *Laws of Media* the subtitle, for it should stand as volume three of a work begun by Sir Francis Bacon and carried forward a century later by Giambattista Vico. As we go to press, I am sorely tempted to use Bacon's own Preface as ours and to scrap these maunderings: in fact, were my father here, I'm inclined to think that's exactly what he would do.

As you read, you will notice that each chapter uses a different style. This is deliberate and the result of a decision to suit the style as much as possible to the matter. So, the first chapter is kaleidoscopic because the matter is compressed and the subject, the senses, a complex equilibrium. Chapter 2 is relatively breezy, and it and 3 return closer to narrative. Chapter 4 moves towards poetry, the tetrads being in a sort of stanza-form surrounded by glosses. To the charges that some are pretty lame, or that some work better than others, we can only plead, 'It's new to us too,' and invite you to help us improve them where you can. When my father died, the Introduction and last chapter were mere sketches, a few pages each. I have worked them up from our notes and added a few rhetorical items to the end that were implied in those notes and in the discussions that gave rise to them.

The five chapters also form a mosaic of approaches to a single theme. As you view and review them, please mine them for whatever you find useful, and leave the rest. They are about the word – but they are far from the last word.

Eric McLuhan
Toronto
8.8.88

Laws of Media

Introduction

Toute vue des choses qui n'est pas étrange est fausse.

Valéry

*... our concern was speech, and speech impelled us
To purify the dialect of the tribe*

T.S. Eliot. 'Little Gidding'

One fundamental discovery upon which this essay rests is that each of man's artefacts is in fact a kind of word, a metaphor that translates experience from one form into another. This essay offers in testable and falsifiable form (the criteria of scientific laws) observations about the structure and nature of things man makes and does; hence *Laws* in its title.

A second fundamental discovery: It makes no difference whatever whether one considers as artefacts or as media things of a tangible 'hardware' nature such as bowls and clubs or forks and spoons, or tools and devices and engines, railways, spacecraft, radios, computers, and so on, or things of a 'software' nature such as theories or laws of science, philosophical systems, remedies or even the diseases in medicine, forms or styles in painting or poetry or drama or music, and so on. All are equally artefacts, all equally human, all equally susceptible to analysis, all equally verbal in structure. *Laws of Media* provides both the etymology and exegesis of these words: it may well turn out that the language they comprise has no syntax. So, the accustomed distinctions between arts and sciences and between things and ideas, between physics and meta-physics, are dissolved.

A New Science replaces the current Old Science of media and artefacts, which is too narrow and too rigid, having drawn its techniques from the abstract Method used since the Renaissance. It is a science of content and

of messages only. The study of human media and technologies *must* begin with their humanity and remain steeped in the study of the senses. In 1620, Francis Bacon pointed out in Aphorism xix of his *Novum Organum* that

There are and can be only two ways of searching into and discovering truth. The one flies from the senses and particulars to the most general axioms, and from these principles, the truth of which it takes for settled and immovable, proceeds to judgment ... And this way is now in fashion. The other derives axioms from the senses and from particulars, rising by a gradual and unbroken ascent, so that it arrives at the most general axioms last of all. This is the true way, but as yet untried.

Barely a century later, in 1725, Giambattista Vico explained in his *Scienza Nuova* (§331): 'But in the night of thick darkness enveloping the earliest antiquity, so remote from ourselves, there shines the eternal and never-failing light of a truth beyond all question: that the world of civil society has certainly been made by men, and that its principles are therefore to be found within the modifications of our own human mind.'

During one year, 1978–9, we undertook the first extended investigation of the forms of space created by the eye and the ear. Visual space, as distinct from acoustic space, is an artefact, a side-effect of using a phonetic alphabet. The alphabet acts to intensify the operation of vision and to suppress the operation of the other senses. We found that, to date, no field had managed any work on the subject, though it is fundamental, save for one article by F.M. Cornford, 'The Invention of Space.' As Bacon remarked, as yet untried.

The transformation to visual space from acoustic space occurred in ancient Greece. What took several thousand years to complete has taken us several decades to reverse: the West now bathes in the emotions of postliteracy. During our research we found that there had been great confusion for many centuries over certain matters crucial to an understanding of acoustic space; for example, the natures of logos, of mimesis, and of formal causality. This confusion flows directly from the fact that all commentary and research, from Aristotle onwards, was conducted by persons, to one or another degree visually biased, who assumed visual space to be the common-sense norm. As a result, there are at least two forms or rather versions of mimesis and of logos and of formal cause.¹ One of each has an oral structure, and the other a visual – with the former conventionally regarded as a confused or tentative attempt to explain the latter.

¹ In researching the oral forms – the true forms – the work of F. M. Cornford, Eric Havelock and Pedro Lain-Entralgo has proved invaluable.

A few of the terms used in *Laws of Media* will be familiar to readers. 'Figure' and 'ground' entered Gestalt psychology from the work of Edgar Rubin, who about 1915 used those terms to discuss aspects of visual perception. They have here been broadened to embrace the whole structure of perception and of consciousness. All situations comprise an area of attention (figure) and a very much larger area of inattention (ground). The two continually coerce and play with each other across a common outline or boundary or interval that serves to define both simultaneously. The shape of one conforms exactly to the shape of the other. Figures rise out of, and recede back into, ground, which is con-figurational and comprises all other available figures at once. For example, at a lecture, attention will shift from the speaker's words to his gestures, to the hum of the lights or to street sounds, to the feel of the chair or to a memory or association or smell. Each new figure in turn displaces the others into ground. Ground provides the structure or style of awareness, the 'way of seeing' as Flaubert called it, or the 'terms on which' a figure is perceived. The study of ground 'on its own terms' is virtually impossible; by definition it is at any moment environmental and subliminal. The only possible strategy for such study entails constructing an anti-environment: such is the normal activity of the artist, the only person in our culture whose whole business has been the retraining and updating of sensibility.

In the order of things, ground comes first and the figures emerge later. 'Coming events cast their shadows before them.' The ground of any technology or artefact is both the situation that gives rise to it and the whole environment (medium) of services and disservices that it brings into play. These environmental side-effects impose themselves willy-nilly as a new form of culture. 'The medium is the message.' Once the old ground becomes content of a new situation it appears to ordinary attention as aesthetic figure. At the same time a new retrieval or nostalgia is born. The business of the artist has been to report on the current status of ground by exploring those forms of sensibility made available by each new mode of culture long before the average man suspects that anything has changed. He is constantly making 'raids on the inarticulate.' T.S. Eliot pointed this out in regard to Dante, that a great poet or serious artist should be able to perceive or distinguish more clearly than ordinary men the forms and objects within the range of ordinary experience and 'be able to make men see and hear more at each end' of the spectrum of their sensibility than they could ever notice without his help.

The Divine Comedy ... is therefore a constant reminder to the poet, of the obligation to explore, to find words for the inarticulate, to capture those feelings which people can hardly even feel, because they have no words for them; and at the same time a reminder that the explorer beyond the

frontiers of ordinary consciousness will only be able to return and report to his fellow-citizens if he has all the time a firm grasp upon the realities with which they are already acquainted. (*To Criticize the Critic*, 134)

Serious artists are the 'antennae of the race'

Audile and tactile spaces are inseparable. In the space created by these senses – each sense and each configuration of senses creates a unique form of space – figure and ground are in dynamic equilibrium, each exerting pressure on the other across the interval separating them. Intervals, therefore, are resonant and not static. Resonance is the mode of acoustic space; tactility is the space of the significant bounding line, of pressure, and of the interval.

When we touch something, we contact it and create an interaction with it: we don't connect with it, else the hand and the object would become one. A 'static interval' is a contradiction in terms; that is, it is either a misnamed connection or an 'empty' visual space. Jacques Lusseyran remarked, of the awareness of tactility in blindness:

If I put my hand on the table without pressing it, I knew the table was there but knew nothing about it. To find out, my fingers had to bear down, and the amazing thing is that the pressure was answered by the table at once. Being blind I thought I should have to go out to meet things, but I found that they came to meet me instead. I have never had to go more than halfway, and the universe became the accomplice of all my wishes.

If my fingers pressed the roundness of an apple, each one with a different weight, very soon I could not tell whether it was the apple or my fingers which were heavy. I didn't even know whether I was touching it or it was touching me. As I became part of the apple, the apple became part of me. And that was how I came to understand the existence of things (*And There Was Light*, 27)

Lusseyran is acutely aware of the 'modifications of his own mind,' to use Vico's phrase, engendered by even simple experience. Much more profound and more subtle are the modifications of our minds and ways of life by our complex media. In *Laws of Media* we can offer only a discussion of visual and acoustic space, although the further study of our other senses and a full report on each one is of the first importance.

As soon as my hands came to life they put me in a world where everything was an exchange of pressures. These pressures gathered together in shapes, and each one of the shapes had meaning. As a child I spent hours leaning against objects and letting them lean against me. Any blind person can tell you that this gesture, this exchange, gives him a satisfaction too deep for words.

Touching the tomatoes in the garden, and really touching them, touching

the walls of the house, the materials of the curtains or a clod of earth is surely seeing them as fully as eyes can see. But it is more than seeing them, it is tuning in on them and allowing the current they hold to connect with one's own, like electricity. To put it differently, this means an end of living in front of things and a beginning of living with them. Never mind if the word sounds shocking, for this is love.

You cannot keep your hands from loving what they have really felt, moving continually, bearing down and finally detaching themselves, the last perhaps the most significant motion of all. Little by little, my hands discovered that objects were not rigidly bound within a mold. It was from the first contact with, form like a kernel. But around this kernel objects branch out in all directions.

I could not touch the pear tree in the garden just by following the trunk with my fingers, then the branches, then the leaves, one at a time. That was only a beginning, for in the air, between the leaves, the pear tree still continued, and I had to move my hands from branch to branch to feel the currents running between them. (*And There Was Light*, 27–8)

His remarks in *And There Was Light* are the more valuable since he articulates in unusual detail the activity of each of the senses and its closure.

More of the foundation of this New Science consists of proper and systematic procedure. We propose no underlying theory to attack or defend, but rather a heuristic device, a set of four questions, which we call a tetrad. They can be asked (and the answers checked) by anyone, anywhere, at any time, about any human artefact. The tetrad was found by asking, 'What general, verifiable (that is, testable) statements can be made about all media?' We were surprised to find only four, here posed as questions:

- What does it enhance or intensify?
- What does it render obsolete or displace?
- What does it retrieve that was previously obsolesced?
- What does it produce or become when pressed to an extreme?

Over more than twelve years of constant investigation, alone and with the help of colleagues, we have been unable to find a fifth question that applies to all media or to locate a single instance in which one of the four is clearly absent or irrelevant. We issue this challenge to the reader: Can you find a fifth question that applies in all, or in even a significant many, instances? Can you locate an instance in which one of the four questions does not apply?

Your answer is of the first importance as it determines the *kind* of our

science. If one question is eliminated, if the tetrad is reduced to a triad, then, as will be discussed, we have merely Old Science tricked out in new clothes, not formal but efficient cause, and familiar Method. If five questions apply, we are in other, but again new, territory. The 'four' pattern has a special resonance and relation to language. Whatever the outcome, once the number of laws is known – and it *will* be four – then we can be certain that every human artefact will occasion exactly those transformations. Moreover, this fulfils one of the two great criteria demanded of any law of science: Can it be verified and tested? Does it allow prediction? Simply knowing in advance which transformations to expect, knowing where and how to look, lets you predict the effects of any new device or technique before they actually appear in time and experience.

Various aspects of the tetrad have, unknowingly, formed parts of our earlier studies, collaborative as well as private. *Take Today: The Executive as Drop-out* (with Barrington Nevitt) revolves around three reversals, from hardware to software, from job-holding to role-playing, and from centralism to decentralism, in patterns of management and of corporate culture. 'Reversal of the Overheated Medium' in *Understanding Media* examines the tendency of any situation to flip into a complementary pattern when subjected to extreme pressure. The same book presented the themes of media as being extensions of limbs and organs and senses (a kind of enhancement) with profound reciprocal effects on the user.

Enhancements (extensions) and reversals are fundamental to *War and Peace in the Global Village* and to *The Mechanical Bride* and *Culture Is Our Business*. The *Bride* examines advertising before tv had hit North America, CB after. *The Gutenberg Galaxy* spells out in detail, as it were, one chapter of the later *Understanding Media*: the like needs to be done for each of the others. But the *Galaxy* primarily reports on the ascendancy of vision over the other senses. *Through the Vanishing Point: Space in Poetry and in Painting* (with Harley Parker) takes the study of the senses to their home ground – the arts – and demonstrates how to use aphorism, probe, and juxtaposition as study techniques.

Another approach is tried (with Dick Schoeck) in *Voices of Literature*. That indispensable tool, figure/ground (and interval, for transformation) analysis, appears in various later works, such as *Take Today* and *City as Classroom* (with Kathryn Hutchon). The two laws of obsolescence and retrieval – the whole complex retrieval and renewal process – formed the basis of the study (with Wilfrid Watson) *From Cliché to Archetype*.

Conventional – Old – science, entirely dominated by visual bias, cannot get a foothold in these areas. This New Science is at once a synthesis and a leap into radically new territory. We subjoin it to the *Novum Organum* of

Bacon and the *Scienza Nuova* of Vico and to the long tradition of which they form a part.

Having gleefully scrapped our traditions in headlong pursuit of the demon of progress, now that we Westerners embrace postliteracy we find no roots or resonance in alphabetic culture. Prior to literacy, the job of transmitting the accumulated knowledge of the culture was given the poets: Homer's *Iliad* and *Odyssey* are meticulously encoded encyclopedias of the arts, manners, sciences, and mores of his Greece. After writing, the logos was smashed and the oral establishment drowned in a sea of ink. Fragments of the old system were soon retrieved and recast in the pattern that became the trivium and quadrivium, or 'seven liberal arts.' The trivium comprised grammar, rhetoric, and dialectic; the quadrivium, arithmetic, astronomy, geometry, and music. The trivium is our concern: all three of its elements are arts and sciences of language.

Rhetoric concerns speech: its ground-work is transforming audiences. Grammar (Greek for 'literature') concerns the interpretation of written texts and the ground-patterns in words, etymology. Dialectic specializes in the word as thought, and in the content of words and of thought, and in systems of right thinking. Having no inherent ground, dialectic is abstract and co-opts rhetoric and grammar as a sort of external ground. It comprises two activities, logic and philosophy, and is the fountainhead of Method and Old Science. The natural affinity between rhetoric and grammar springs in part from each having both figure and ground elements, and in part from both concerning words as presented to the exterior senses in writing and speech. Grammatical commentary on and interpretation of texts, first of the poets and later of the Christian scriptures, was ever regarded as a cumulative and collaborative enterprise, so the tradition of learning (the *translatio studii*) formed as a deliberate offshoot. (The natural complementarity of scripture and tradition remains vital, for example, in the Catholic church as the twin sources of revelation. Each serves as ground for the other.)

Christian grammarians found a congenial figure/ground interplay between scripture and nature (Latin for 'about to be born') in Genesis where the creation is presented as a divine speech. Accordingly, they bent their efforts to developing parallel techniques for interpreting the 'two Books,' which they regarded as fully complementary, as warp and woof. Equally interwoven in picking out the details were the twin sciences of writing and speech, grammar and rhetoric. In fact, their alliance had begun well before Christianity: it persisted unbroken for some two thousand years. (In all this, the sister science, dialectic, stands a bit to one side.)

The alliance was further cemented in language. Rome had no single

word to translate the Greek term for word or utterance, 'logos'; instead, it used the phrase 'ratio atque oratio' (roughly, reason and speech). The phrase provided a basis for the pat formula for the ideal man of learning as one possessed of 'wisdom' (master of grammatical tradition and technique) 'and eloquence.' The ideal survives, vigorous as ever, in our time: T.S. Eliot used it to discuss 'The Importance of Mr. Pound.'

Because of their conservative attachment to tradition, grammarians and rhetoricians were ever styled 'Ancients,' while dialecticians, who in each age propose marvellous new systems and methods for organizing knowledge and thought and endeavour, were styled 'Moderns.' The proverbial rivalry between the two camps and their intellectual wars continue apace today, albeit largely unknown to the combatants. With *Laws of Media* we launch a fresh campaign in the war, against the futility of deploying the science of the Moderns of recent decades and centuries to deal with matters of media, as distinct from messages. Now although both Vico and Bacon, the two other generals in the field, are universally and quite ironically accounted philosophers, both are thoroughgoing Ancients. Vico was a professor of rhetoric; his *Scienza Nuova* employs etymology and exegesis and mobilizes the full canon of traditional 'poetic wisdom.' The full title of Bacon's sally is *The New Organon; or, True Directions concerning the Interpretation of Nature*.

We mention these matters for purposes of orientation. Where dialectic is inevitably theoretical, grammar and rhetoric are always empirical first.² A complete history of the three arts together does not exist and is badly needed, for all three are reasserting themselves now, at the close of the second millennium, as never before. With a knowledge of the trivium, for example, it is fairly easy to see why much of modern linguistics and semiotics, as presently constituted, will not succeed. Or to see the root problem of phenomenology, namely that it is an all-out attempt by dialectic

- 2 Maurice Merleau-Ponty has put the matter succinctly. 'A concrete philosophy is not a happy one,' he writes. It cannot have ground and be abstract at the same time: 'It must stick close to experience, and yet not limit itself to the empirical but restore to each experience the ontological cipher which marks it internally. As difficult as it is under these conditions to imagine the future of philosophy, two things seem certain: it will never regain the conviction of holding the keys to nature or history in its concepts, and it will not renounce its radicalism, that search for presuppositions and foundations which has produced the great philosophies' (*Signs*, tr. Richard C. McCleary, page 157). It would appear, then, that when ground is added to dialectic, to Old Science, it flips into grammar, New Science. Adding ground flips the concept approach into percepts, from the abstract contents alone to the Book of Nature as a whole. Both grammar and dialectic are concerned with 'the word' *in* things: dialectic with the word or ideal thought in the mind, pure, before speech; grammar with the word in (informing) or even as things about us, outside the mind and body. The difference between them is exactly rhetoric, utterance, which thus belongs to grammar.

to invent – or turn itself into – grammar, to force some sort of *ground* to surface.

A theoretical science has to begin with knowledge and theory; empirical science, with ignorance and bias. The one is rooted in concepts, the other in percepts. The first cannot succeed unless it has an apparatus for locating and remedying flaws in reasoning, nor can the latter without a similar apparatus to detect and compensate for sensory bias. So the one proceeds by figure alone, the other by ground and figure. Francis Bacon noted this in the preparatory study *Of the Advancement of Learning*: 'For the mind of man is far from the nature of a clear and equal glass, wherein the beams of things should reflect according to their true incidence; nay, it is rather like an enchanted glass, full of superstition and imposture.' Early in the *New Science* he developed these notions as a foundation for a detailed theory of communication – that is, of effects and of perceptual bias. It takes the form of his four 'Idols,' which whoring after false gauds is strong red-herring hauled across the path of right awareness. Vico, next to take up arms, begins by reiterating and updating Bacon's Idols as his own first four Axioms.³ Each is a form of blindness or insensitivity, personal or cultural, to a part of the spectrum. Our science accounts for these and in some measure compensates for them, by the tools of figure and ground, and the opening discussion of the sensory bias imposed on us by our extensions.

It would be arrogant to profess that we, going the same road as Vico and Bacon and the Ancients, have produced something better, and to do so would be to set up a rivalry between us that at best would make an irrelevant distraction. Instead, as Bacon said in his preface to *Novum Organum*, 'my object being to open a new way for the understanding, a way by [the Ancients] tried and unknown – the case is altered; party zeal and emulation are at an end; and I appear merely as a guide to point out the road; an office of small authority, and depending more upon a kind of luck than upon any ability or excellency.'

3 Benedetto Croce first noted the parallels in his *Philosophy of Giambattista Vico*, tr. R.G. Collingwood (pages 155–7). Donald Philip Verene presents the parallels in his essay *Vico's Science of the Imagination* (pages 128–33). The first four axioms constitute the basis of Vico's elements and, says Vico, 'give us the basis for refuting all opinions hitherto held about the principles of humanity' (*New Science*, 163). 'These four axioms express a theory of ignorance which we need in order to acquire a doctrine of truth concerning the nature of humanity' (pages 128–9).

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... we might come to a better understanding of the world in which an organism lives – in other words, the section of the world of which it partakes through its sensory apparatus – by studying its sensory systems themselves and their particular sensitivities.

Robert Rivlin and Karen Gravelle,
Deciphering the Senses

PROTEUS BOUND:¹ The Genesis of Visual Space

When the consonant was invented as a meaningless abstraction, vision detached itself from the other senses and visual space began to form. By means of the phonetic alphabet, the units of syllabaries could be analysed into their 'components,' vowels and consonants. Of these, as Eric Havelock observes in *Origins of Western Literacy*, 'The former, the vowel, could exist by itself in language, as in exclamations, like "Ah." The latter, the consonant, could not. It was therefore an abstraction, a non-sound, an idea of the mind. The Greek system proceeded to isolate this non-sound

1 In the *Odyssey*, Proteus is styled 'an ancient one of the sea,' who herds the seals, knows all things, and has the power of assuming different shapes in order to avoid being questioned. Ovid (*Metamorphosis*, VIII.731ff.) sings, 'men saw thee as a youth, now as a lion; now thou wast a raging boar, now a serpent whom men would fear to touch; now horns made thee a bull, often thou couldst be a stone, often, again, appear as a tree; sometimes imitating flowing water thou wast a river, and sometimes the contrary of water, a flame.' When the senses dance together transformation is the common-sense mode of experience; when vision reigns over the others the universe turns static

and give it its own conceptual identity, in the form of what we call a "consonant" (page 43).

With the representation of the abstract consonant, then, began the separation of the eye from the other senses and the separation of inner from outer experience. 'What the Greeks did,' Havelock insisted in *Prologue to Greek Literacy*, 'was invent the idea that a sign could represent a mere consonant, a sound, so to speak, which does not exist in nature but only in "thought" (page 11). This invention came from pursuing the analysis of the bare sounds of speech to the level of complete abstraction. The result was the invention of 'the first system in which in all cases one and only one acoustic value was theoretically attachable to one given shape' (*Prologue*, 12).

The basis of alphabetic abstraction is the phoneme, the irreducible meaningless 'bit' of sound, which is 'translated' by a meaningless sign. The phoneme is the smallest 'sound unit' of speech, and it has no relation to concepts or semantic meanings. If the consonant is a concept minus a percept, the phoneme, a 'thing' perceived in special, fragmentary terms, is a percept minus a concept. Syllabaries preserved the relation between percept (ground of experience) and concept (e.g., 'pa,' father or paw); with the phoneme, the two are split apart. 'The phonemic principle is that there are in each language a limited number of elemental types of speech sounds, called phonemes, peculiar to that language; that all sounds produced in the employment of the given language are referable to its set of phonemes; that only its own phonemes are at all significant in the given language' (Morris Swadesh, 'The Phonemic Principle,' 32).

With the phonetic alphabet, as distinct from other writing systems in which meanings still adhered to the signs and symbols, the letters had to be free of ambiguity. This was accomplished both by one-to-one matching of sign and sound, and by rendering the signs themselves inherently meaningless:

The script was reduced to a gimmick; it had no intrinsic value in itself as a script and this marked it off from all previous systems. It was characteristic of the alphabet that the names of the Greek letters borrowed from the Phoenician, for the first time became meaningless: *alpha, beta, gamma*, etc., constitutes simply a nursery chant designed to imprint the mechanical sounds of the letters, by using what is called the acrophonic principle, in a fixed series on the child's brain, while simultaneously tightly correlating them with his vision of a fixed series of shapes which he looks at as he pronounces the acoustic values. (Havelock, *Origins*, 46)

This immense feat of abstraction had at least three effects. In the first place, whereas a syllabary presented the reader with miniature Gestalts – ba, ka, and so on – the new alphabet rendered the atomistic sounds – b-a

and so on – as a series of marks that had no character whatever and no meaning. A second direct effect of splitting the visual (sign) off from interplay with the other senses (sounds and meanings) was that the abstract system gave the user the power to transcribe any language into a series of abstract, meaningless sounds. Thanks to its ability to identify the abstract components of syllables, 'the sign-system used in the Greek alphabet, provided in theory an instrument of unique efficiency for transcribing any language, and in practice one of peculiar efficiency for transcribing the Greek language, a tongue in which the vocalic component of a syllable was enlarged in comparison with the usage of Semitic tongues, and which therefore encouraged a more ready identification of the difference between a vowel and its consonantal accompaniment' (Havelock, *Prologue*, 12).

By phonemic transformation into visual terms, the alphabet became a universal, abstract, static container of meaningless sounds.

A third, and perhaps most significant, effect of the alphabet derives from its direct and regular use of the subconscious by interiorization: The acoustic efficiency of the script had a result which was psychological: once it was learned you did not have to think about it. Though a visible thing, a series of marks, it ceased to interpose itself as an object of thought between the reader and his recollection of the spoken tongue' (Havelock, *Origins*, 46).

The formal structure of visual space involves the suppression (interiorizing by means of the subconscious) of all ground as a guarantee of abstract, static uniformity. When the visible letter 'ceased to interpose itself as an object of thought,' it too became a (suppressed and subliminal) percept minus a concept. A correlative effect of the alphabet on the reader, in splitting apart percept and concept, was to lend to the concept a similar independence, making it a figure without a conscious ground.

As Robert Rivlin and Karen Gravelle remark, a primary function of our sense of vision is to isolate a figure on its ground (*Deciphering the Senses*, 65). Cultural evidence suggests that this is the supreme property of vision alone: no other sense, in high definition, that is, pressed to intensity of operation, can suppress ground by isolating and detaching figures. The letters, as a result, came to be regarded as not only having no meaning but also as having no properties. The alphabet served as the formal cause of dialectic (logic and philosophy) and of visual (geometrical) space.

The split between conscious and unconscious, as an effect of the alphabet, is of crucial significance. It is a mimesis of the dissociation of perceptual sensibilities (of vision from the other senses), which is inherent in the form of the phonetic alphabet.

For the preliterate, mimesis is not merely a mode of representation but 'the process whereby all men learn'; it was a technique cultivated by the oral poets and rhetors and used by everybody for 'knowing,' via merging knower and known. This understanding survives in the maxim 'the cognitive agent is and becomes the thing known.' Using mimesis, the 'thing known' ceases to be an object of attention and becomes instead a ground for the knower to put on. It violates all the properties of the visual order, allowing neither objectivity, nor detachment, nor any rational uniformity of experience, which is why Plato was at pains in the *Republic* to denounce its chief practitioners. Under the spell of mimesis the knower (hearer of a recitation) loses all relation to merely present persona, person, and place and is transformed by and into what he perceives. It is not simply a matter of representation but rather one of putting on a completely new mode of being, whereby all possibility of objectivity and detachment of figure from ground is discarded. Eric Havelock devotes a considerable portion of *Preface to Plato* to this problem. As he discovered, mimesis was the oral bond by which the tribe cohered:

You threw yourself into the situation of Achilles, you identified with his grief or his anger. You yourself became Achilles and so did the reciter to whom you listened. Thirty years later you could automatically quote what Achilles had said or what the poet had said about him. Such enormous powers of poetic memorisation could be purchased only at the cost of total loss of objectivity. Plato's target was indeed an educational procedure and a whole way of life. (*Preface to Plato*, 45)

Paradoxically, when the Greeks approached alphabetic technology using their oral habit of mimesis, they put on its visual stress instead. The new visual ground completely alienated them from tribal culture; and so there came to be an intense rivalry between the two modes of culture. In the *Republic* Plato vigorously attacked the control exercised through mimesis by the oral establishment, for it

constituted the chief obstacle to scientific rationalism, to the use of analysis, to the classification of experience, to its rearrangement in sequence of cause and effect. That is why the poetic state of mind is for Plato the arch-enemy and it is easy to see why he considered this enemy so formidable. He is entering the lists against centuries of habituation in

rhythmic memorised experience. He asks of men that instead they should examine this experience and rearrange it, that they should think about what they say, instead of just saying it. And they should separate themselves from it instead of identifying with it; they themselves should become the 'subject' who stands apart from the 'object' and reconsiders it and analyses it and evaluates it, instead of just 'imitating' it. (*Preface to Plato*, 47)

Through mimesis of the alphabet, the Greeks absorbed visual dissociation of sensibilities in at least three forms, as we have seen. There is the invention of the consonant as a phoneme, and its endowment with an independent, abstract existence, which entails a split of inner (imaginative) and outer (verbal) experience. And there is the sundering of the sign and the phoneme, by virtue of both being made meaningless. Finally, there is the aspect of translating everything into visual terms alone, on an abstract and purely one-to-one matching basis. Much more than the writer, it is the reader who, in the act of reading, puts on these dissociations as the basis of replaying and re-cognizing:

When, therefore, it came to transcribing a given oral statement, the signs employed, through the abstract values attached to them, produced a relatively clear, unambiguous and economical register of the exact sounds of what had been said. The reader therefore – and it is in the act of reading rather than writing that the secret of the alphabet subsists – the reader of any transcription who had previously memorized the proper values could acquire automatic and rapid 'recognition' – the Greek word for the act of reading – of what was being said. (*Prologue*, 13)

Since all reading was done aloud, this constitutes another significant split between inner and outer experience.

Prolonged mimesis of the alphabet and its fragmenting properties produced a new dominant mode of perception and then of culture.

In 1936, F.M. Cornford published a paper, 'The Invention of Space' in *Essays in Honour of Gilbert Murray*. He noted that rational, visual space was regarded as exotic and avant-garde by its newly literate Greek

inventors. He overlooked the alphabet as the formal cause of the Greek invention of space. Nevertheless he has tracked down the introduction of abstract, non-experiential space as having been 'constructed by the reasoning of Greek geometers and imposed by the atomists.' 'As geometry developed, mathematicians were unconsciously led to postulate the infinite space required for the construction of their geometrical figures – that space in which parallel straight lines can be produced "indefinitely" without meeting or reverting to their starting-point. In the sixth and fifth centuries no distinction was yet drawn between the space demanded by the theorems of geometry and the space which frames the physical world.'²

The old acoustic 'common sense' of space continued as spherical, multisensory, and multidimensional space until well into the first age of alphabetic literacy; moreover, it provided the basis of considerable opposition to the new abstract visual space of the atomists. 'Hence the considerations which led mathematicians to recognize infinite space in their science simultaneously led some physicists to recognize an unlimited Void in nature. These were the atomists, whose system was the final outcome of a tradition inspired by Pythagorean mathematics. The atomists broke down the ancient boundaries of the universe and set before mankind, for the first time, the abhorrent and really unimaginable picture of a limitless Void' (Havelock, *Origins*, 44).

The most remarkable quality of the alphabet is its abstractness of various kinds. From the patterns of separation, of sensibilities, and of figure from ground, with the subsequent suppression of ground, comes the character of stasis, one of the four features of visual space. When figure and ground are in interplay, they are in dynamic relation, continually modifying each other. Thus, stasis of the figures can only be achieved by detaching them from their ground, and is the necessary result of detachment. The sound and sign of the phonetic alphabet are in no dynamic relation or interplay: one simply *stands* for the other. Both are abstracted from all meaning or relation. Oral, resonant speech is broken into irreducible (uniform) bits of meaningless sound, each *connected* to a sign by arbitrary association, and by uniform orthography. By means of a continuous linear sequence of signs, the bare sounds that compose speech are re-presented and re-cognized through a single sense in isolation. From this static, connected figure-detached-from-ground character, the alpha-

2 Comford, 'The Invention of Space,' page 220. Havelock confirms this, in noting that: 'Atomism and the alphabet alike were theoretic constructs, manifestations of a capacity for abstract analysis, an ability to translate objects of perception into mental entities, which seems to have been one of the hallmarks of the way the Greek mind worked' (*Origins*, page 44).

bet derives its other great power of abstraction, that of translating into itself (as an abstract, unmodified/unmodifying container) the sound-systems of other languages.

The new (Euclidean) space was antithetic in all respects to the established geocentric spherical universe.

Cornford presents the abstract, infinite plane of the geometers as having 'no centre and no circumference. In its full abstraction, as conceived by the mathematician, it was an immeasurable blank field, on which the mind could describe all the perfect figures of geometry, but which has no inherent shape of its own. For the physicist it was the frame of the material universe, partly occupied by visible or tangible bodies, whose number and extent were again without definite limit' (page 219). This is visual space in all its aspects, an 'inner' conceptual reality and not an outer or empirical one. Again, 'geometrical space was seen to be continuous, not a pattern of empty gaps interrupted by solid things; it penetrates the solids that occupy its single continuous medium. At the same time, the theorems of geometry were seen to require that parallel straight lines shall travel on for ever through this medium without meeting or returning upon themselves' (page 230).

The present essay had its beginning in an effort to locate the origin of visual space as a Western paradigm. Its earliest expression seemed to be manifested in the new Greek science of dialectic, and its influence was responsible for the transition Cornford has labelled 'from religion to philosophy.' That is, the alphabetic ground of new sensibility was mimed and explored in several ways, one of the products of which was dialectic (as begun by the pre-Socratic philosophers) and another the imposition of 'geometrical' visual space by the atomists Leucippus and Democritus.

The new metaphysical concerns with 'being' adopted the form of abstract figures detached from the ground of immediate awareness. Previously, with mimesis, 'being' had been immersed in the metamorphic and Protean flux of everyone's daily experience. With the new ground of alphabetic awareness, objectivity and detachment became the rule. Mimesis was turned from a making process into representational matching, and the old experience of being was retrieved on the new terms of visual space, that is, as an abstract absolute.

Formal logic and the logical syllogism encapsulate connectedness in reasoning.

In contrast to the discontinuous aphoristic statements of the poets and pre-Socratic philosophers, logic would seem the very paradigm of connected thought. On closer inspection it appears that 'connection' is a metaphor and is achieved by other means. In his *History of Formal Logic*, I.M. Bochenski examines at length the 'Greek variety of logic,' and presents sufficient evidence to show that 'connection' is in fact a metaphor for containment (page 118).³ The relation between elements of the syllogism is termed 'connexive implication,' which means that the consequent has to be implied in its antecedent. 'Implied in' means 'folded into' or 'enveloped by' so the 'connected logic' of the syllogism is actually a matter of the *containment* of the consequent in the antecedent premisses. As Bochenski remarks, it is generally recognized 'that the connected [proposition] is true when its consequent is potentially contained in the antecedent' (page 119).

To pursue this a step further: The Stoics defined an argument as 'a system of premisses and conclusions':

Premises are propositions agreed upon for the proof of the conclusion, the conclusion is the proposition proved from the premisses. E.g., in the following [argument]: 'if it is day, it is light; it is day; therefore it is light,' 'it is light' is the conclusion, the other propositions are premisses.

Some arguments are conclusive, others not conclusive. They are conclusive when a connected proposition, beginning with the conjunction of the premisses of the argument and ending with the conclusion, is true. E.g., the argument mentioned above is conclusive, since from the conjunction of its premisses 'if it is day, it is light' and 'it is day' there follows 'it is light' in this connected proposition: 'if: it is day and if it is day, it is light: then it is light.' Not conclusive are arguments not so constructed. (page 122)

The 'connected proposition' is a sequence with a well-defined beginning and end; perhaps it is the strong sequentiality that provides the sense of connectedness. As with the syllogism, truth is abstract, based on

3 Under the heading 'Connexive Implication' he gives the definition: '20.09 [According to Diodorus] this [proposition] is true: "if there are no atomic elements of things, then there are atomic elements of things" — but those who introduce connection say that the connected [proposition] is sound when the contradictory of its consequent is incompatible with its antecedent. So according to them the aforesaid connected [propositions] [20.07] are bad, but the following is true: "if it is day, it is day."'

matching, and the 'system' is informed by containment of the conclusion in the premisses, or in the conjunction of the premisses. All of the features of logical 'connection' and syllogistic reasoning exhibit and use only the properties of visual space: space imagined as a neutral container, space that is static, linear, continuous, and connected.

PROTEUS BOUND: Visual Space in Use

Cornford's theme in 'The Invention of Space' is that 'normal' space for the Greeks was the preliterate or acoustic space, which has suddenly re-emerged in our twentieth-century world under the aegis of Einstein and relativity theory. What we would call 'normal' or 'common-sense space' remains visual and Euclidean for us in the twentieth century, while the avant-garde or Einsteinian space is acoustic or simultaneous once again.

Visual space is a man-made artefact, whereas acoustic space is a natural environmental form. Visual space is space as created and perceived by the eyes *when they are abstracted or separated from the activity of the other senses*. With respect to its properties, this space is a continuous, connected, homogeneous (uniform), and static container. Visual space is man-made in the basic sense that it is abstracted from the interplay with other senses and their specific modes. This abstraction occurs by the agency of the phonetic alphabet alone: it does not occur in any culture lacking the phonetic alphabet. The alphabet is the hidden ground of the figure of visual space.

Any continuum inherently presents a situation that is a figure minus a ground, such as a Euclidean straight line or plane. A continuum as such is infinite and featureless. Actually, there can be no such thing as a continuum. In nature there are no figures-minus-grounds. In fact, in nature there are no figures at all – only a dynamic environmental mosaic that is discontinuous and diverse.

To the scientist using visual assumptions about phenomena, nature appears as a collection of figures whose variety and discontinuity can be eliminated by means of abstraction.

Writing in the *Toronto Globe and Mail* (12 February 1979), Walter Sullivan discusses the recent interest in 'the first strong evidence for the existence of gravity waves': 'The new findings created a sensation last month when they were announced at an international conference of astrophysics in Munich ... The direct detection of gravitational waves would be an historic step toward fulfilling the dream of several generations of scientists who have been seeking to bring all laws of nature – and the phenomena that derive from them – into a comprehensive and rational framework.' Connected, rational space presents to the scientist the possibility of linking figures logically inside a connected framework, and in abstraction from any natural ground. Rational space results from enclosing one space inside another as a means of creating stasis. The Romans were the first to play with enclosed architectural spaces – they put the arch inside the rectangle. In the second century, AD, in his *Geographica*, Ptolemy imposed a rectilinear grid system – abstract, uniform, linear, homogeneous, geometrical space – over his maps, thereby pushing aside the traditional heterogeneity of the earth's surface.

Part of the confusion of Einsteinian four-dimensional space-time results from the figure of abstract visual space suddenly acquiring a ground of 'relativity.' The visual figure now relates to the speed of light as its ground, just as the acoustic figure relates to silence as its ground (as Max Picard points out, in *Silence*). Three-dimensional Euclidean logic of the merely visual variety is made obsolete by our return to the simultaneous and resonant.

With the advent of Gutenberg technology the components and features of visual space were greatly enhanced. The intensification of visual space in

the experience of the readers of the printed word appears closely in the work of Descartes and Galileo and Hobbes and Locke.

By the time of Locke and Newton, explicit consciousness of the concept of visual space was current

The familiar *Essay Concerning Human Understanding* (1690) by John Locke presents, fully elaborated, the long-held and still currently acceptable perception of time and space. Locke worked in the shadow of Newton and Descartes in a period famous for both its literacy and its rationalism.

Locke's idea of space as extension (which 'includes no solidity nor resistance to the motion of *body*, as *body* does') led him to formulate the idea of 'pure space.' In commenting on 'our idea of place,' he notes: 'We can have no *idea* of the place of the universe, though we can of all the parts of it; because beyond that, we have not the *idea* of any fixed, distinct, particular beings, in reference to which we can imagine it to have any relation of distance; but all beyond it is one uniform space or expansion, wherein the mind finds no variety, no marks' (*Essay*, I: 136). That is, the universe is a figure without a ground. This happens to be one of the primary characteristics of visual space, since it too, as an imaginary continuum, is a figure without a ground. He goes on to locate the universe in terms of container and contained, which is another feature of visual space alone: 'when one can find out and frame in his mind clearly and distinctly the place of the universe, he will be able to tell us whether it moves or stands still in the indistinguishable *inane* of infinite space: though it be true that the word place has sometimes a more confused sense and stands for that space which any body takes up; and so the universe is in a place' (*Essay*, I: 138).

Among the characteristic qualities of visual space are that it is static and unmodified by its 'contents,' and that it is a continuum. Locke remarks:

Secondly, The parts of pure space are inseparable one from the other, so that the continuity cannot be separated, neither really nor mentally. For I demand anyone to remove any part of it from another, with which it is continued, even so much as in thought.

Thirdly, The parts of pure space are immovable, which follows from their inseparability, *motion* being nothing but change of distance between any two things, but this cannot be between parts that are inseparable, which, therefore, must needs be at perpetual rest one amongst another. (*Essay*, I: 138)

The imagined stasis and continuity of abstract space permits its infinitesimal divisibility.

Locke is careful to observe that 'In both of these (viz. *expansion* and *duration*) the mind has this common *idea* of continued lengths, capable of greater or less quantities: for a man has as clear an *idea* of the difference of the length of an hour and a day, as of an inch and a foot' (*Essay*, I: 138). Besides being of infinite divisibility, space is infinite in extent:

But to return to our idea of *space*. If *body* be not supposed infinite (which I think no one will affirm), I would ask whether, if god place a man at the extremity of corporeal beings, he could not stretch his hand beyond his body? If he could, then he would put his arm where there was before *space* without *body*; and if he there spread his fingers, there would still be *space* between them without *body*. If he could not stretch out his hand, it must be because of some external hindrance (for we suppose him alive, with such a power of moving the parts of his body that he hath now ...); and then I ask whether that which hinders his hand from moving outwards be substance or accident, something or nothing? ... the argument is at least as good that where nothing hinders (as beyond the utmost bounds of all bodies), a *body* put into motion may move on, as where there is nothing between, there two bodies must necessarily touch; for pure *space* between is sufficient to take away the necessity of mutual contact, but bare *space* in the way is not sufficient to stop motion. The truth is, these men must either own that they think *body* infinite, though they are loath to speak it out, or else affirm that *space* is not *body*. For I would fain meet with that thinking man that can in his thoughts set any bounds to space, more than he can to duration, or by thinking hope to arrive at the end of either. (*Essay*, I: 141)

This last passage provides a prime example of Euclidean or 'geometric' space. As F.M. Cornford points out (page 233), it is quite traditional, having been used by Lucretius, and, earlier, by Archytas: 'If I am at the extremity of the heaven of the fixed stars, can I stretch outwards my hand or staff? It is absurd to suppose that I could not; and if I can, what is outside must be either body or space. We may then in the same way get to the outside of that again, and on on; and if there is always a new place to which the staff may be held out, this clearly involves extension without limit' (Eudemus, frag. 30).

Locke's idea of time is endowed with all the properties of visual space: 'Time in general is to duration as *place* to expansion': 'They are so much of

those boundless oceans of eternity and immensity as is set out and distinguished from the rest, as it were by landmarks; and so are made use of to denote the position of finite real beings, in respect one to another, in those uniform infinite oceans of duration and space' (Locke, *Essay*, I: 161–2). Not only are both uniform and infinite, but also they are continuous and infinitely divisible. As Locke points out, 'Every part of duration is duration too, and every part of extension is extension, both of them capable of addition or division *in infinitum*.'⁴

Time, like space, is for Locke abstract, homogeneous, uniform, and a container

Time was visually recast as linear and continuous: 'But yet there is this manifest difference between them: that the *ideas* of length which we have of *expansion*, are *turned every way*, and so make figure, and breadth, and thickness; but *duration is but as it were the length of one straight line*, extended *in infinitum*, not capable of multiplicity, variation or figure; but is one common measure of all existence whatsoever, wherein all things, whilst they exist, equally partake' (*Essay*, I: 166).

Locke was by no means the originator of the idea of visual space as clear, distinct, and logical. Two generations earlier, Descartes had announced his 'geometrical method' or *Mathesis Universalis* as extending to every subject whatever. The critical survey of C.M. Turbayne approached the question of the disguises 'placed on the face of nature' by the pervasive acceptance of visual space in the seventeenth century:

Consider the metaphor, or heap of metaphors, known as 'the geometrical model' whose presence we can now detect in the systems of Descartes and Newton. Hallowed in science, it has been so constantly used in various fields that it is now nothing but a disguise placed on the face of nature, a disguise so complete and so ingeniously contrived by a succession of make-up artists from Pythagoras through Euclid to Descartes, Newton, and beyond, that most of us are fooled by it. Newton called it his 'Mathematical Way,' and Descartes 'The Geometrical Method' or *Mathesis Universalis*. But Descartes' is the best model because, of all the make-up artists, he was most aware of what he was doing. On the night of November 10, 1619,

4 *Essay* I: 165. A typical example of the way in which the assumptions of visual space, in physics and cosmology, were transmitted to the Western European tradition occurs in Cicero's *Academica* as Varro expounds infinite divisibility and continuity in matter and in space (I. vii).

having experienced a moment of illumination, Descartes dreamed a dream which, after interpretation, enabled him to envisage the extension of the geometrical model to every subject. All his subsequent work amounted to presenting outlines of, and exercises in the use of, this model (*The Myth of Metaphor*, 66)

The 'geometrical model' (and the mechanist outlook) is built on the properties of visual space, principally that of detachment of figures through ignoring or suppressing ground. The first property of the model is, as noted in *The Discourse on Method*, deduction, as Euclid had used it, but now to be extended beyond abstract geometry to all human knowledge. 'Those long chains of reasoning, all simple and easy, which geometers are wont to use to reach the conclusions of their most difficult demonstrations, had led me to fancy that everything that can call under human knowledge forms a similar sequence' (Turbayne, *The Myth of Metaphor*, 66)

The second property of the model is extension, which now comprises the whole of the physical world. As Turbayne remarks: 'amazingly, this property is to be treated as the defining property of the physical world, for the latter is nothing but *res extensa*. Physics is geometry, or, in other words, the object of abstract geometry, namely extension in length, breadth, and depth, is the object of physics: "But I have only decided to give up abstract geometry ... in order to have more time to study another kind of geometry which concerns itself with problems about the phenomena of nature ... My physics are nothing but geometry"' (page 67).

Descartes brought the physical world, as an abstract machine, into line with geometrical space.

As Turbayne notes, the inclusion of motion 'enables the first three properties to define mechanics, making the geometrical model identical with the machine model' (*The Myth of Metaphor*, 67; the three properties are long chains, extension, action). Descartes wrote, 'I have hitherto described this earth, and generally the whole visible world, *as if it were merely a machine in which there was nothing at all to consider except the shapes and motions of its parts*' (*Principles* IV: 118; Turbayne's italics).

The work of Locke provides an inventory of the attributes of visual space. A philosopher of the rational enlightenment, Locke developed ideas of the spatial continuum that have persisted along with Newtonian

concepts until the introduction of electric technology in the nineteenth century. Ernest L. Tuveson, in *The Imagination as a Means of Grace*, examines the process whereby visual abstraction resulted in a mechanist approach to cosmology and the intellect alike: 'Once the mind has been absorbed into nature, it takes on characteristics of the natural world; and when the cosmic order appears as a marvelously and perfectly contrived machine, each part working precisely with every other part, the mind too must appear as natural and (to use a modern term which had to be invented to express a new attitude) "normal"' (page 46).

It was a perfectly natural step from this view to regarding 'absolute space' as sharing some of the attributes of God:

The empty places of the solar system took on a sacred character. An obscure country preacher, Ellis Bradshaw, in 1649 printed *A Week-daies Lecture, or Continued Sermon to wit, The Preaching of the Heavens*, which shows how great was the excitement over space mystique, even among the relatively uneducated. Bradshaw, in his simple enthusiasm for 'place,' 'boundlesse, and unlimitable extensive, vastly circumventing, even the highest Heavens, beyond all thought, or imagination of man, or any finite being, and that on every side,' anticipates the enthusiasm of Shaftesbury. (*The Imagination as a Means of Grace*, 62)

This equation between visual space and God actually retrieves a late-medieval image of God's working in the world, imagery drawn from the new, arcane science of optics:

The propitious link between the mechanistic optical theories of the Arabs and the eventual demonstrations of linear perspective by Brunelleschi and Alberti was made possible by three thirteenth-century English monks with close connections to the Franciscan order: Robert Grosseteste (c. 1168–1253), Roger Bacon (c. 1220–1292), and John Pecham (c. 1235–1292). Why should the mathematical science of optics hold such fascination for these faraway, northern men of the cloth? Bacon gives us the answer in his own *Opus Majus*:

Since the infusion of grace is very clearly illustrated through the multiplication of light, it is in every way expedient that through the corporeal multiplication of light there should be manifested to us the properties of grace in the good, and the rejection of it in the wicked. For in the perfectly good the infusion of grace is compared to light incident directly and perpendicularly, since they do not reflect from them grace nor do they refract it from the straight course which extends along the road of perfection in life ... But sinners, who are in mortal sin, reflect and repel from them the grace of God ...

In other words, optics seemed the model by which God spread His grace to the world. To understand the physical laws of optics meant that one might gain insight into the very nature of God. (S.Y. Edgerton, *The Renaissance Rediscovery of Linear Perspective*, 74–5)⁵

Because it is incorporeal, God's moral power (grace) seemed familiar to a sensibility schooled in abstract space. Edgerton elaborates: 'Grosseteste was first concerned with defining the nature of light. Since *lux* was created by God on the First Day, he reasoned, this had to be the basic force for the divine energizing of the universe. Light was therefore synonymous with God's grace, and Grosseteste then postulated that light was to the natural world what abstract space was to geometry' (page 75).

Gradually the idea and expression of abstract immensity became synonymous with God himself. The Cambridge Platonist Henry Moore elaborates: 'That the perpetual Observation of this infinite Amplitude and Mensurability, which we cannot disimagine in our Phancy but will necessarily be, may be a more rude and obscure Notion offered to our Mind of that *necessary* and *self-existent* Essence which the *Idea* of God does with greater fulness and distinctness represent to us ... Whence, as I said before, the *Idea* of God being such as it is, it will both justly and necessarily cast this ruder notion of *Space* upon that Infinite and Eternal Spirit which is God' (Tuveson, *The Imagination as a Means of Grace*, 66). His Neo-Platonist approach proves very congenial to Sir William Jones, the orientalist, who represents God as the Being

... who through ev'ry part
Of space expanded and of endless time,
Beyond the stretch of lab'ring thought sublime,
Bad'st uproar into beauteous order start ...

(*The Imagination as a Means of Grace*, 66)

Galileo's chief effect was to move man in his self-image from the centre of the universe to the periphery. This was the main reason for the church's

5 Mr Edgerton notes: 'Alhazen's lengthy optical treatise was first printed in the West by Frederick Risner in *Optica Thesaurus Alhazeni Arabis libri septem item Vitellonis Thuringopolonis opticae libri decem* (Basel, 1572). This work has been recently reissued by the Hohnson Reprint Corporation (New York, 1972). David C. Lindberg, ed. ... Alhazen's ingenious explanation of how the light rays pass into the eye, "make" their image on the crystallinus, and then become refracted (all save the centric ray (the apple of the eye)) in the vitreous humor in order to pass the image upright to the optic nerve and brain, was finally proven wrong by Kepler. Following the experiments by Felix Platter, Kepler proved that the crystalline lens was not the seat of visual power but merely a dioptric focusing agent of light rays upon the sensitive retina at the back of the eye. In spite of the fact that in Kepler's explanation the visual image in the eye remains inverted, he proved that this is in fact the way we "see."' Samuel Y. Edgerton, Jr., *The Renaissance Rediscovery of Linear Perspective*, 195.

opposition to his disputation to the cardinals. What Tuveson regarded as the 'great crisis of change from an anthropocentric and geocentric cosmology, with a supranatural theology, to the Newtonian world machine, produced no great spiritual upheaval.' That this upheaval did not occur was surely a direct result of the acceptance of the visual space continuum by all groups alike. 'Immensity and eternity gave at least the illusion that supreme values were to be found in the endless continuum of commonplace thoughts and petty, selfish purposes which came to constitute the laissez-faire society. The natural sublime served to validate the actions of life and thus took its place along with the idea of progress, as a psychological prop of Western society' (*The Imagination as a Means of Grace*, 67-8).

From the immense and the sublime, the natural reversal was to meditation on ruins.

The Alps 'are nothing but great ruins: but such as show a certain magnificence in Nature.' With the reversal from the admiration of the sublime and the immense into the contemplation of the magnificence of confusion and disorder, the new sensibility of romanticism appears in embryo. Paradoxically, the world of ruins brought into motion the train of ideas that a 'law of the imagination' is that by which 'an idea perceived of a part of a thing recurs as the whole of it.' This 'law' brings us directly to the world of the nineteenth-century symbolists and the study of suggestions and effects.

Once critics had turned their attention inward to the impact of ruins or desolation on the imagination, it was not difficult to take the further step of separating subjective effects from the themes and content of art and poetry. It became possible to revisit the accepted masterpieces of classical art for the specific purpose of experiencing their effects as if they were previously unknown. Addison observes, 'Reading the *Iliad* is like traveling through a country uninhabited, where the fancy is entertained with a thousand savage prospects of vast deserts, wide uncultivated marshes, huge forests, misshapen rocks and precipices.' Although the *Iliad* had become, in Addison's time, a 'romantic poem,' it was, as Tuveson points out, available on these terms only after the subjective impressions derived from a poem were completely dissociable from its content.

Paradoxically, it is in the visual space of Locke and Addison that mental faculties and 'outer' space can be infinitely fragmentized. Their visual

classical space, when pushed to the limit, yielded the world of special subjective impressions.

Our intent in these pages has been to show visual space, as it wore, at the peak of its form in the eighteenth century and to indicate how it was generated as a side-effect of alphabetic technology. Acoustic space as known by *perliterates* (and many non-alphabetic cultures), by contrast, is presumably the natural mode of spatial awareness, for it was not the side-effect of any technology. The next section examines the pre-Euclidean sensibility of space, and in the concluding section of this chapter we will examine the reappearance of that sensibility as a side-effect of electric technology.

Something that happens according to a law doesn't need a cause.

R. G. Collingwood

PROTEUS UNBOUND: Pre-Euclidean Acoustic Space

Visual space – Euclidean space – was introduced in ancient Greece in the teeth of considerable opposition. The persistent pre-Euclidean common sense had to be overcome and transformed into the visual space of the atomists and geometers. So, medieval illustrative styles persisted even in scientific manuals right through the sixteenth century;⁶ so too our conventional Euclidean common sense has yet to catch up with the reality or the implications of relativity. The alphabetic revolution took centuries:

6 'It is interesting that most of the Italian artists during the first half of the fifteenth century did not suddenly adapt to linear perspective, and the new art-science was never applied either to scientific drawings or architectural models until the time of Leonardo da Vinci (1452–1519). Rather amusingly, there was a propensity, continuing right through the sixteenth century, to illustrate scientific manuals with pictures in split-view or reverse perspective, long after the rules of Brunelleschi and Alberti had been acknowledged by artists generally.' Edgerton, *The Renaissance Rediscovery of Linear Perspective*, 24–5

Eric Havelock identifies a long period of 'proto literacy' which, in Athenian society during the seventh and as far as the last decades of the sixth century BC, had only reached the condition of 'craft literacy.' It is normally assumed that the alphabet filtered down from the upper classes to the artisans, or conversely that the artisans were very educated types. Havelock shows that the reverse is the case, 'that the alphabet's use did not achieve what I may call cultural prestige for a very long time.' The earliest alphabetic writing extant is on a pot dated between 750 and 690 BC: it is, he concludes, as Athens entered upon her fourth century that her literate revolution was being accomplished.

The change in perception brought about by the spread of the alphabet provided the visual bias necessary to support the atomist revolution and pushed aside the inclusive, audile-tactile orchestration of the senses. Comford observes that the introduction of visual space 'was still denied by Aristotle; and his immense authority, fortified by ecclesiastical prejudice, held atomism at bay for some time' ('The Invention of Space,' 222).

Tactility is the space of the interval; acoustic space is spherical and resonant

Acoustic space is a complete contrast to visual space in all of its properties, which explains the wide refusal to adopt the new form. Visual space, created by intensifying and separating that sense from interplay with the others, is an infinite container, linear and continuous, homogeneous and uniform. Acoustic space, always penetrated by tactility and other senses, is spherical, discontinuous, non-homogeneous, resonant, and dynamic. Visual space is structured as static, abstract figure minus a ground; acoustic space is a flux in which figure and ground rub against and transform each other.

There is much confusion among early commentators and later scholars about the various forms of space as well as other matters such as the nature of mimesis and of the logos. Aristotle and others were working with one foot in each world, as it were, using the new forms of awareness but trying to retain or update the ideas of the old oral culture. The atomists proposed an infinite void, which was simply Euclidean space credited with physical existence but carrying the old name. The atomists' excitement over their discovery of visual space and their use of it as a technique of invention of isolated figures was spotted by Francis Bacon as a seductive distortion of true sensibility. He indicts 'the school of Leucippus and

Democritus as compared with the other philosophies' for being 'so busied with the particles that it hardly attends to the structure' and cites them as a prime exemplum of 'Idols of the Cave' (*Novum Organum*, I: Ivii). To the pre-Euclidean, sixth-century BC oral imagination, there was instead 'a spherical universe called "the Heaven," a living creature, whose breath is drawn in from the boundless air enveloping it outside. The important point is that "the Void" is another name for this air or breath' ('The Invention of Space,' 223).

Another confusion arises, in our minds, accustomed to infinity, concerning 'the boundless.' Boundlessness did not imply infinity, but rather the absence of fences or boundaries. 'Boundless' had no implication of 'the infinite and shapeless extent of mental Euclidean space or the Lucretian Void ... On the contrary, it is frequently and specially used of circular or spherical shape, because on the circumference of the circle or the sphere there is no beginning or end, no boundary separating one part from another' ('The Invention of Space,' 226). 'The Void had none of the properties of container and contained. Cornford observes that 'Anaximander described his "boundless," encompassing the world, as "the divine"; and Empedocles calls his universe "a rounded sphere altogether boundless."' ⁷

The pre-atomist multisensory void was an animate, pulsating, and moving vibrant interval, neither container nor contained – acoustic space penetrated by tactility.

Aristotle, on a feature of Pythagorean cosmology, pointed out: 'The Pythagoreans too asserted that Void exists and that it enters the Heaven itself, which, as it were, breathes in from the boundless a sort of breath which is at the same time the Void. This keeps things apart, as if it constituted a sort of separation or distinction between things that are next

7 'Invention of Space,' 227. C.H. Kahn comments: 'As Cornford has rightly urged, the only motive for such a theory is the atomist assumption of an infinite, indiscriminate void, in which one point is as good as another for the fortuitous concourse of bodies that may produce a world. The apenon: "boundless" of Anaximander is of a different order, and his world arises not by chance but, as far as we can tell, by a kind of organic growth' (*Anaximander and the Origins of Greek Cosmology*, 51 and *passim*).

to each other.⁸ It is not so much the elements as the intervals or discontinuous residue between them that give form or configuration.⁹

Within the Heaven, 'the function of the air or vacancy is to keep apart the solid bodies we see and to give them room to move in' ('The Invention of Space,' 223). There, space is constituted of resonant intervals, dynamic relationships, and kinetic pressure. We hear from all directions simultaneously; acoustic space has the structure of a sphere in which things create their own space and modify and coerce each other. Without visual stress necessary to drive the other senses 'underground' into the subconscious, their interrelatedness is constant.

The mode of cognition in acoustic or multisensory spaces is mimesis. 'The cognitive agent is and becomes the thing known,' while the eye is in equal interplay with the other senses. There is no infinity: to the ear faculty, the question is unintelligible. The essential structure of the old void is kinetic and tactile, a matter of pressure and interval.

Parmenides conceived of the whole of being as 'complete on every side, like the mass of a rounded sphere, equally poised from the centre in every direction.' Cornford adds: 'We naturally ask, what is outside this finite sphere of being? Parmenides does not raise that question; apparently it did not occur to him that such a question could be asked' (pages 227–8). In fact, 'at Parmenides' date, no one had seen any reason why there should be an infinity of unoccupied space. It appears, then, that in these earliest cosmologies the universe of being was finite and spherical, with no endless stretch of emptiness beyond' (page 228).

The space of early Greek cosmology was structured by logos – resonant utterance or word.

The Greeks had two words for 'word' or 'utterance,' logos and mythos, of which logos was much the older and more complex. As Havelock, in

8 *Physics*, IV, 6, 213b, 23: after Cornford, 'Invention of Space,' 223. The obscurity of this commentary is largely a result of the problem posed Aristotle by his own visual bias, when trying to report on audile-tactile awareness.

9 Commenting on Erwin Panofsky's essay 'Perspective as "Symbolic Form,"' Samuel Edgerton, Jr, notes that in antiquity 'space was understood by artists as a discontinuous residue between objects rather than as something which transcends and unites them. Such a conception allows a proper sensation of above, below, ahead, behind, but never of a unified continuum such as today informs us about the relative distance between objects in perspective pictures' (*The Renaissance Rediscovery of Linear Perspective*, 158).

Preface to Plato, has shown, the spoken word, logos, functioned in oral society as the principal technology both of communication and of fashioning and transmitting the culture.

Logos was also related to formal cause, to the existential essence of things. In this sense, Pedro Larn-Entralgo observes, all things are as it were words, expressions.

The *logos* of the philosophers, from Thales to Democritus, was used to declare what things 'are.' Moreover, it should be stated, with Zubin, that after Empedocles, Anaxagoras, and Democritus, the *logos* means that which is understood and said rather than a mere saying or understanding, as it had been up to then, and belongs therefore to the very structure of being ... Things will be very different when the *logos*, as an instrument of human social intercourse, is principally used to convince or persuade others, or, as Zubin says, when the 'is' of conversation becomes the 'is' of things. (*Therapy of the Word in Classical Antiquity*, 87)

The logos in its double sense of word and reason (the Romans had to translate it 'ratio et oratio') was considered by the preliterate Greeks as the 'highest and most specific' of the gifts of nature. By means of active utterance, logos (speech), men could express what things are as well as exercise rhetorical power over other men. 'Fair words and lofty deeds' are the titles of social excellence in Homer. Before writing, logos was active and metamorphic rather than neutral: words and deeds were related as were words and things. The logos of creation is of the same order: 'Let there be light' is the uttering or outering of light.

Among others, Heraclitus discussed logos as the informing principle of cosmology, of the kosmos. For Heraclitus, god's chief name is Highest Reason, Logos; and, in a different aspect, 'the Wise Being' or even 'the Only Wise Being.' (Fr. 32). As F.M. Cleve explains, the divine body that encircles the world is that part of the resonant logos which never 'changes.' This part is not contained by the world (Fr. 108), but keeps outside, as an environment: The Logos does not dwell within the world, penetrating it, but around the world. Beyond the continent, the ocean, the air cover, the fire of the stars, there is still the *pyr aeizoon*, the lasting body of the Logos ... The Logos, then, is not in the world. This was changed later on by the Stoics. They imagined the world as penetrated by the Logos, thus deviating from the genuine dogma of Heraclitus' (Cleve, *The Giants of Pre-Sophistic Greek Philosophy*, 78).

The Stoics revived much of Heraclitus's theodicy, but they reformulated the doctrine of the logos for their own time, in a threefold pattern that served as a precursor of the trivium. By their time the alphabetic ground was becoming pervasive. The nature of kosmos was also transformed, so that the Heraclitean god was translated from 'the outermost sphere around

the world' to a position inside, 'penetrating the whole world.' The old ground was becoming figure as visual space intensified.

In Fr. 30, kosmos is identified with 'fire' (that is, energy) undergoing a process, in which is found the essential relation between logos and kosmos: 'it may not be going too far, therefore, to say that insofar as the Logos, which is closely related to this kosmos, is thought of as a material component of the things to which it is "common," it is thought of as a form of fire; to which should be added that Heraclitus perhaps as far as possible avoided thinking about the Logos in this analytical way. The Logos is the formula, structure, plan, of each thing and all things: this is the important point' (G.S. Kirk, *Heraclitus, the Cosmic Fragments*, 70).

Logos is the formal cause of the kosmos and all things, responsible for their nature and configuration.

As C.H. Kahn shows in his treatment of the same fragment,¹⁰ both the kosmos and the logos that informs it are encyclopedic (as they concern the universe, 'the world of nature taken in its widest sense') and both are concerned with metamorphosis. These properties of the logos are of particular importance to the later development of Stoic and Roman grammar and rhetoric. Heraclitus made it far clearer than his immediate predecessors that 'man himself is part of his surroundings' and not merely a contained or detachable figure: 'in him, too, the logos is operative, and his effective functioning depends upon action in accordance with it' – and so upon his understanding of it.¹¹

While common-sense acoustic space held sway, the cosmos was perceived as a resonant and metamorphic structure informed by logos. 'The structure of man's speech was an embodiment of the structure of the world' (Harold Innis, *Empire and Communication*, 76). The boundless, spherical, resonating kosmos of acoustic space constituted an environmental ground of energies and potencies and forms, to which men, things,

10 C.H. Kahn, *Anaximander and the Origins of Greek Cosmology*, 224–5. Here kosmos is understood as referring to the entire sequence of world conditions as it were simultaneously, and not to any one: it stands for the entire system of transformations.

11 G.S. Kirk, *Heraclitus, the Cosmic Fragments*, 403. In Fr. 112 is found, 'the greatest superiority is it to have wisdom, and wisdom it is to tell the truth and act in accordance with nature (i.e., with the will of *Logos*), listening for it (i.e., in intuitive comprehension)' (F.M. Cleve, *The Giants of Pre-Sophistic Greek Philosophy*, I: 107).

and events were almost accidentally figures, and into which they might easily emerge. Figure was not yet abstract and was inseparable from its metamorphic relation to ground. The universe was a verbal universe – a perception that is reappearing in the twentieth century, thanks to the new ground of instantaneous electric information, which is in many ways similar to Heraclitus's 'fire' or energy.

... discontinuity ... more than anything else brings new content, releases locked powers, and opens up the greatest tasks in the realm of life no less than in the realm of science.

Harald Høffding,
The Problems of Philosophy

The only thing that can be urged against spherical space is that more than twenty centuries ago a certain Greek published a set of axioms which (inferentially) stated that spherical space is impossible.

A.S. Eddington,
The Expanding Universe

PROTEUS UNBOUND: Post-Euclidean Acoustic Space – The Twentieth Century

By the twentieth century, visual space was obsolesced in all fields and acoustic space retrieved. The mechanical paradigm, enthroned in the seventeenth and eighteenth centuries, was eventually replaced by a field-mosaic approach.¹² In physics, a concerted, almost military opposition

12 As Langdon Winner observed: 'the mid-twentieth century has brought the eclipse of the machine as a model for everything under the sun. Too many recent developments in science and technology – quantum physics, relativity, modern chemistry and biology, the alloys, plastics, the transistor – simply do not match the two primary images of the older mechanical tradition: Newton's clockwork universe and the cog and wheel machine of nineteenth-century industry. Artifice has become more subtle. Many devices properly called machines are no longer truly mechanical. Even Lewis Mumford, who emphasizes the idea of society as machine, has changed his emphasis to something called the "Power Complex." What needs expression is the idea of a set of large-scale, complex, interdependent, functioning networks which form the basis of modern life: for this, "the machine" will no longer suffice' (*Autonomous Technology*, 193).

was required to circumvent the centuries-old 'common-sense' assumptions of visual space. It was this revolution that impelled F.M. Cornford to write the seminal essay 'The Invention of Space.' He opens his essay by quoting the (1934) address of the president of the British Association to the effect that, in the preceding half-century, the main edifice of science had grown almost beyond recognition, as whole armies of labourers added wing after wing, storey upon storey: 'Yet the theoretical physicist must admit that his own department looks like nothing so much as a building which has been brought down in ruins by a succession of earthquake shocks' (page 215).

Continuity pertains only to visual space, and therefore the phrase 'space-time continuum' is misleading and a contradiction. There is no 'continuum' in acoustic space, whether pre- or post-Euclidean: it is formed as a discontinuous and resonant mosaic of dynamic figure/ground relationships. Although the language used in discussing the new post-Euclidean spaces reflects an underlying adherence to the visual- or absolute-space model, the actual perception of the scientists is that of a mythic double-plot of space and time without connections. They maintain that 'there is no such thing as a fixed interval of time independent of the system to which it is referred.' Space and time serve as grounds for each other. Werner Heisenberg illustrates the confusion inherent in their language. '[In modern physics], one has now divided the world not into different groups of objects but into different groups of connections ... What can be distinguished is the kind of connection which is primarily important in a certain phenomenon ... The world thus appears as a complicated tissue of events, in which connections of different kinds alternate or overlap or combine and thereby determine the texture of the whole' (*Physics and Philosophy*, 96).

Visual space is the only form of space that is purely mental: it has no basis in experience because it is formed of abstract figures minus any ground, and because it is entirely the side-effect of a technology.

To say that a body or its gravitational field 'bends the space' in its vicinity is to discuss visual space in acoustic terms.

To talk of space being 'curved' is to 'do the old thing in the new way': the 'curved space' in question is a distortion of visual (Euclidean) space, which is still clung to in language and thought. In acoustic space, which involves

the dynamic interaction of a figure as a part of its ground, each thing creates its own space; that is, it reshapes the ground even as it is shaped by the ground.

In the words of Milič Čapek, in *The Philosophical Impact of Contemporary Physics*: 'In the general theory of relativity every motion, accelerated or not, results naturally from the local structure of time-space' (page 178). In this approach objects make their own space and are not *contained* in any space. Consciousness itself would be a relation among objects or experiences. Cornford realized that the 'new space' of science was a return to pre-Euclidean awareness:

This post-Euclidean finite but unbounded space takes us back to the pre-Euclidean finite but boundless sphere of Anaximander, Parmenides, and Empedocles. These philosophers did not know as much mathematics as Einstein; but they had the advantage over Newton in knowing much less mathematics than Euclid. They had not been misled by geometry into projecting its infinite space into the external world under the name of the Void. The Euclidean era thus presents itself as a period of aberration, in which common sense was reluctantly lured away from the position that it has now, with no less reluctance, to regain. ('The Invention of Space,' 234-5)

In his foreword to Max Jammer's *Concepts of Space*, Albert Einstein reports how the absolute forms were bypassed by means of a dynamic, non-homogeneous field or ground:

The victory over the concept of absolute space or over that of the inertial system became possible only because the concept of the material object was gradually replaced as the fundamental concept of physics by that of the field. Under the influence of the ideas of Faraday and Maxwell the notion developed that the whole of physical reality could perhaps be represented as a field whose components depend on four space-time parameters. If the laws of this field are in general covariant, that is, are not dependent on a particular choice of coordinate system, then the introduction of an independent (absolute) space is no longer necessary. That which constitutes the spatial character of reality is then simply the four-dimensionality of the field. There is no 'empty' space, that is, there is no space without a field. (page xv)

A recent article by T.H. Boyer 'The Classical Vacuum' in *Scientific American*, sings the same song: 'It is not empty. Even when all matter and heat radiation have been removed from a region of space, the vacuum of classical physics remains filled with a distinctive pattern of electromagnetic fields.'

The 'victory' over Euclidean space was not achieved by isolated individuals, but by a field of young rebels opposed to all absolutes.

The ground that informed the perceptions of these revolutionaries was that of electrical experimentation and technology, even as the alphabet informed and biased the perceptions of the atomists and early geometers. Then, as now, the common-sense position stubbornly resisted the new awareness. Regarding this resistance, Max Planck, the innovator of quantum theory, observed: 'A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents die, and a new generation grows up that is familiar with it.'

Lewis Feuer observed, in *Einstein and the Generations of Science*, that 'When the Zurich-Berne student circle was attracted by Mach's critique of absolute space and time, they were moved strongly apart from scientific arguments, by sociological, emotional, nonlogical factors. For the most powerful logicians of the time regarded Mach's arguments as utterly unconvincing.'¹³ With absolutes removed, the whole mode of perception reverted from the abstract visual order instituted by our phonetic alphabet back to the fluid and dynamic audile-tactile Gestalt; from isolated, rigidly fixed figures to a mosaic of figure-ground interplay. As a perceptual exercise Ernst Mach played with figure-ground reversability: '[He] would stand on a bridge, look fixedly at the water flowing beneath, and the water would seem to be in motion; but with "prolonged gazing," the water would assume the appearance of being at rest, while "the bridge, with the observer and his whole environment" would begin to move in the opposite direction: "the relative motion of the objects is in both cases the same"' (Feuer, *Einstein and the Generations of Science*, 34).

13 Lewis S. Feuer, *Einstein and the Generations of Science*, 52. Feuer emphasizes the group approach as central: 'It was the distinctive, revolutionary student culture of Zurich and Berne, the *revolutionary international of young intellectuals*, that provided the cultural soil in which a young Einstein with his unique personal traits could find the necessary supporting nutriments. Without such a group, he himself felt that he would have perished intellectually. Such a group, with its Marxian and Machian cultural vectors, standing physically outside the scientific establishment, was found only in Zurich and Berne' (page 52). 'The Zurich-Berne circle was predominantly composed of students of Jewish origin - Einstein, Adler, Besso, Solovine' (page 51).

Relativity theory forced the abandonment, in principle, of absolute space and absolute time.

In *The Tao of Physics*, Fritjof Capra remarks the similarities between the forms of awareness implicit in modern physics and the traditional philosophy of Eastern, non-alphabetic cultures. The east bypasses hardware and absolute concepts in favour of percepts, that is, a 'direct, non-intellectual experience of reality.' A number of fundamental characteristics are independent of the mystic's geographical, historical, or cultural ground: 'The most important characteristic of the Eastern world view – one could almost say the essence of it – is the awareness of the unity and mutual interrelation of all things and events, the experience of all phenomena in the world as manifestations of a basic oneness. All things are seen as interdependent and inseparable parts of this cosmic whole; as different manifestations of the same ultimate reality' (*The Tao of Physics*, 174). The East, which never had a phonetic alphabet, never had a Euclid and never developed absolute concepts of space and time. However, now that China is pressing a program of (our) alphabetic literacy without attention to its side-effects, it may be expected soon to develop abstract concepts and a taste for hardware.

Once introduce discontinuity, once challenge any of the properties of visual space, and as they flow from each other, the whole conceptual framework collapses.

Feuer notes that, 'quite apart from the discontinuous electronic transition from one orbit to another, Bohr's theory of the atom departed in its total imagery from the old model of the Newtonian, continuous world ... The Kierkegaardian model reached so deeply into Bohr's thinking that he described the atom in its transitions from one stationary state to another as

possessing a “free choice” like that of the human subject choosing his qualitative leaps from one stage to another.’¹⁴

Kierkegaard’s *Concept of Dread* was published in 1844, the year of the telegraph, to which he alluded in the book as a sinister technology. The telegraph was the first technology of instantaneous communication. Kierkegaard made the discovery that both the creative spirit and human will act through sudden and discontinuous transitions or leaps. The same figure-ground ambiguity obtained between Bohr’s principle of complementarity and Kierkegaard’s dread. ‘To Kierkegaard, dread was the point of intersection of the nature-determined world and the world of the individual free spirit; the person chose between them’ (Feuer, *Einstein and the Generations of Science*, 144). Complementarity served as an escape from single, private, or abstract points of view, focusing on the inherent multiplicity of ‘perspectives’ in the interactions between physical phenomena and human observers. Bohr’s coat of arms displayed the Chinese yang-yin symbols of cosmic complementarity.

Max Planck, Werner Heisenberg, and Louis de Broglie introduced further components of acoustic space into physics with quanta, indeterminacy, resonance, and wave mechanics. Heisenberg simplified the general presentation of quantum mechanics by abandoning ‘the principle of continuity in Riemannian or Euclidean geometry and introduced the suggestion of a “smallest length” to meet certain difficulties in quantum electrodynamics.’¹⁵

Interdeterminacy was a figure-ground problem arising from incongruity between the visual bias of classical science and the new acoustic sensibilities.

In his famous paper of 1927, Heisenberg based the notion of the indeterminacy of the ‘location of an electron’ on the sympathetic interac-

14 Feuer, *Einstein and the Generations of Science*, 136–7. Bohr reviewed his work in the same terms: ‘the author suggested that every change in the state of an atom should be regarded as an individual process, incapable of more detailed description, by which the atom goes over from one so-called stationary state to another ... We are here so far removed from a causal description that an atom in a stationary state may in general even be said to possess a free-choice between various possible transitions to other stationary states’ (*Atomic Theory and the Description of Nature*, 24).

15 Jammer, *Concepts of Space*, 186. Jammer continues: ‘The impossibility of an exact

tion of the phenomena under observation with the instruments and the human observer (the Compton effect). Although obsolesced as a way of doing things, of seeing the world, old visual space was retained as a fiction ('as if ...'). (The same kind of conservatism greeted the new visual space in ancient Greece.) As Max Jammer noted: 'In view of the great mathematical difficulties involved in the construction of a geometry of discontinuous space, however, physics has still to resort to the traditional geometry of a continuous space by a statistical treatment of the concept of length. Thus continuous space resumes its service, even for nuclear physics, but as a convenient fiction for the statistical mathematization of physical reality' (*Concepts of Space*, 188).

Another attack on continuity came from the quarter of logic: Lukasiewicz fashioned a three-valued logic in which things could be true, false, or indeterminate. By attacking determinism and sequentiality, he undermined the autonomy of efficient causality as well as that of history: 'We should not treat the past differently from the future ... Facts whose effects have disappeared altogether, and which even an omniscient mind could not infer from those now occurring, belong to the realm of possibility. One cannot say about them that they took place, but only that they were *possible*. It is well that it should be so. There are hard moments of suffering and still harder ones of guilt in everyone's life. We should be glad to be able to erase them not only from our memory but also from existence' ('On Determinism,' *Polish Logic*, 38-9).

Heisenberg endorsed Lukasciewicz's three-valued logic, and saw the principle of indeterminacy as having similar implications: 'This knowledge of the past is of a purely speculative character, since it can never (because of the unknown change in momentum caused by the position measurement) be used as an initial condition in any calculation of the future progress of the electron and thus cannot be subjected to experimental verification. It is a matter of personal belief whether such a calculation concerning the past history of the electron can be ascribed any physical reality or not' (*The Physical Principles of the Quantum Theory*, 20). As the visual sense moves back into interplay with the other senses, it is natural that rigid chronology becomes fuzzy and uncertain. While these developments occurred in science, our artists were articulating discontinuity and simultaneity for their own publics.

In a further departure from visual absolutism, Louis de Broglie postulated that even matter was constituted by acoustic waves - 'matter waves.'

localization in combination with the determination of the momentum, and the related dualistic wave-particle character of physical reality, can be interpreted as a challenge for a critical revision of the accepted space and time conceptions. In his discussion of electron transitions between stationary states within the atom, Niels Bohr already called such processes "transcending the frame of space and time" (page 189).

'The hypothesis at once showed its heuristic power, for it made possible the derivation of the preferred, stationary, discontinuous orbits that Niels Bohr had assigned to his electrons in correspondence with the experimental spectral data' (Feuer, *Einstein*, 216). The resonant interval of acoustic space is vibratory and discontinuous. As Einstein observed, 'The victory over the concept of absolute space ... became possible only because the concept of the material object was gradually replaced as the fundamental concept of physics by that of the field' (Jammer, *Concepts of Space*, xv).

Figure yielded to ground mosaic, particle to field or resonant wave. De Broglie wrote:

We have been guided by the idea that the corpuscle and its phase wave are not physically different realities. If one reflects one will see that the following conclusion seems to follow: Our dynamics (its Einsteinian form understood) has lagged behind optics; it still is in the stage of geometrical optics. If it seems to us today probable enough that every wave comports concentrations of energy, by contrast the dynamics of a material point undoubtedly conceals a propagation of waves, and the true sense of the principle of least action is to express a concordance of phase. ('Recherches sur la Théorie de Quanta,' 33)

The philosopher Harald Høffding, the Danish William James, was influenced by Kierkegaard and, in turn, greatly influenced his student, Niels Bohr. In *The Philosophy of Religion*, he noted that 'the deepest foundation for the principle of natural causation is the need for continuity, which lies in the nature of our unconsciousness.' As Feuer shows (*Einstein*, 112ff.), his unique contribution to scientific thought was in exploring discontinuity. It was discontinuity, he wrote, 'which more than anything else brings new content, releases locked powers, and opens up the greatest tasks in the realm of life no less than in the realm of science' (Hoffding, *The Problems of Philosophy*, 8).

Commenting on the fallacy of specialization, Milič Čapek points out that chronological simultaneity was discovered as implicit in the discontinuous interface of space and time, first formulated by Hermann Minkowski in 1908:

As soon as this fusion of space and time was proposed, certain psychological influences came into play and peculiarly distorted its true meaning. The very choice of the word which Minkowski used for designating this fusion was characteristic: the four-dimensional continuum of points-events was called by him 'the world' (die Welt). This indicated that he understood this fusion as an operation in which the temporal component was absorbed by the spatial. In this respect Minkowski was not alone. Emile Meyerson in his philosophical commentary on the theory of relativity gives a long list

of thinkers, both philosophers and physicists, who regarded the proposed fusion as a *spatialization of time*; according to them, time itself has become an additional fourth dimension of space in which all events, 'past,' 'present' and 'future' were juxtaposed. (*The Philosophical Impact of Contemporary Physics*, 154)

The artists of our culture, 'the antennae of the race,' had tuned in to the new ground and begun exploring of discontinuity and simultaneity.

The service environment of electric information was developed throughout the nineteenth century with the aid of, first, telegraph (and the telegraph press), then the telephone. Electrical experimentation had been going on for years (e.g., by Faraday) before the telegraph arrived, paving the way for the new technology and helping to establish its ground or service environment. The new electric sensibility, the percept of simultaneity, is central to the development of modern poetry as well. T.S. Eliot opens his *Four Quartets* with:

Time present and time past
Are both perhaps present in time future,
And time future contained in time past. ...
What might have been and what has been
Point to one end, which is always present.

In his 1917 essay 'Tradition and the Individual Talent,' Eliot observed that the individual functions as a figure against 'Tradition,' the simultaneous ground. 'Conformity' between the two is a con-forming, or mutual figure/ground shaping or metamorphosis in which past and present modify each other:

What happens when a new work of art is created is something that happens simultaneously to all the works of art which preceded it. The existing monuments form an ideal order among themselves, which is modified by the introduction of the new (the really new) work of art among them. The existing order is complete before the new work arrives; for order to persist after the supervention of novelty, the *whole* existing order must be, if ever so slightly, altered; and so the relations, proportions, values of each work of art toward the whole are readjusted; and this is conformity

between the old and the new. Whoever has approved this idea of order, of the form of European, of English literature will not find it preposterous that the past should be altered by the present as much as the present is directed by the past. (Eliot, *Selected Essays*, 15)

The awareness of this resonant interplay he termed the 'historical sense,' a perception that 'the whole of the literature of Europe from Homer and within it the whole of the literature of [one's] own country has a simultaneous existence and composes a simultaneous order' (page 14).

The French symbolist poets responded immediately and intuitively to the ground introduced by the telegraph by retrieving pre-alphabetic forms of discontinuous resonance and mimesis. Baudelaire announced the rediscovery of audience as mimetic ground for a work: his reader puts on and wears the art as a means of correcting not his concepts but rather his perception. The reader is a mask-wearer ('hypocrite'), the poem the *mask*: 'Hypocrite lecteur, – mon semblable, – mon frère!'

Edgar Allan Poe spoke of a 'suggestive indefiniteness' as preferable to the clarity and distinctness demanded by visual bias. This view was picked up by the symbolist Mallarmé and reformulated. 'To name an object,' he says, 'is to do away with three-quarters of that delight in a poem which consists in unravelling it bit by bit. It must be suggested' (*Oeuvres Complètes de Stéphane Mallarmé*, 869; our translation). The ground (audience) and figure (poem) are increasingly in interplay. In 'The Philosophy of Composition' Poe upset romanticized notions of artistic 'inspiration' by insisting on the rhetorical principle of beginning with the desired effect.

The audience, as ground, shapes and controls the work of art.

Théophile Gautier, in a preface to Baudelaire's *Les Fleurs du mal*, expanded the principles in Poe's 'Philosophy of Composition,' adding an insistence on the musical value of poetry, on pure sculptural form, and on the notion of correspondence between the senses, developed on the basis of Baudelaire's 'Les parfums, les couleurs et les sons se confondent.' The senses, intellect, and emotions are in abrasive interplay as a mosaic of author, reader, and poem.

To cite but one example from a variety of such experiments, the English 'Imagist' school approached the matter only slightly differently: 'Imagism is not the facile presentation of images or pictures; it is hard, clear, unblurred statement, whether it uses metaphor or not. It must be done by

means of the chosen "exact word". "The exact word," says Mr. Aldington, "does not mean the word which exactly describes the object in itself, it means the exact word which brings the effect of that object before the reader as it presented itself to the poet's mind at the time of writing the poem" (J. Issacs, *The Background of Modern Poetry*, 45). As in physics, the 'object' was being replaced by a ground-mosaic. The imagists were also fascinated by the Japanese haiku ('stop-short') form, which involved the careful juxtaposition of two situations without connections: the words stop and the meaning goes on. For example, Ezra Pound's 'Fan-piece, for her Imperial Lord':

O fan of white silk,
Clear as frost on the grass-blade.
You also are laid aside.

or his more modern 'In a Station of the Metro':

The apparition of these faces in the crowd;
Petals on a wet, black bough.

Pound and Eliot are the Cicero and Quintilian of our time, tirelessly working to bring the language up to date and to retrieve for modern artistic enterprise the ancient modes of rhetoric and grammar.¹⁶ Pound's energy and encyclopedic erudition impelled Eliot to nominate him as his ideal poet, in the same terms used in our own tradition of learned studies (the *translatio studii* from Cicero forward to Ramus) for the ideal orator, scholar, and prince:

The historical method is, of course, the one which suits Mr. Pound's temperament: it is also a conscious and consistent application of a procedure suggested by Browning, which Mr. Pound applies more consciously and consistently than Browning did. Most poets grasp their own time, the life of the world as it stirs before their eyes, at one convulsion or not at all. But they have no method for closing in upon it. Mr. Pound's method is indirect and one extremely difficult to pursue. As the present is no more than the present existence, the present significance, of the entire past, Mr. Pound proceeds by acquiring the entire past: and when the entire past is acquired, the constituents fall into place and the present is revealed. Such a method involves immense capacities of learning and of dominating one's learning, and the peculiarity of expressing oneself through historical masks. Mr. Pound has a unique gift for expression through some phase of past life. This is not archaeology or pedantry, but one method, and a very high method of poetry. It is a method which allows of no arrest, for the poet imposes

16 Cf. Marshall McLuhan, 'Pound, Eliot and the Rhetoric of "The Waste Land"' (*New Literary History*, X [1978-9]: 557-80).

upon himself, necessarily, the condition of continually changing his mask; *hic et ubique*, then we'll shift our ground. (Eliot, 'The Method of Mr. Pound,' *The Athenaeum*, 1065)

The great Irish poet W.B. Yeats turned to the Celtic oral bardic tradition as a means of revivifying the poetry of his time and giving it proper acoustic stress. He had spent his life studying Eastern and Greek and medieval mythologies. In 1937 he said, in retrospect: 'I have spent my life in clearing out of poetry every phrase written for the eye, and bringing all back to syntax that is for the ear alone ... "Write for the ear," I thought, so that you may be instantly understood as when actor or folk singer stands before an audience. I would have poetry turn its back on all that modish curiosity, psychology' ('An Introduction for My Plays,' *Essays and Introductions*, 529–30).

Poe had written of 'a suggestive indefiniteness' as an essential ingredient of true musical poetry, referring to the power of resonance and interplay of acoustic space as opposed to the rigid frameworks of visual space. In a review of Thomas Moore's poetry, Poe commented on the (discontinuous) double-plot as another fecund interval: 'The term *mystic* ... is here employed in the sense of Schlegel and of most other German critics. It is applied by them to that class of composition in which there lies beneath the transparent upper current of meaning an under or *suggestive* one. What we vaguely term the *moral* of any sentiment is its mystic or secondary expression. It has the vast force of an accompaniment in music' (Issacs, *The Background of Modern Poetry*, 23).

When Isaac Newton, operating with the assumptions of visual space, discussed the general laws of nature, he regarded them as manifest qualities: 'their Truth appearing to us by Phaenomena, though their Causes be not yet discover'd. For these are manifest Qualities, and their causes only are occult.' Newton viewed acoustic intervals and ground as interfering with the advance of science: 'such occult Qualities put a stop to the Improvement of Natural Philosophy, and therefore of late Years have been rejected' (*Opticks*, 401).

Newton, and 'proper scientific method' after him, conducted attention to 'continuous description' of experimental phenomena instead of to causes.

In the Middle Ages, the usual practice, continued since antiquity, was to employ multilevel causality as interpretation of the 'Book of Nature' and

multilevel exegesis as interpretation of the 'Book of Scripture.' In both systems, the levels were resonant and simultaneous, and the 'two Books' formed an acoustically structured double-plot; like wave and particle, each served as ground for the other. With the final advent of print and visual space, the resonance was stilled. The double-plot structure had always been regarded as both metamorphic and aetiological, as revealing form (and formal causality), as, for example, in the *Cosmographia* of Bernard Sylvestris. Paradoxically, causality was banished in the Renaissance as unscientific, and only sequential 'efficient cause' remained, as Mario Bunge relates:

The Aristotelian teaching of causes lasted in the official Western culture until the Renaissance. When modern science was born, formal and final causes were left aside as standing beyond the reach of experiment; and material causes were taken for granted in connection with all natural happenings – though with a definitely non-Aristotelian meaning, since in the modern world view matter is essentially the subject of change, not 'that out of which a thing comes to be and which persists.' Hence, of the four Aristotelian causes only the efficient cause was regarded as worthy of scientific research. (*Causality*, 32)

With efficient cause, all study of effects (i.e., of ground) is set aside, this having been the whole point of causality. With the new 'long chains' of 'causes,' each efficient cause results in another efficient cause, and so on. The study of effects, because discontinuous, appears as occultism, as Newton observed. But with intervals and such double-plot structures as wave/particle complementarity, aetiology returned to modern science.¹⁷ In literature, the great retrieval and exploration of the double-plot acoustic structure was James Joyce's *Ulysses*. His contemporary T.S. Eliot wrote:

It is here that Mr. Joyce's parallel use of the *Odyssey* has a great importance. It has the importance of a scientific discovery. No one else has built a novel upon such a foundation before: it has never before been necessary ...

In using myth, in manipulating a continuous parallel between contemporaneity and antiquity, Mr. Joyce is pursuing a method which others must pursue after him. They will not be imitators, any more than the scientist who uses the discoveries of an Einstein in pursuing his own, independent, further investigations. It is simply a way of controlling, of ordering, of giving a shape and a significance to the immense panorama of futility and anarchy which is contemporary history. ('*Ulysses*, Order and Myth,' *James Joyce: Two Decades of Criticism*, 201)

17 So, Niels Bohr wrote that quantum mechanics, by its essence, entails 'the necessity of a final renunciation of the classical ideal of causality and a radical revision of our attitude toward the problem of physical reality' (*Atomic Theory and Human Knowledge*, 60).

While Poe and the Symbolists were exploring the irrational in literature, Freud had begun to explore the resonant figure/ground double-plot of the conscious and unconscious.

Arnold Schoenberg abandoned the visual strictures of tonality in composition for the 'multi-localism' of atonality:

in the years when Freud was diving into – and uncovering – the Unconscious, so too was Schoenberg, because in a very real sense, having abandoned tonality, and with it the 'subconsciously functioning sense of form which gave a real composer an almost somnambulistic sense of security in creating, with utmost precision, the most delicate distinctions of formal elements,' Schoenberg had only his Unconscious to look to as potential source of the means and principles of unity and organization which would replace the lost paradise of tonality. (D. Mitchell, *The Language of Modern Music*, 39)

As Donald Mitchell remarked, 'By the end of the nineteenth century the governing principle of tonality, which had created and served a language of music of wonderful richness, had become so weakened that it could no longer divulge the new vocabulary which was required to match the new images of composers like Schoenberg and Stravinsky' (pages 58–9).

Atonality in music represents the abandonment of the 'central key,' that is, of a single perspective or organizing frame to which all elements of a composition are related. That is, tonality served as a figure to which to relate other figures in an abstract way: in the mosaic of acoustic space, each element creates its own space, and everywhere is the centre of the sphere. Using atonality, as it were (as in acoustic space), 'wherever you are at the moment' is the key you're in, the tonal centre, and the governing consideration is the nature of and effect on the overall pattern. Such space is not uniform but rather a multidimensional dynamic of figure and ground. Schoenberg wrote: 'THE TWO-OR-MORE DIMENSIONAL SPACE IN WHICH MUSICAL IDEAS ARE PRESERVED IS A UNIT. Though the elements of these ideas appear separate and independent to the eye and the ear, they reveal their true meaning only through their cooperation, even as no single word alone can express a thought without relation to other words. All that happens at any point of this musical space has more than a local effect. It functions not only in its own plane but also in all other directions and planes' (*Style and Idea*, 109).

Jeremy Rifkin shows that, thanks to the computer, visual, centralized time is as obsolete as visual space. The Central Processing Unit orchestrates a ballet of operations in simultaneous times, chronology in counterpoint.

The second distinguishing feature of the computer is its temporal creativity. David Bolter, author of *Turing's Man*, points out that while clocks are all set to the same exacting sequence, duration, and rhythm, the computer is free to manipulate all three of these temporal dimensions by merely changing the program.

The computer imprints a unique temporality into every program. Every computer has an electronic timer in its central processor. The timer releases electrical impulses at specific intervals allowing the central processor 'to execute one by one the instructions given in its program'

The electronic timer provides the measure by which the processor ticks its way through its calculations, ensuring that the electrons have settled down, that one step is finished before the next is begun. The instructions themselves may require varying amounts of time ... This variation must be taken into account by the sequencing mechanism, which decides how many pulses of time to allot to each instruction. [Daniel Bell, 'The Clock Watchers,' 55]

Bolter argues that time is a resource for the computer just as coal is a resource for the steam engine. Time is used to transform 'billions of countless impulses of electrical energy into useful instructions for manipulating data.' The difference, then, between clocks and computers is that 'an ordinary clock produces only a series of identical seconds, minutes and hours; a computer transforms seconds or microseconds or nanoseconds into information.' With this new timepiece, time is no longer a single fixed reference point that exists external to events. Time is now 'information' and is choreographed directly into the programs by the central processor. With computers we enter the age of 'multiple times.' Every program has its own sequences, durations, rhythms, its own unique time.

While the clock establishes the notion of artificial time segments – hours, minutes, and seconds – it remained tied to the circadian rhythm. The clock dial is an analogue of the solar day, an acknowledgment that we perceive time revolving in a circle, corresponding to the rotation of the earth. In contrast, computer time is independent of nature: it creates its own context. (*Time Wars*, 101–2)

In acoustic space, every thing or event creates its own space, and time. Since the invention of huge parallel computers, for sharing the 'inner workload,' tabletop models now comprise dozens of mini-computers: soon, overall choreography may become necessary.

Georg von Békésy in his *Experiments in Hearing* offers a strategy for bypassing the difficulties that visually oriented people (those who regard

visual space as 'common sense') have in conceiving of acoustic space. As one proficient in auditory spaces, he is keenly aware of the difficulty of talking about the space of hearing, for the acoustical is necessarily a world in 'depth.' It is of the utmost interest that in trying to elucidate the nature of hearing and of acoustic space, von Békésy should deliberately avoid viewpoint and perspective in favour of mosaic-field. And to this end he resorts to two-dimensional painting as a means of revealing the resonant depth of acoustic space.

It is possible to distinguish two forms of approach to a problem. One, which may be called the theoretical approach, is to formulate the problem in relation to what is already known, to make additions or extensions on the basis of accepted principles, and then to proceed to test these hypotheses experimentally. Another, which may be called the mosaic approach, takes each problem for itself with little reference to the field in which it lies, and seeks to discover relations and principles that hold within the circumscribed area.

A close analogy to these two approaches may be found in the field of art. In the period between the eleventh and seventeenth centuries the Arabs and the Persians developed a high mastery of the arts of description ...

Later, during the Renaissance, a new form of representation was developed in which the attempt was made to give unity and perspective to the picture and to represent the atmosphere ...

When in the field of science a great deal of progress has been made and most of the pertinent variables are known, a new problem may most readily be handled by trying to fit it into the existing framework. When, however, the framework is uncertain and the number of variables is large the mosaic approach is much the easier.¹⁸

18 *Experiments in Hearing*, 4. Siegfried Giedion describes cubism: 'It views objects relatively - that is, from several points of view, no one of which has exclusive authority. And in so dissecting objects it sees them simultaneously from all sides - from above and below, from inside and outside. It goes around and into its objects. Thus, to the three dimensions of the Renaissance, which have held good as constituent facts throughout so many centuries, there is added a fourth one - time' (*Space, Time and Architecture*, 436). Mitchell (*The Language of Modern Music*, 75) comments: 'The presentation of objects from several points of view,' he continues, 'introduces a principle which is intimately bound up with modern life - simultaneity'; and that very principle is no less intimately bound up with much modern architecture, where we may comprehend inside and outside - and many other hitherto hidden relations - simultaneously; an experience which, previously, was dependent upon chronological appraisal of isolated relations. Apprehension of the total relation between all the parts (or planes) could only be accomplished by a feat of mental reconstruction. A simple example of the kind of simultaneity Giedion has in mind is the combined profile and full face which we encounter in Picasso's portrait *L'Arlésienne*, painted in the early years of the twentieth century. Another is Le Corbusier's astounding Villa Savoye (1929-31), which conveys a simultaneity of exterior and interior, of inner and outer space, with breathtaking virtuosity.'

The mosaic approach is not only 'much the easier' in the study of the simultaneous, which is the auditory field; it is the only relevant approach. In the iconic and mosaic form there is no attempt to reduce space to a single, uniform, and connected character such as was done with perspective: it is a simultaneous field of relations. Mosaic, iconic form is discontinuous, abrupt, and multilevelled, as is iconic art. The 'two-dimensional' mosaic or painting is the mode in which there is muting of the visual as such, in order that there may be maximal interplay among all of the senses. Such was the painterly strategy 'since Cezanne,' to paint as if you held, rather than as if you saw, objects.

Cubism ('multi-locationalism') is one of the painterly forms of acoustic space.

Paralleling Schoenberg, cubist painting abandons single fixed points of view along with Euclidean geometry and perspective. The subject is presented, not a merely seen, but as *known*, from many sides simultaneously. Siegfried Giedion explains how, by using simultaneity and transparency, artists escaped the static container that was visual space: 'Around 1910 Picasso and Braque, as a consequence of a new conception of space, exhibited the interiors and exteriors of objects simultaneously. In architecture Le Corbusier developed, on the same principle, the interpenetration of inner and outer space ... But this interpenetration of space at large and space-particles could have further development only in an age whose science and art both perceived space as essentially many-sided and dynamic.'¹⁹

The new philosophies, logics, and linguistics of our time are also born of the shift from visual to acoustic space and modes of awareness, under the same pressure from the ground of electric technology. De Broglie saw a rapprochement between wave mechanics and the philosophy of Bergson.²⁰ As Wyndham Lewis explains, in the nineteenth and early twentieth

19 Giedion, *Space, Time and Architecture*, 521. The theme of Mitchell's study is that atonality and cubism are formally equivalent: 'It seems to me therefore, that to draw a parallel between Cubism and the New architecture, on the one hand, and Schoenberg's method on the other, is to plot a genuine identity of pattern between the arts in a given period; and, in fact, the parallel between the development of Cubism and serial technique runs more strictly than I may have suggested' (Mitchell, *The Language of Modern Music*, 77; *vide* also pages 77-93, and *passim*)

20 Feuer (*Einstein*, 220-1) observes: 'Louis de Broglie saw a confirmation of this view in the developments of quantum physics: "If Bergson could have studied quantum theory in detail, he would have observed that in the image of the evolution of the physical world

centuries, the arts, especially painting, took their cue from the sciences.²¹ It was in the heyday of radio, he notes, that artists switched from the natural sciences to politics and ideology and philosophy, from hardware to software, from 'outside' to 'inside,' in a sense abolishing the merely outside world:

Before the coming of Politics, Science dominated our scene. Artistic extremism, prior to the 'twenties of this century, always was in some way related to Science. The Impressionist revolution for instance in the last century was purely scientific in inspiration: or to take an illustration from literature, the unorthodox form taken by the narrative art in the hands of Henry James derived from the new science of psychology, in which his

which it offers us, at each instant nature is described as if hesitating between a multiplicity of possibilities, and he could doubtless have repeated as in *The Creative Mind* that 'time is this very hesitation or it is nothing.' Quantum theory also seemed to de Broglie to have confirmed Bergson's insight that reality was characterized by interpenetration, by fusion of its components: individualities such as atoms or sensations, related to each other by purely external relations were demarcated for practical reasons, but were not intrinsic to the nature of reality. Reality was more akin to a symphony of music in which the notes modify each other, compenetrating in melody. So de Broglie declared that in wave mechanics, too, it was impossible, in dealing with a group of particles of the same physical nature, to give to each a distinct individuality. For that is possible only when one can distinguish particles through their different spatial positions, whereas 'in wave mechanics, one cannot in general attribute to particles well-defined positions in space . . . if their regions of possible presence merge or overlap – which will most often happen – how can one follow their individuality? Thus wave mechanics has given up individualizing particles and following the evolution of each separately with the course of time' (quotations in the above passage were from de Broglie, 'Recherches sur la théorie de Quanta,' 57 and 59).

- 21 Cf. Wyndham Lewis, *The Demon of Progress in the Arts*, 23: 'In the first decades of the last century painting, to start with, merely mirrored the mighty battle of the new and the old; so there was a grand cleavage into two schools of painting, the classicism of Ingres standing confronted by the romanticism of Delacroix or Géricault. A new factor becomes apparent after that: namely the invasion of the visual arts by the spirit of scientific discovery – the French painters were seized by the desire to make their imitation of nature more scientifically exact. They studied the theory of colour and this eventually led to the following system: (1) the colours were, as usual, squeezed out upon the palette; (2) the colours were not mixed with one another, neither on the palette nor on the canvas, small dabs of each colour were transferred intact from palette to canvas; (3) the theory was that the colours would mix in the eye of the spectator – they must never be allowed to mix anywhere else, but to preserve their original purity. The Pointillistes adhered most rigidly to this rule, and were the culmination of these experiments. A borrowing of a quite different kind from science, in the present century, was jeeringly named Cubism. So, from the middle of the last century, a pseudo scientific impulse had been apt to start some school; reflected from science, there has been the impulse incessantly to perfect, constantly discarding what has been bettered, like yesterday's model in the motor-car industry; and last, but not least, the fiery millennial zeal of the social revolutionary emotionally galvanizing everything, and instilling the painter with a quite irrational belief in the rightness of his latest mannerism.'

brother William was a pioneer. Artists behaved as if they were attempting to outstrip each other in novelty of technical invention – as though they were men-of-science, and art were an affair of technical discovery. This pseudo-scientific snobbism still haunts the notion of being artistically 'advanced': but that is as it were a time-lag in publicity technique (*The Writer and The Absolute*, 43–4)

Tom Wolfe has discovered this same kink in our arts or reversal from outside to inside, from the big public to the in-group. His two studies *The Painted Word* and *From Bauhaus to Our House* detail the electric urge to drive inward:

For that matter, in most of the higher arts in America prestige was now determined by European-style clerisies. By the mid-1960s, painting was a truly advanced case. The Abstract Expressionists had held on as the ruling compound [in-group] for about ten years, but then new theories, new compounds, new codes began succeeding one another in a berserk rush. Pop Art, Op Art, Minimalism, Hard Edge, Color Field, Earth Art, Conceptual Art – the natural bias of the compounds toward arcane and baffling went beyond all known limits. The spectacle was crazy, but young artists tended to believe – correctly – that it was impossible to achieve major status without joining in the game. In the field of serious music, the case was even more advanced; in fact, it was very nearly terminal. Within the university compounds, composers had become so ultra-schoenbergian, so exquisitely abstract, that no one from the outside world any longer had the slightest interest in, much less comprehension of, what was going on. In the cities, not even that Gideon's army known as 'the concert-going public' could be drawn to an all-contemporary program.²²

22 Tom Wolfe, *From Bauhaus to Our House*, 88–9. Such concerts 'took place only in university concert halls': 'Here on the campus the program begins with Scott Joplin's "Maple Leaf Rag," followed by one of Stockhausen's early compositions, "Punkte," then Babbitt's Ensembles for Synthesizer, a little Easley Blackwood and Jean Barraqué for a change of pace, then the committed plunge into a random-note or, as they say, "stochastic" piece for piano, brass, Moog synthesizer, and computer by Iannis Xenakis. The program winds up with James P. Johnson's "You Gotta Be Modernistic." Joplin and Johnson, of course, are as cozy and familiar as a lullaby, but they are essential to the program. The same thirty-five or forty souls, all of them faculty members and graduate students, make up the audience at every contemporary musical event. The unspeakable fear is that not even they will show up unless promised a piece of candy at the beginning and a piece of candy at the end. Joplin and Johnson numbers are okay because both men were black and were not appreciated as serious composers in their own day' (pages 89–90).

The art compound with its clerisy, as Wolfe terms the circle of high priests and true believers, revives the *vates* of the Roman renaissance of the emperor Augustus. The *vates*, or poet-priests at the temple of Palatine Apollo – Horace, Virgil, and company – responded to sudden recent advances in craft and the use of the imagination, by retrieving and updating tradition against the merely private or sentimental use of artistic emotion. The Roman term combined the notions of priest and soothsayer with that of serious artist charged with responsibility for maintaining and updating language and culture and their relation to tradition. Horace wrote:

Quodsi me lyricubus vatibus inseres

Sublimi feriam sidera vertice.

Lyricus vates: the patina of time and tradition prevents us from realizing the full paradox of this *callida iunctura*, which would have astounded Lucrotius, for example. The noun is Augustan: the adjective is Alexandrian (it was Callimachus who had wanted to put lyricism back into poetry). The whole history of the Augustan experiment in poetry can be read in these two words.²³

In *The Painted Word*, Wolfe shows how the press critics made themselves the theologians, and the artists, the priests, of each new sect and style (way of seeing) of the TV and the colour-TV periods. Architects had no equivalent army of critics and reviewers to co-opt, no PR machine to hand to mobilize, so they formed 'compounds' or tribal in-groups. The whole purpose of the compound was not to adapt or develop outwardly but to exploit and explore inner modes of being and complex sensibility.

In his discussion of 'the fallacy of specialization,' Čapek observed:

The impossibility of separating space from time was for the first time clearly formulated by H. Minkowski in 1908. It was then that the concept of the relativistic space-time continuum was explicitly formulated, although mathematically it was implied in Lorentz's transformation ...

According to Einstein himself, 'becoming' in the three-dimensional space has been transformed into 'being' in the world of four dimensions; according to Herman Weyl, 'the objective world *is*, it does not become'; it appears to become only to our 'blindfolded consciousness' (*abgeblendete Bewusstsein*) which creeps along its 'world line' into the future. (*The Philosophical Impact of Contemporary Physics*, 158–9)

23 J.K. Newman. *Augustus and the New Poetry*, 130. Newman introduces the quote as follows: 'There are five occurrences of *vates* in Odes I–III (I,1,35; I,31,2; II,6,24; II,20,3; and III,19, 15) and no use of *poeta* at all. The first example is in the programme poem at the beginning of the collection (the metre indicates its nature)'

The chiaroscuro of 'Becoming' as a sequential process has been pushed aside and replaced by the iconic absolutism of 'Being.'

Being is multidimensional and environmental and admits of no point of view. As with any other ground, Being cannot be perceived directly; it has to be seen by side-effects. Traditionally, the Westerner had placed stress on goals and becoming, so the Chinese observed that he was 'always getting ready to live.'

As all conceptual absolutes had been dissolved by the new electric ground and had been replaced by percepts, the first reaction, in philosophy as elsewhere, was to regard the result as simply solipsism. Solipsism is going through the old motions, as if concepts still reigned, minus the ground-continuum of visual space: it is the prelude to transcendentalism and occultism, which bypass individualism ('a man all wrapped up in himself makes a very small package').

It was visual space in its aspect of container that was reflected in thinking of an 'inside' or 'outside' world. Prior to the alphabet there was no 'outside world,' no apparent separation of inner and outer, only the metamorphic flux of modes of being. Private identity is pushed to its extreme, or breakdown point, with solipsism, and it may well be that solipsism, on a corporate scale, is what we call tribalism. With the return of acoustic space through the ground of electric technology, the visual forms of detachment and of separation of inside and outside were dissolved. Solipsism is the first response: there is no (abstract) 'outside world' - all 'reality' is fantasy - and 'the OTHER' poses a challenge.

Solipsism is using percepts while behaving as if using concepts, which is why it seems to have pervaded modern linguistics and philosophy. The reaction, in art and physics, was to explore the flux of interaction of observer and observed, as in the Symbolists and Moderns and the Cubists. Capra remarked that the recognition by science of the interaction of the observer and the observed phenomena implies, ultimately, 'that the structures and phenomena we observe in nature are nothing but creations of our measuring and categorizing mind.' He goes on to observe a crucial correspondence:

That this is so is one of the fundamental tenets of Eastern philosophy. The Eastern mystics tell us again and again that all things and events we perceive are creations of the mind, arising from a particular state of consciousness and dissolving again if this state is transcended. Hinduism

holds that all shapes and structures around us are created by a mind under the spell of *maya*, and it regards our tendency to attach deep significance to them as the basic human illusion. Buddhists call this illusion *avidya*, or ignorance, and see it as the state of a 'defiled' mind. In the words of Ashvaghosha (*The Awakening of Faith*, 79, 86), 'When the oneness of the totality of things is not recognized, then ignorance as well as particularisation arises, and all phases of the defiled mind are thus developed ... ALL phenomena in the world are nothing but the illusory manifestation of the mind and have no reality of their own.' (*The Tao of Physics*, 292-3)

There is no individualism in Eastern or oral cultures.

The same principles are present, implicitly, in Heisenberg's uncertainty principle. Heisenberg himself longed to escape the world of concrete things and to replace it with transcendent 'forms.'²⁴ In the absence of visual space, the only available technique for avoiding solipsism is to press solipsism to the extreme – to nihilism. Capra shows how this shift is already implicit in physics: the same transformation has occurred in philosophy and metaphysics. Edmund Husserl proposed a new strategy for philosophy, phenomenological philosophy, founded in a new technique – bracketing. 'Absolute Being' and 'absolute experiences' are the objective: whereas scientists pursue reflections in accordance with the 'logic of experience.'

At the phenomenological standpoint, acting on lines of general principle, we *tie up* the performance of all such cogitative theses, i.e., we 'place in brackets' what has been carried out, 'we do not associate these theses' with our new inquiries, instead of living in them and carrying *them* out, we carry out acts of *reflexion* directed towards them, and these we appre-

24 Feuer, *Einstein and the Generations of Science*, 187: 'The efforts of representational art to conform to the familiar patterns of the common-sense, visual world were to the surrealist what models of the classical quantum physicists were to Werner Heisenberg and the new generation; the latter repudiated the efforts to picture the electrons as moving in planetary orbits around the atomic nucleus. André Breton called similarly for the liberation of artists from the limitation of the laws of perspective, gravity, and extension. It was part and parcel of their project to "overturn the foundations of our stupid bourgeois culture," and to "revolutionize our moral and social values." The quest was for a "super-reality."

'As Heisenberg was disaffected from the everyday realities of material objects and longed to see them superseded by spiritual mathematical forms, that is, Platonic ideas, so the surrealist strove to "burst the bonds of reason of narrow rationalism," to permeate the world of reality with that of dreams to engender a "super-reality."'

hend as the *absolute* Being which they are. We now live entirely in such acts of the second level, whose datum is the infinite field of absolute experiences – *the basic field of Phenomenology*. (Husserl, *Ideas: General Introduction to Pure Phenomenology*, 155)

Responding to the sudden disappearance of visual space, Husserl adopts the Easterner's method of regarding the 'real world' as a manifestation of a 'particular state of consciousness.' 'Reality,' he wrote, 'that of the thing taken singly as also that of the whole world, essentially lacks independence.' In other words, the inside/outside visual dichotomy has dissolved. He continues, 'Reality is not in itself something absolute, binding itself to another only in a secondary way, it is, absolutely speaking, nothing at all, it has no "absolute essence" whatever, it has the essentiality of something which in principle is *only* intentional, *only* known, consciously presented as an appearance.'²⁵

His technique is the 'bracketing' of 'phenomenological reduction' – anticipated somewhat by Marvell in 'The Garden':

Meanwhile, the mind, from pleasure less,
Withdraws into its happiness.
The mind, that ocean where each kind
Does straight its own resemblance find;
Yet it creates, transcending these,
Far other worlds, and other seas;
Annihilating all that's made
To a green thought in a green shade.

Husserl's 'reduction' creates a new split between inner and outer experience, in order to drive ever more inward:

instead of naively *carrying out* the acts proper to the nature-constituting consciousness with its transcendent theses, and so forth – we set all these theses 'out of action,' we take no part in them; we direct the glance of apprehension and theoretical inquiry to *pure consciousness in its own absolute Being*. It is this which remains over as the 'phenomenological residuum' we were in quest of: remains over, we say, although we have 'Suspended' the whole world, with all things, living creatures, men, ourselves included. We have literally lost nothing, but have won the whole

25 Husserl, *Ideas*, 154. He reiterates: 'What is essential for our purpose is to see upon evidence that the phenomenological reduction, as a means of disconnecting us from the natural standpoint and its general thesis, is possible, and that, when carried out, the absolute or pure transcendental consciousness is left over as residuum, to which it is then absurd to ascribe reality (Realität)' (page 170).

of Absolute Being, which, properly understood, conceals itself in all transcendences, 'constituting' them within itself.²⁶

Phenomenology is dialectic in ear-mode – a massive and decentralized quest for roots, for ground.

Husserl includes the occult or psychic experience, as indicating and as a part of transcendent consciousness. Here his affinities with Eastern mysticism are most in evidence, that is, with the tenet that 'all things and events we perceive are creations of the mind, arising from a particular state of consciousness and dissolving again if that state is transcended.'

Even psychical states point to the ordering conditions of absolute experiences in which they are constituted and take on the intentional and in its way transcendent form 'state of consciousness.'

Certainly an incorporeal and, paradoxical as it may sound, even an inanimate and non-personal consciousness is conceivable, i.e., a stream of experience in which the intentional empirical unities, body, soul, empirical ego-subject do not take shape, in which all these empirical concepts, and therefore also that of *experience in the psychological sense* (as experience of a person, an animal ego), have nothing to support them, and, at any rate no validity. (Husserl, *Ideas*, 167)

Martin Heidegger has found a variation on the theme. For him, too, the actual is not a first consideration: actuality emerges from a 'standing reserve' of unrealized possibilities that were obscured or brushed aside by act. 'The essence of modern technology lies in Enframing. Enframing belongs within the destining of revealing' (*The Question Concerning Technology*, 25). 'Enframing,' he explains,

26 Husserl, *Ideas*, 154–5. For detail: 'In the first place it goes without saying that with the suspending of the natural world, physical and psychological, all individual objectivities which are constituted through the functional activities of consciousness in valuation and in practice are suspended – all varieties of cultural expression, works of the technical and of the fine arts, of the sciences also (so far as we accept them as cultural facts and not as validity-systems), aesthetic and practical values of every shape and form. Natural in the same sense are also realities of such kinds as state, moral custom, law religion. Therewith *all the sciences natural and mental*, with the entire knowledge they have accumulated, undergo disconnexion as sciences which require for their development the natural standpoint' (page 171).

'is the gathering together that belongs to that setting-upon which sets man upon and puts him in position to reveal the real, in the mode of ordering, as standing-reserve. As the one who is challenged forth in this way, man stands within the essential realm of Enframing ... The essence of modern technology starts man upon the way of that revealing through which the real everywhere, more or less distinctly, becomes standing-reserve. (*The Question Concerning Technology*, 24)

Heidegger quite accurately observes that modern technologies, electric media, are responsible for the return to acoustic and Eastern forms of awareness, which, as we shall see in the next chapter, render experience discarnate.

Heidegger's language is driven to incomprehensibility by tortured translation. In the German, however, he is witty and concise, and his discussions pay close attention to the play of etymologies in his terms, in an evident attempt to retrieve grammatical stress as a new mode of dialectic. 'Enframing' is not a batch of concepts, but a special technique of perception that reveals the ground. Since 'the actual' emerges as a figure from the ground of 'standing reserve,' it is the latter realm that becomes for him the phenomenologist's quarry. Heidegger is using Husserl's rubric that 'the possible precedes the actual,' which is to observe abstractly that ground comes before figure. He has not noted that the ground is formed as a mosaic, structured acoustically, nor that its structure is entirely due to its interface with figures.

Like the physicists, Heidegger is trying to do the new thing in the old way: he has retrieved percepts as a tool for exploring the occult (hidden) area, but the manner is stiii abstract (visual).

There is in Heidegger still no sense of interplay between figure and ground; the attention has just been shifted from one to the other without trying to take the new thing on its own terms. That is, *ground* cannot be dealt with conceptually or abstractly: it is ceaselessly changing, dynamic, discontinuous and heterogeneous, a mosaic of intervals and contours. As von Békésy discovered, the appropriate form of awareness is acoustic-tactile-kinetic and alive to the stress and coercion that each exerts on the other. The

necessary training is not available in philosophy and dialectic. Yet it does exist both in the arts as training of perception, and in our Western learned tradition as grammatical training of critical awareness for application to both the written book and the Book of Nature.

In the passage quoted above, Heidegger seems to insist that reality will be revealed when all act has, through the ground of electric technology, been obliterated or relegated back to the realms of potencies: anything that initiates that process constitutes the 'realm of freedom.'²⁷ That is, freedom from the material bond is attainable when, by mimesis, we submit to electric technology. 'When we once open ourselves expressly to the essence of technology, we find ourselves unexpectedly taken into a freeing claim' (*The Question Concerning Technology*, 26).

This submissive interiorizing of modern technology necessitates a total shelving of private identity or merely humanistic values: robotism. The acoustic power available to the poetic establishment that Plato warred against was puny by comparison to the sensory stress exerted by any one of our technologies and its grounds. Plato realized that civilization did not have a chance until the mimetic spell of the bards was broken. To re-enter that world is to cast off the civilized – which seems to have escaped Heidegger, for he identifies the merge with electric technology with the path to salvation: 'As the one so needed and used, man is given to belong to the coming-to-pass of truth. The granting that sends in one way or another into revealing is as such the saving power. For the saving power lets man see and enter into the highest dignity of his essence' (*The Question Concerning Technology*, 32). Curiously, this is to return philosophy to the medieval modes of the Book of Nature. That is, through reading and exegesis of this book, one discovers the author, 'Being,' God.

Is it ironic that pietistically inclined phenomenology, gnostic or agnostic, should retrieve medieval modes of etymology and exegesis?

'Revealing' is an awareness of potencies, seen *through* the obscuring curtain of things (-in-act) – thanks to the sensibilities afforded us by the electric ground of acoustic space. This obscuring of Being, of potency, of the Real, Heidegger calls 'nihilism.'

27 'Freedom is the realm of the destining that at any given time starts a revealing upon its way' (*The Question*, 25).

The essence of nihilism lies in history; accordingly, in the appearing of whatever is as such, in its entirety, Nothing is befalling Being itself and its truth, and indeed in such a way that the truth of what is as such passes for Being, because the truth of Being remains wanting ... then metaphysics as the history of the truth of what is as such, is, in its essence, nihilism. (*The Question Concerning Technology*, 109)

In other words, visual space and visual bias, with abstract metaphysics as their outcome, have been nihilistic in cutting us off from awareness of ground, of Being as the ground of all that is. However, as Erich Fromm pointed out in *The Anatomy of Human Destructiveness*, the interiorization of any technology or technique is itself a form of nihilism.²⁸ In dissolving the separation between inner and outer world, in turning us inward, the new ground of acoustic awareness turns the 'outer world' (no longer 'out there') into an obsolete figment of the imagination. It would be well to bear in mind the observation of Wyndham Lewis about the man who is in harmony with his technologies – 'the well-adjusted man is a robot' – his humanity has been put off and he is a servo-mechanism only. Reviewing the penetrative and configuring power of the new ground of Gutenberg technology, Alexander Pope cautioned his readers not to be distracted by mere 'content' obsession and the practical benefits of applied knowledge. He says, in a note to the *Dunciad*, Book III: 1.337: 'Do not gontle reader, rest too secure in thy contempt of the Instruments for such a revolution in learning, or despise such weak agents as have been described in our poem, but remember what the *Dutch* stories somewhere relate, that a great part of their Provinces was once overflow'd by a small opening made in one of their dykes by a single *Water-Rat*.'

This chapter has reviewed the alphabet and its effects in creating a ground of visual stress that transformed the society and intellects of Greece, creating the West as characterized by individualism and abstract conceptual schemes. In the present section, we have touched upon some aspects of science, literature, and philosophy to indicate how the same formal patterns of awareness have now penetrated all aspects of twentieth-century existence in the West, plunging us back into the acoustic and

28 Erich Fromm, *The Anatomy of Human Destructiveness*, 380ff. For example: For the new man, 'The world becomes a sum of lifeless artifacts; from synthetic food to synthetic organs, the whole man becomes part of the total machinery that he controls and is simultaneously controlled by. He has no plan, no goal for life, except doing what the logic of technique determines him to do. He aspires to make robots as one of the greatest achievements of his technical mind, and some specialists assure us that the robot will hardly be distinguished from living men. This achievement will not seem so astonishing when man himself is hardly distinguishable from a robot' (page 389).

multisensory matrix of sensibility common both to the East and to preliterate Greece. Under present circumstances, the usual and accepted theories of communication of Western Science – Old Science – are powerless to provide any understanding of electric technologies. This leads us straight on to a consideration of recent discoveries in neurology, to the formal patterns of Eastern and oral cultures in relation to our own, and to the tetradic 'laws of the media' as providing a theory of communications that bridges ancient and modern phases of Western culture.

CULTURE AND COMMUNICATION: The Two Hemispheres

To the Inuit, truth is given, not by 'seeing is believing,' but through oral tradition, mysticism, intuition, all cognition – in other words, not simply by observation and measurement of physical phenomena. To the Inuit, the ocularly visible apparition is not clearly so common as the purely auditory one; 'hearer' would be a better name than 'seer' for their holy men.

Robert J. Trotter, writing on 'The Other Hemisphere' in *Science News*,¹ reports an investigation of brain-hemisphere dominance and patterns of behaviour 'among the Inuit or Eskimo people of Baffin Island in north-eastern Canada.' The project discovered, among the Inuit people, a language that reflected 'a high degree of spatial, right-hemispheric orientation. Linguistic studies rate it as being the most synthetic of languages. American English is at the other end of the same scale, and is rated as the most analytic (left-hemisphere).' Inuit sculptures, lithographs,

1 R.H. Trotter, 'The Other Hemisphere,' 218. The chart on the next page is taken from this article.

<i>Left Hemisphere</i> <i>(Right side of body)</i>		<i>Right Hemisphere</i> <i>(Left side of body)</i>	
<i>Speech/Verbal</i>		<i>Spatial/Musical</i>	
<i>Logical, Mathematical</i>		<i>Holistic</i>	
<i>Linear, Detailed</i>		<i>Artistic, Symbolic</i>	
<i>Sequential</i>		<i>Simultaneous</i>	
<i>Controlled</i>		<i>Emotional</i>	
<i>Intellectual</i>		<i>Intuitive, Creative</i>	
<i>Dominant</i>		<i>Minor (Quiet)</i>	
<i>Worldly</i>		<i>Spiritual</i>	
<i>Active</i>		<i>Receptive</i>	
<i>Analytic</i>		<i>Synthetic, Gestalt</i>	
<i>Reading, Writing, Naming</i>		<i>Facial Recognition</i>	
<i>Sequential Ordering</i>		<i>Simultaneous Comprehension</i>	
<i>Perception of Significant Order</i>		<i>Perception of Abstract Patterns</i>	
<i>Complex Motor Sequences</i>		<i>Recognition of Complex Figures</i>	

Reproduced courtesy of R.H. Trotter

and tapestries are ‘without apparent linear or three-dimensional analytic orientation.’ That is, they have never developed any measure of visual bias such as is normal to Western culture

To the Inuit, nature’s forms ‘lie hidden’ until man reveals them one by one. Their language makes little distinction between ‘nouns’ and ‘verbs’; rather, all words are forms of the verb ‘to be,’ which is itself lacking in Eskimo. ‘Eskimo isn’t a nominal language; it doesn’t name things which already exist, but brings things/action (nouns/verbs) into being as it goes along ... when the mother is in labor, an old woman stands around and says as many different eligible names as she can think of. The child comes out of the womb when its name is called’ (Edmund Carpenter, *Eskimo Realities*, 39).

In the beginning was the word. The primitive is a phenomenologist who equates reading aloud the Book of Nature with the making process. As a man speaks, his language is in a state of birth, as is also the thing about which he is talking. Such parentage confers responsibilities. In this sense, every man is artist. Primitives have no need, as we have, of a special and unique group (artists) that uses special processes and perceptions. Carvings are often discarded after being made, just a ‘words fade away’ ‘When Orpingalic says, “And we will fear to use words,” he doesn’t mean

he's afraid of the words themselves. He means he's in awe of their power to bring the universe into existence. Words must "shoot up of themselves." They must arise naturally out of experience. To impose words of his own would be sacrilegious. "Many are the words that rush over me, like the wings of birds out of darkness" (Eskimo Realities, 52).

Prior to writing and to print, words and utterances were still endowed with the magical power to form and transform existence. The difference between the two states is clearly reflected in the hemispheric differences in the brain. Trotter's chart of the characteristics of the left and right hemispheres presents a pattern of basic contrasts.² Because the dominant feature of the left hemisphere is linearity and sequentiality, there are good reasons for calling it the 'visual' (quantitative) side of the brain; and because the dominant features of the right hemisphere are the simultaneous, holistic, and synthetic, there are good reasons for indicating it as the 'acoustic' (qualitative) side of the brain.

We are not Argus-eyed, but Argus-eared.

Visual space is the result of left-hemisphere dominance in a culture, and its use is restricted to those cultures that have immersed themselves in the phonetic alphabet and thereby suppressed the activity of the right hemisphere.

- 2 The chart reflects the scientific understanding of the cortical hemispheres, gained mainly in the last twenty years. The cortex of the ordinary human brain has two hemispheres, joined by a massive bundle of fibres called the *corpus callosum*, which seems to be the agency of dialogue between the hemispheres. It was only in the 1950s that these forebrain commissures in man were first deliberately severed, allowing the hemispheres to be studied independently. 'The first important finding was that the internemispheric exchange of information was totally disrupted following commissurotomy. The effect was such that visual, tactual, proprioceptive, auditory, and olfactory information presented to one hemisphere could be processed and dealt with in that half-brain, but each of these activities went on outside the realm of awareness of the other half-cerebrum. This observation confirmed the animal work done earlier by Myers and Sperry, except that in a sense the results were more dramatic. Since it is the left hemisphere that normally possesses the natural language and speech mechanisms, all processes ongoing in the left hemisphere could easily be verbally described by the patients; information presented to the right hemisphere went undescribed' (Michael S. Gazzaniga, 'Review of the Split Brain,' 91). In subsequent tests of patients that had undergone commissurotomy, the complementarity of the two hemispheres became increasingly evident. Most surprising was the range of activities proper to the right hemisphere, which in the nineteenth century carried the label of 'minor' or 'quiet.' So complete was our culture's visual bias at that time, it was seriously proposed that the right hemisphere made no contribution to human intellection or activity.

Since, as Jeremy Campbell points out in *Grammatical Man*,³ alphabetic consonants and much of syntax are products of the left hemisphere, visual space is an extrapolation into the environment of the left brain in high definition – abstract, structured as a figure minus a ground. Acoustic space has the basic character of a dynamic sphere whose focus or centre is simultaneously everywhere and whose margin or periphery is nowhere. As it is multisensory, involving both the interval of tactility and kinetic equilibrium-pressure, it is one of the many figure/ground right-hemisphere forms of space. Ordinarily, the two hemispheres are in constant dialogue through the *corpus callosum*, and each hemisphere uses the other as its ground except when one (i.e., the left) is habitually dominant. Each hemisphere, as it were, provides a particular type of information processing less available to the other. As Dr J.E. Bogen notes, 'the type of cognition proper to the right hemisphere has been called *appositional*, a usage parallel to the common use by neurologists of *propositional* to encompass the left hemisphere's dominance for speaking, writing, calculation and related tasks.'⁴

The individual features of the face, as isolated figures, are easily noted by the left hemisphere, which cannot handle them together as a pattern. It is the 'acoustic' power of simultaneous comprehension that gives the right hemisphere the ability to recognize faces. By the same token, the sense of touch creates the space of the 'resonant interval': interval defines the relation of figure to ground and provides the structure, the con-figuration of ground. Synesthetic interplay among all the senses would seem to relate mainly to the right hemisphere. That Trotter, in 'The Other Hemisphere,' selects a Third World or non-literate society for observation and illustration points to the fact that societies that have not developed the use of the phonetic alphabet tend to adopt the same Third World posture. While the Third World is mainly oral/aural, even when it cultivates some non-phonetic form of writing such as Sanskrit, the First World (Western) countries tend to be visual (left hemisphere), even when most of their population is declining into a semi-literate state via the information environment of electronic technologies.

- 3 Page 244: 'It is well known that the right brain is poor at comprehending consonants and does not do well at syntax, which is the left brain's special province. How far this is a sheer absence of function, and how far it is an effect of the left brain inhibiting the right across the corpus callosum is still not clear.' If the right brain cannot even handle consonants they must have had their genesis in the left brain: this adds point to the mystery of what it was that urged the Greeks to invent them in the first place.
- 4 Joseph E. Bogen. 'Some Educational Implications of Hemispheric Specialization,' 138. Bogen observes further: 'What distinguished hemispheric specialization is not so much certain kinds of material (e.g. words for the left, faces for the right) but the way in which the material is processed. In other words, hemispheric differences are more usefully considered in terms of *process specificity* rather than *material specificity*.'

Technologies themselves, regardless of content, produce a hemispheric bias in the users.

Herbert Krugman performed brain-wave studies, comparing the response of subjects to print and television. One subject was reading a book as the tv came on. As soon as she looked up, her brain waves slowed significantly. In less than two minutes, she was in a predominantly alpha state – relaxed, passive, unfocused. Her brain-wave response to three different types of tv content was basically the same, even though she told Krugman she 'liked' one, 'disliked' another, and 'was bored by' the third. As a result of a series of such experiments, Krugman argues that this predominantly alpha state is characteristic of how people respond to tv – any tv. He recently remarked, 'the ability of respondents to show high right brain response to even familiar logos, their right brain response to stories even before the idea content has been added to them, the predominantly right brain response to tv, and perhaps even to what we call print advertising – all suggests that in contrast to teaching, the unique power of the electronic media is to *shape* the content of people's imagery, and in that particular way determine their behavior and their views.'⁵

Krugman's investigations were, he admitted, initially undertaken to disprove that 'the medium is the message.' His quantitative results point to the massive and subliminal erosion of our culture through right-hemisphere indoctrination by tv in all its forms, including vcrs, video games, computer monitors, and word-processors. In a wider sense, all electric media, as a new ground, give salience only to the right hemisphere. There is no way to quantify the right hemisphere, which emphasizes inner and qualitative aspects of experience.

How paradoxical that the hardware channels of radio and telephonic communication contribute to an extraordinary software effect. Nathaniel Hawthorne was particularly sensitive to the implications of electric information and not infrequently remarked on them, as in *The House of the Seven Gables*: 'Is it a fact that ... by means of electricity the world of matter has become a great nerve, vibrating thousands of miles in a breathless point of time? Rather, the round globe is a vast head, a brain, instinct with intelligence! Or, shall we say, it is itself a thought, and no longer the

5 Herbert Krugman, from a paper delivered to the annual conference of the Advertising Research Foundation, October 1978. Cf. also, Barry Siegel, 'Stay Tuned for How tv Scrambles Your Brain,' in *The Miami Herald*, C10. Krugman's original report was presented as a paper to the annual conference (1970) of the American Association for Public Opinion Research.

substance which we deemed it!' When people are on the telephone or on the air, they have no physical bodies but are translated into abstract images. Their old physical beings are entirely irrelevant to the new situations. The discarnate user of electric media bypasses all former spatial restrictions and is present in many places simultaneously as a disembodied intelligence. This puts him one step above angels, who can only be in one place at a time. Since, however, discarnate man has no relation to natural law (or to Western lineality), his impulse is towards anarchy and lawlessness. Minus his body, the user of telephone or radio or tv also is minus his private identity, an effect that is becoming increasingly evident.

In another experiment, an audience was equally divided, with each half seated facing a translucent-opaque screen placed in the middle of a room. A movie was shown, and then the audience was asked to write a brief response. One group saw light reflected from the screen in the usual manner; the other group saw light passing through the screen, as with television. In their remarks, the 'light-on' group adopted an objective, detached tone, and was analytic as to narrative, continuity, cinematography, editing and workmanship, and so on. Whereas they reported 'how the movie looked,' by contrast, the 'light-through' group was mainly concerned with 'how the movie felt.' Their responses were subjective and emotional: they discussed themselves, how they felt, and the mystical or archetypal significance of characters or actions. The differences between the light-on and the light-through situations (immediate ground) were sufficiently potent to cause one group to have a right-hemisphere experience and the other to have a left-hemisphere experience. With the low-intensity mosaic tv image, this effect is greatly amplified.

Cultural dominance by either the left or the right hemisphere is largely dependent upon environmental factors.

The lineality of the left hemisphere is supported by an alphabet-based service environment of roads and transportation, and by logical or rational activities in social and legal administration. Dominance of the right hemisphere, however, depends upon a cultural milieu or environment of a simultaneous resonating character. Such dominance is normal in oral societies, and today our universal environment of simultaneous electric information has entirely subverted the dominance of the left hemisphere. By tuning in on the new audile-tactile awareness made available by our

electric ground, Fritjof Capra found that modern physics was, unwittingly, retrieving a world-view harmonious with ancient Eastern wisdom. His problems in reconciling the two were entirely those of the hemispheres:

I had gone through a long training in theoretical physics and had done several years of research. At the same time, I had become very interested in Eastern mysticism and had begun to see the parallels to modern physics. I was particularly attracted to the puzzling aspects of Zen, which reminded me of the puzzles in quantum theory. At first, however, relating the two was a purely intellectual exercise. To overcome the gap between rational, analytical thinking and the meditation experience of mystical truth, was, and still is, very difficult for me. (*The Tao of Physics*, 9–10)

The alphabet created visual space, and with it a lineal and visual 'outer world' environment of services and experiences (everything from architecture and highways to representational art), which contributed to the ascendancy or dominance of the left, or lineal, hemisphere. This observation is consistent with the findings of the Russian neurophysiologist A.K. Luria, who found that the area of the brain which controls linear sequencing, and, hence, mathematical and scientific thinking, is located in the pre-frontal region of the left hemisphere: 'The mental process for writing a word entails still another specialization: putting the letters in the proper sequence to form the word. Lashley discovered many years ago that sequential analysis involved a zone of the brain different from that employed for spatial analysis. In the course of our extensive studies we have located the region responsible for sequential analysis in the anterior regions of the left hemisphere' ('The Functional Organization of the Brain,' 71–2). Luria's results show that the expression 'linear thinking' is not merely a figure of speech, but a mode of activity peculiar to the left hemisphere of the brain. His results support the observation that the use of the alphabet, with its emphasis on linear sequence, stimulates dominance of this area of the brain in cultural patterns.

Luria's observations provide an understanding of how the written alphabet, with its lineal structure, was able to create conditions conducive to the development of Western science, technology, and rationality. Many left-hemisphere stroke patients become aphasic, losing some or all of their ability to speak or to write, in some cases also losing the capacity for sustained (sequential) thought. They seem to become 'astonied' (fifteenth-century English), or 'stunned' – the experience is not unlike being 'stoned' on drugs. In part, this may be the result of a loss of muscular motor control. But much of it is directly related to the inner-outer split between the hemispheres and to linearity as a feature of the left side of the brain. Speech and writing have to be *uttered*, in a *sequence*. Just as all forms of sequential activity (as contrasted to configuration or pattern) are functions

of the left hemisphere, so too all forms of utterances (and artefacts), whether technological or verbal or written, are functions of the left hemisphere. This extends to private identity – uttering the self as fragmented and abstracted from the group – and to entrepreneurial aggression of all kinds. Conversely, all technologies that emphasize the outer or the abstract or sequentiality in organizing experience, contribute to left-hemisphere dominance in a culture. Harold Innis remarked on the Oriental (right-hemisphere) antipathy to sequence and abstraction and our sort of precision:

Social time, for example, has been described as qualitatively differentiated according to the beliefs and customs common to a group and as not continuous but as subject to interruption of actual dates. It is influenced by language which constrains and fixes prevalent concepts and modes of thought. It has been argued by Marcel Granet that the Chinese are not equipped to note concepts or to present doctrines discursively. The Word does not fix a notion with a definite degree of abstraction or generality but evokes an indefinite complex or particular images. It is completely unsuited to formal precision. Neither time nor space is abstractly conceived: time proceeds by cycles and is round. (*The Bias of Communication*, 62)

Dr Bogen noted, appositely, 'what may well be the most important distinction between the left and right hemisphere modes is the extent to which a linear concept of time participates in the ordering of thought' (*The Human Brain*, 141).

The visual power of the phonetic alphabet to translate other languages into itself is part of its power to invade right hemisphere (oral) cultures.

Tribal, right-hemisphere 'closed' cultures are holistic and entire and resistant to penetration by other preliterate cultures. But the specialist qualities of the left-hemisphere phonetic alphabet have long provided the only means of invading and taking over oral societies. 'Propaganda cannot succeed where people have no trace of Western culture.' These words of Jacques Ellul in *Propaganda* draw attention to one of the crucial features of Western history. It is no accident that the Christian church, dedicated to propaganda and propagation, adopted Graeco-Roman phonetic literacy from the earliest days. The impact of alphabetic literacy is strong enough not only to break the tribal bond, but to create individualized (left-

hemisphere) consciousness as well. Phonetic literacy – our alphabet – alone has this power.

The spread of Graeco-Roman literacy and civilization became inseparable from Christian missionary and educational activity. Paradoxically, people are not only unable to receive, but are unable to retain doctrinal teaching without a minimum of phonetic or Western culture. Here is the observation of Ellul on this matter:

In addition to a certain living standard, another condition must be met: if a man is to be successfully propagandized, he needs at least a minimum of culture. Propaganda cannot succeed where people have no trace of Western culture. We are not speaking here of intelligence; some primitive tribes are surely intelligent, but have an intelligence foreign to our concepts and customs. A base is needed – for example, education; a man who cannot read will escape propaganda, as will a man who is not interested in reading. People used to think that learning to read evidenced human progress; they still celebrate the decline of illiteracy as a great victory; they condemn countries with a large proportion of illiterates; they think that reading is a road to freedom. All this is debatable, for the important thing is not to be able to read, but to understand what one reads, to reflect on and judge what one reads. Outside of that, reading has no meaning (and even destroys certain automatic qualities of memory and observation). But to talk about critical faculties and discernment is to talk about something far above primary education and to consider a very small minority. The vast majority of people, perhaps 90 percent, know how to read, but they do not exercise their intelligence beyond this. They attribute authority and eminent value to the printed word, or, conversely, reject it altogether. As these people do not possess enough knowledge to reflect and discern, they believe – or disbelieve – *in toto* what they read. And as such people, moreover, will select the easiest, not the hardest, reading matter, they are precisely on the level at which the printed word can seize and convince them without opposition. They are perfectly adapted to propaganda.⁶

The dominance of the left hemisphere (analytic and quantitative) entails the submission or suppression of the right hemisphere; and so, for example, our intelligence tests exist only for measuring left-hemisphere achievement, and take no cognizance of the existence of the (qualitative) right hemisphere.

6 Jacques Ellul, *Propaganda: The Formation of Men's Attitudes*, 108–9. Harold Innis comments on the moment of transition: 'For a brief period the Greeks escaped from the oral tradition and the written tradition. The oral tradition was sufficiently strong to check complete submergence in the written. The oral tradition supported Greek skepticism and evaded monopolies of religious literature' (*The Bias of Communication*, 111).

The dyslexic: Everyman as cubist.

The present electronic age, in its inescapable evocation of simultaneity, presents the first serious threat to the 2500-year dominance of the left hemisphere. It is no surprise that students whose right brains have had eighteen years' education by tv have problems with left-brain curricula and SAT tests.

The current spate of dyslexia and other reading difficulties – some 90 per cent of the victims are males – is a direct result of tv and other electric media pressuring us into returning to the right hemisphere. Dyslexia is an inability to adopt a single, fixed point of view with respect to all letters and words: conversely, it consists of approaching letters and words from many points of view simultaneously (right-hemisphere fashion), minus the assumption that any one way is solely correct. As the pressure continues, so will the problems with our left-hemisphere alphabet. The cubists, as artists and 'antennae of the race,' detected the shift some seventy years ago, and explored the grammar of this sensory modality. If literacy is to survive for another generation in the West, our writing system will soon have to be completely recast in a mould congenial to right-hemisphere sensibility and satisfactions. We might, for example, replace it with a syllabary of fifty to seventy characters.

A variety of factors can give salience or dominance either to the right (simultaneous and acoustic) hemisphere of the brain, or to the left (lineal and visual). But no matter how extreme the dominance of either hemisphere in a particular culture, there is always some degree of interplay, thanks to the *corpus callosum*, that part of the nervous system which bridges the hemispheres. Even the Chinese with their traditionally monopolistic cultivation of the right hemisphere, which invests every aspect of their lives, their language, and their writing with artistic delicacy – even the Chinese exert much left-hemisphere stress through their practicality and their concern with moral wisdom. However, their sensory stress falls heavily on what Heisenberg calls the 'resonant interval,' that is, touch.

Indeed the use of space is one of the Chinese painter's most coveted secrets, one of the first thoughts in his head when he begins to plan his composition. Almost every space in our pictures has a significance: the onlooker may fill them up with his own imagined memory or with feeling merely. There was a Chinese poet of the Sung dynasty, Yeh Ch'ing Ch'en, who wrote the sorrows of a parting and described the scene as follows:

Of the three parts Spring scene, two are sadness,
And other part is nothing but wind and rain.

Who would venture to paint this scenery, but yet who would deny the truth of it? This is what we leave to the well-disposed blank, more eloquent than pictorial expression. (Chiang Yee, *The Chinese Eye*, 189–90)

The Chinese, in other words, use the eye as an ear, creating the paradoxical situation that Tony Schwartz notes in *The Responsive Chord* apropos the tv image: 'In watching television, our eyes function like our ears.'

The interval between the wheel and the axle has long served as an example not only of 'touch,' but of 'play.' Without 'play,' without that figure/ground interval, there is neither wheel nor axle. The space between the wheel and the axle, which defines both, is 'where the action is'; and this space is both audile and tactile.

***The Chinese use the intervals between things
as the primary means of getting 'in touch'
with situations.***

Nothing could be more expressive than this statement of the properties of the right hemisphere in contrast to the left. For, to the left hemisphere, the interval is a space that must be *logically* connected and filled and bridged. Such is the dictate of lineality and visual order in contrast to the resonating interval or gap of the simultaneous world of the right hemisphere. In *The Book of Tea*, Okakura Kakuzo explains the Japanese attitude to social relationships as a 'constant readjustment to our surroundings.' This is in extreme contrast to the Western or visual 'point of view,' which assumes a fixed position from which to examine each situation and to assert one's preference. Right-hemisphere culture has no place for the private individual, just as the left-hemisphere society regards tribal groups as sinister and threatening (remember the 'Yellow Peril').

Suzuki, the great authority on Zen Buddhism, describes muga as 'ecstasy with no sense of *I am doing it*,' 'effortlessness.' The 'observing self' is eliminated; a man 'loses himself,' that is, he ceases to be a spectator of his acts. Suzuki says: 'With the awaking of consciousness, the will is split into two: ... actor and observer. Conflict is inevitable, for the actor (-self) wants to be free from the limitations' of the observer-self. Therefore in Enlightenment the disciple discovers that there is no observer-self, 'no soul

entity as an unknown or unknowable quantity.' Nothing remains but the goal-and-the-act that accomplishes it. (Ruth Benedict, *The Chrysanthemum and the Sword*, 247–8)

The right-hemisphere culture has a great affinity for the simultaneity of the age of electric information, as Okakura Kakuzo explains: 'The Present is the moving Infinity, the legitimate sphere of the Relative. Relativity seeks Adjustment: Adjustment is Art. The art of life lies in a constant readjustment to our surroundings' (*The Book of Tea*, 44).

The right-hemisphere culture naturally seeks to 'tune' or reconfigure intervals rather than to 'connect' situations and relationships:

The Taoists claimed that the comedy of life could be made more interesting if everyone would preserve the unities. To keep the proportion of things and give place to others without losing one's own position was the secret of success in the mundane drama. We must know the whole play in order to properly act our parts; the conception of totality must never be lost in that of the individual. This Laotse illustrates by his favourite metaphor of the Vacuum. He claimed that only in vacuum lay the truly essential. The reality of a room, for instance, was to be found in vacant space enclosed by the roof and walls, not in the roof and walls themselves. The usefulness of a water pitcher dwelt in the emptiness where water might be put, not in the form of the pitcher or the material of which it was made. Vacuum is all potent because all containing. In vacuum alone motion becomes possible. (*The Book of Tea*, 44–5)

Kakuzo adds: 'In Jiu-Jitsu one seeks to draw out and exhaust the enemy's strength by non-resistance, vacuum, while conserving one's own strength for victory in the final struggle.' In Western art, however, we admire the power of statement and the 'bounding line' in design, whereas the right-hemisphere culture gives play to the opposite principle; instead of statement, the stress is on 'the value of suggestion': 'In art the importance of the same principle is illustrated by the value of suggestion. In leaving something unsaid the beholder is given a chance to complete the idea and thus a great masterpiece irresistibly rivets your attention until you seem to become actually a part of it. A vacuum is there for you to enter and fill up to the full measure of your aesthetic emotion' (*The Book of Tea*, 46).

This is of the same order as the preliterate Greek technique of mimesis, discussed earlier. By contrast, Wyndham Lewis, in *Men without Art*, maintains that the role of the artist is to *prevent* our becoming adjusted, since to individualized Western society the Protean 'well-adjusted man' is an impercipient robot.

Julian Jaynes proposed that the preliterate Homeric hero had 'no subjective consciousness, no mind, soul, or will':

Iliadic man did not have subjectivity as do we; he had no awareness of his awareness, no internal mind-space to introspect upon. In distinction to our own subjective conscious minds, we can call the mentality of the Myceneans a *bicameral mind*. Volition, planning, initiative is organized with no consciousness whatever and then 'told' to the individual in his familiar language, sometimes with the visual aura of a familiar friend or authority figure or 'god,' or sometimes as a voice alone. The individual obeyed these hallucinated voices because he could not 'see' what to do by himself.

(*The Origin of Consciousness in the Breakdown of the Bicameral Mind*, 75)

The culture-heroes of preliteracy and postliteracy alike are robots.

'Robotism' for those with writing means the suppression of the conscious 'observer' self or conscience so as to remove all fear and circumspection, all encumbrances to ideal performance. Such a man 'becomes as the dead, who have passed beyond the necessity of taking thought about the proper course of action. The dead are no longer returning *on*; they are free. Therefore to say 'I will live as one already dead' means a supreme release from conflict.'⁷ The Japanese use 'living as one already dead' to mean that one lives on the plane of expertness. As W.B. Yeats noted in 'Byzantium,' it creates the superman:

I hail the superman;
I call it death-in-life and life-in-death.

It entails the extinction of the left-hemisphere detached and objective self. If the result resembles detachment, it is from pushing the right hemisphere all the way, to the point of reversal of apparent characteristics. As Ruth Benedict remarks, 'it is used in common, everyday exhortation. To encourage a boy who is worrying about his final examinations from middle school, a man will say, "Take them as one already dead and you will pass them easily." To encourage someone who is undertaking an important business deal, a friend will say, "Be as one already dead." When a man goes through a great soul crisis and cannot see his way ahead, he quite commonly emerges with the resolve to live "as one already dead"' (page 249). She continues:

⁷ Benedict, *The Chrysanthemum and the Sword*, 249. 'On' is an obligation passively incurred (cf. page 116).

It points up vividly the difference between Western and Eastern psychology that when we speak of a conscienceless American we mean a man who no longer feels the sense of sin which should accompany wrongdoing, but that when a Japanese uses the equivalent phrase he means a man who is no longer tense and hindered. The American means a bad man; the Japanese means a good man, a trained man, a man able to use his abilities to the utmost. He means a man who can perform the most difficult and devoted deeds of unselfishness. The great American sanction for good behavior is guilt; a man who because of a calloused conscience can no longer feel this has become antisocial. The Japanese diagram the problem differently. According to their philosophy man in his inmost soul is good. If his impulse can be directly embodied in his deed, he acts virtuously and easily. Therefore, he undergoes, in 'expertness,' self-training to eliminate the self-censorship of shame (*haji*). Only then is his 'sixth sense' free of hindrance. It is his supreme release from self-consciousness and conflict. (page 251)

The paradox today is that the ground of the latest Western technologies is electronic and simultaneous, and thus is structurally right-hemisphere and 'Oriental' and oral in its nature and effects. This situation began with the telegraph more than a century ago. Still, the overwhelming pattern of procedures in the Western world remains lineal, sequential, and connected in political and legal institutions, and also in education and commerce, but not in entertainment or art. A formula for complete chaos!

The ground of the Oriental right-hemisphere world, meantime, is rapidly acquiring some of the hardware connectedness of the left-hemisphere Western world. China has recently embarked on a program of alphabetic literacy, which will result in their acquiring a completely left-hemisphere cultural bias, plunging them into a new phase of individualized enterprise and aggression, for which they are already developing a ground of industrial hardware. In general, it needs to be noted that left-hemisphere man has very little power to observe or to control environments, or to see the patterns of change.

The effects of the alphabet are well-known and by now quite predictable as we have seen them enacted in a variety of cultures and periods. But one thing is different about the modern Chinese courtship of the alphabet: the speed. It took many centuries for the alphabet to suppress the right hemisphere and the mimetic tribal bonds of the Greeks and to release the focused energy of the visual left hemisphere, for the technology had to filter up from the working and merchant classes to the aristocracy. With the Romans, too, generally only the slaves were alphabetic, and again the outward urge and thrust took some time to gather momentum; when the time was ripe – the ground was sufficient – the Alexander or Caesar appeared. China now promises fair to accomplish the same dissemination

in a generation or so. The question remains whether phonetic literacy will be powerful enough to dislodge their residue of right-brain habitude, backed as it is by the new range of electronic gimmicks and media.

Left-hemisphere industrialism has blinded the Chinese to the effects of our alphabet: pattern recognition is in the right hemisphere.

The Oriental tradition reflects a particular attunement to all facets of ground, and immediate responsiveness to changes in ground configuration. Oral peoples are notoriously conservative about new technologies because of their sensitivity to the side-effects involved – the new ground they bring into play – and theirs are histories of rejections of innovations. We tend to adopt anything that promises immediate efficiency or profit, and to ignore all side-effects. We pride ourselves on our uniform consistency. It is his sensitivity to ground, plus a strong sense of decorum (propriety) and a lack of private identity that enables an Oriental to change his behaviour instantly from one pattern to another. For example, until August 1945, the 'chu' code of loyalty demanded of the Japanese people that they fight to the last man against the enemy. When the emperor changed the requirements of 'chu' by broadcasting Japan's capitulation, the Japanese outdid themselves in expressing their co-operation with the victors.

Occidentals cannot easily credit the ability of the Japanese to swing from one behavior to another without psychic cost. Such extreme possibilities are not included in our experience. Yet in Japanese life the contradictions, as they seem to us, are as deeply based in their view of life as our uniformities are in ours. It is especially important for Occidentals to recognize that the 'circles' into which the Japanese divide life do not include any 'circle of evil.' This is not to say that the Japanese do not recognize bad behavior, but they do not see human life as a stage on which forces of good contend with forces of evil. They see existence as a drama which calls for careful balancing of the claims of one 'circle' against another and of one course of procedure against another, each circle and each course of procedure being in itself good. (*The Chrysanthemum and the Sword*, 197)

Instead of an abstract, uniform (visual) code of conduct applicable to all situations (as a figure minus a ground), there is rather an equilibrium of properties that requires constant attunement.

In his book *Out of Revolution*, Eugen Rosenstock-Huessy explains how the figure of Western capitalism has persisted in a program of advance by environmental destruction, without any policy of replacement of such (environmental) ground. By contrast, the right-hemisphere man, like the primitive hunter, is always intensely aware of ground, and in fact prefers ground and the experience of participation in ground to detached contemplation of figures.

Chiang Yee points to the rejection of (visual) matching and representation in Chinese art: 'Verisimilitude is never a first object; it is not the bamboo in the wind that we are representing but all the thought and emotion in the painter's mind at a given instant when he looked upon a bamboo spray and suddenly identified his life with it for a moment' (*The Chinese Eye*, 114). He further notes, 'we try, in the steps of the Sages, to lose ourselves in Great Nature, to identify ourselves with her. And so in landscapes, in the paintings of flowers and birds, we try not to imitate the form, but to extract the essential feeling of the living object, having first become engulfed in the general life Stream' (page 115). The Oriental aspires not merely to love and understand a painting itself, but to probe for a meaning far beyond its confines in a world of the spirit. On these right-hemisphere terms, figure painting is a peculiar Western preoccupation that is devoid of satisfaction: 'We have never elevated figure-painting as you have in the West; some of it may have a religious significance, but it seldom reaches the depths of thought which landscape attains' (page 115). It was the dominance of the left hemisphere by means of the civilizing stream of phonetic literacy that evoked in Western man the ability to detach himself from participation in his surroundings. His program to conquer nature is but one result of the enormous psychic and cultural energy released by that ground of specialist goals.

It is always the psychic and social grounds, brought into play by each medium or technology, that readjust the balance of the hemispheres and of human sensibilities into equilibrium with those grounds.

The experience of the blind amply illustrates how the shift of any component in the sensorium creates an entirely new world:

When I came upon the myth of objectivity in certain modern thinkers, it made me angry. So there was only one world for these people, the same for everyone. And all the other worlds were to be counted as illusions left over from the past. Or why not call them by their name – hallucinations? I had learned to my cost how wrong they were.

From my own experience I knew very well that it was enough to take from a man a memory here, an association there, to deprive him of hearing or sight, for the world to undergo immediate transformation, and for another world, entirely different but entirely coherent, to be born. Another world? Not really. The same world, rather, but seen from another angle, and counted in entirely new measures. When this happened, all the hierarchies they called objective were turned upside down, scattered to the four winds, not even like theories but like whims. (*And There Was Light*, 143–4)

This writer, Jacques Lusseyran, was made particularly aware of the right hemisphere 'inner' experience afforded by blindness, by having to live in an 'objective' left-hemisphere culture. Blindness creates the seer much as the ancient world conceived the seer as blind. 'Blindness works like dope, a fact we have to reckon with. I don't believe there is a blind man alive who has not felt the danger of intoxication. Like drugs, blindness heightens certain sensations, giving sudden and often disturbing sharpness to the senses of hearing and touch. But, most of all, like a drug, it develops inner as against outer experience, and sometimes to excess' (*And There Was Light*, 49). In our culture the parallel is the caricature of inner or right-hemisphere awareness experienced by the drug culture of hallucinogenics that provide an artificial mimesis of the electric information environment.

Francis Bacon's four Idols constitute the basis for a complete theory of communication in that they account for the various forms of blindness and ignorance conferred upon self and society by technology and culture alike. Each results in a transformation of sensibility, as Lusseyran notes. For the cause (ground or formal cause) of ignorance is knowledge as that of poverty is wealth; so the form of the blindness is the form or bias of sensibility. The 'myth of objectivity,' a result of visual bias, belongs to the 'Idols of the Theatre' or what Giambattista Vico termed 'the conceit of scholars' in his fourth axiom. Vico was merely following instructions when, at the outset of his *Scienza Nuova*, he set out his 'Elements' or 'axioms,' for Bacon had prefaced his account of his 'Idols' with these words:

The formation of ideas and axioms by true induction is no doubt the proper remedy to be applied for the keeping off and clearing away of idols. To

point them out, however, is of great use for the doctrine of idols is to the interpretation of nature what the doctrine of the refutation of sophisms is to common logic.⁸

The Idols of the Tribe, and Vico's first axiom, specify the general bias of sensibility, such as the suppression of the right hemisphere by the alphabet or that of the left by radio and tv, as a pollution of exact observation which must be allowed for.⁹ The Idols of the Cave, and Vico's second axiom, pinpoint intellectual laziness and conceptual dogmatism as distorting influences.¹⁰ The idols of the Marketplace – Vico's 'conceit of nations' – arise in the 'intercourse and association of men with each other,'¹¹ and

8 *Novum Organum*, Book I, aphorism xl.

9 *Novum Organum*, Book I, aphorism xli: 'The Idols of the Tribe have their foundation in human nature itself, and in the tribe or race of men. For it is a false assertion that the sense of man is the measure of things. On the contrary, all perceptions, as well of the sense as of the mind, are according to the measure of the individual and not according to the measure of the universe. And the human understanding is like a false mirror, which, receiving rays irregularly, distorts and discolours the nature of things by mingling its own nature with it' (page 3). Vico's first axiom is this: '120. Because of the indefinite nature of the human mind, wherever it is lost in ignorance, man makes himself the measure of all things. 121. This axiom explains those two common human traits, on the one hand that rumor grows in its course (*fama crescit eundo*), on the other that rumor is deflated by the presence [of the thing itself] (*minuit praesentia famam*). In the long course that rumor has run from the beginning of the world it has been the perennial source of all the exaggerated opinions which have hitherto been held concerning remote antiquities unknown to us, by virtue of that property of the human mind noted by Tacitus in his *Life of Agricola*, where he says that everything unknown is taken for something great (*omne ignotum pro magnifico est*)' (*The New Science of Giambattista Vico*, 54).

10 *Novum Organum*, Book I, aphorism xlii: 'The Idols of the Cave are the idols of the individual man. For everyone (besides the errors common to human nature in general) has a cave or den of his own, which refracts and discolours the light of nature; owing either to his own proper and peculiar nature or to his education and conversation with others, or to the reading of books, and the authority of those whom he esteems and admires . . . or the like. So that the spirit of man (according as it is meted out to different individuals) is in fact a thing variable and full of perturbation, and governed as it were by chance. Whence it was well observed by Heraclitus that men look for sciences in their own lesser worlds, and not in the greater or common world' (page 35). This Idol takes its name from the cave in the *Republic* of Plato (Book VII). Vico notes (axiom two): '122. It is another property of the human mind that whenever men can form no idea of distant and unknown things, they judge them by what is familiar and at hand. 123. This axiom points to the inexhaustible source of all the errors about the beginnings of humanity that have been adopted by entire nations and by all the scholars. For when the former began to take notice of them and the latter to investigate them, it was on the basis of their own enlightened, cultivated and magnificent times that they judged the origins of humanity, which must nevertheless by the nature of things have been small, crude and quite obscure' (page 54).

11 *Novum Organum*, Book I, aphorism xliii: 'There are also idols formed by the intercourse and association of men with each other, which I call Idols of the Market-place, on account of the commerce and consort of men there. For it is by discourse that men associate;

are rooted in social and cultural preference and in the bias imposed by languages and jargons. Cleansing these Augean stables is the special task of the poet. Fourth and last, Bacon cites the Idols of the Theatre 'which have immigrated into men's minds from the various dogmas of philosophies' – Old Science. These Vico terms 'conceit of scholars' whose sciences have neither real antiquity of knowledge nor knowledge of antiquity, being cut off from tradition. This conceit shores up its own narrow version of thought by claiming that what it knows is what all learning has always been about.¹²

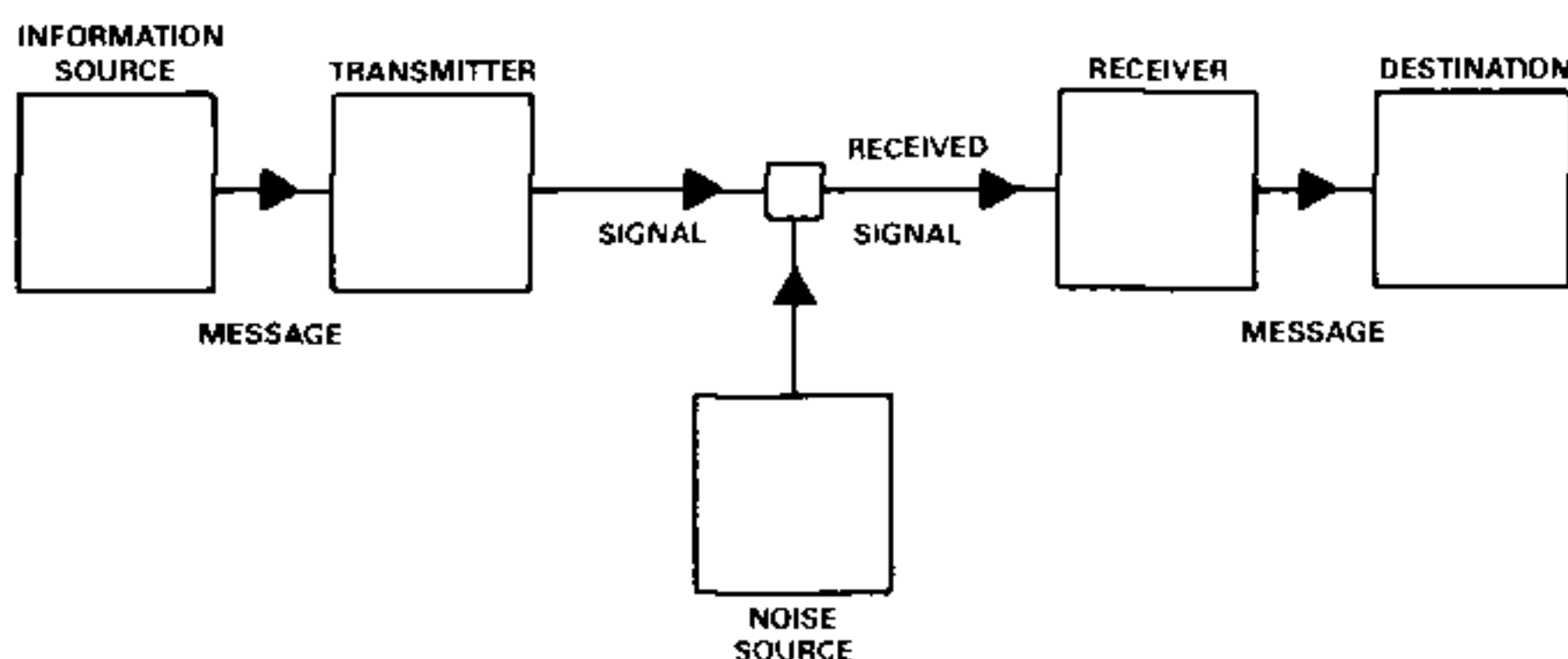
Western Old Science approaches the study of media in terms of linear, sequential transportation of data as detached figures (content); the New Science approach is via the ground of users and of environmental media effects.

and words are imposed according to the apprehension of the vulgar. And therefore the ill and unfair choice of words wonderfully obstructs the understanding. Nor do the definitions or explanations wherewith in some things learned men are wont to guard and defend themselves, by any means set the matter right. But words plainly force and overrule the understanding, and throw all into confusion, and lead men away into numberless empty controversies and idle fancies' (page 35). Vico translates this into his third axiom, as follows: '125. As for the conceit of the nations, we have heard that golden saying of Diodorus Siculus. Every nation, according to him, whether Greek or barbarian, has had the same conceit that it before all other nations invented the comforts of human life and that its remembered history goes back to the very beginning of the world' (page 55).

- 12 *Novum Organum*, Book I, aphorism xlv. 'Lastly, there are the idols which have immigrated into men's minds from the various dogmas of philosophies, and also from wrong laws of demonstration. These I call Idols of the Theater; because in my judgment all the received systems are but so many stage-plays, representing worlds of their own creation after an unreal and scenic fashion. Nor is it only of the systems now in vogue, or only of the ancient sects and philosophies, that I speak; for many more plays of the same kind may yet be composed and in like artificial manner set forth; seeing that errors the most widely different have nevertheless causes for the most part alike. Neither again do I mean this only of entire systems, but also of many principles and axioms in science, which by tradition, credulity, and negligence have come to be received' (page 35). Vico renders this in his fourth axiom: '127. To this conceit of the nations there may be added that of the scholars, who will have it that whatever they know is as old as the world. 128. This axiom disposes of all the opinions of the scholars concerning the matchless wisdom of the ancients...' (page 55). Summing his great chapter on Poetic Wisdom, Vico reiterates: '779. We have shown that poetic wisdom justly deserves two great and sovereign tributes. The one, clearly and constantly accorded to it, is that of having founded gentile mankind, though the conceit of the nations on the one hand, and that of the scholars on the other, the former with ideas of an empty magnificence and the latter with ideas of an impertinent philosophical wisdom, have in effect denied it this honour by their very efforts to affirm it. The other, concerning which a vulgar tradition has come down to us, is that the wisdom of the ancients made its wise men, by a single inspiration, equally great as philosophers, lawmakers, captains, historians, orators and poets, on which account it has been so greatly sought after' (page 265).

The Shannon-Weaver model of communication, the basis of all contemporary Western theories of media and of communication, typifies left-brain lineal bias.

It is a kind of pipeline model of a hardware container for software content. It stresses the idea of 'inside' and 'outside' and assumes that communication is a kind of literal *matching* rather than resonant *making*:



The Shannon-Weaver model of communication

Weaver interprets:

The *information source* selects a desired *message* out of a set of possible messages ... The selected *message* may consist of written or spoken words, or of pictures, music, etc

The *transmitter* changes this *message* into the *signal* which is actually sent over the *communication channel* from the transmitter to the *receiver*. In the case of telephony, the channel is a wire, the signal a varying electrical current on this wire; the transmitter is the site of devices (telephone transmitter, etc.) which change the sound pressure of the voice into the varying electrical current ... In oral speech, the information source is the brain, the transmitter is the voice mechanism producing the varying sound pressure (the signal) which is transmitted through the air (the channel). In radio, the channel is simply space (or the aether, if any one still prefers that antiquated and misleading word), and the signal is the electromagnetic wave which is transmitted.

The *receiver* is a sort of inverse transmitter, changing the transmitted signal back into a message, and handing this message on to the *destination* ...

In the process of being transmitted, it is unfortunately characteristic that certain things are added to the signal which were not intended by the information source. These unwanted additions may be distortions of sound (in telephony, for example) or static (in radio), or distortions in shape or shading of picture (television), or errors in transmission (telegraphy or facsimile), etc. All of these changes in the transmitted signal are called *noise*. (Shannon and Weaver, *The Mathematical Theory of Communication*, 7-8)

Claude Shannon presents his theory of communication in terms of left-hemisphere verisimilitude as 'first object': 'The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning*' (page 32). This is to ignore completely the ground of users and of sensibility. The Shannon-Weaver model and its descendants provide exact examples of Idols of the Theatre. In point of fact, the multiplicity of side-effects of any communication system forms an entire environment of interfacing, a kind of subculture which accompanies the central 'service' or channel of communication. For example, the side-effects of the Alaska oil pipeline are the subject of a large report by the Berger Commission. The gist of this report is that the entire native population would be deprived of its environmental livelihood, were the pipeline to be built. In the same way, the side-effects of telephone or radio assume a complex system of electric technology and supporting services, the adoption of which serves as a new ground that transforms the entire user society. Equally, the system of manufacturers and roads and services that are the side-effect of the motor car alter the entire face (and odour) of any user-society.

The Shannon-Weaver model and its derivatives follow the linear pattern of efficient cause – the only sequential form of causality.

Aristotle provides the earliest systematic treatment of causes, by drawing together Plato's observations. Aristotelian causality is fourfold, and is applicable both to nature and to artefacts. There are

the material cause (the scholastic *causa materialis*), which provided the passive receptacle on which the remaining causes act – and which is anything except the matter of modern science; the formal cause (*causa formalis*), which contributed the essence, idea, or quality of the thing concerned, the motive force or efficient cause (*causa efficiens*), that is, the external compulsion that bodies had to obey; and the final cause (*causa finalis*) was the goal to which everything strove and which everything served.¹³

The first two were generally regarded as related to *being* (right hemisphere), the last two to *becoming* (left hemisphere). As George Steiner points out, 'Much of Greek drama and of the Greek theory of history is founded on the tensions which occur between realized necessity and meaningful action' – that is, between Formal and Efficient Causes. Formal Cause, which sends the effects ahead of the cause, found expression in Greek tragedy as Fate, or fateful necessity.¹⁴ This doctrine of simultaneous causes lasted until the Gutenberg era when print gave complete ascendancy to visual space and modern scientific Method was born. Galileo reformulated the definition of efficient cause as the necessary and sufficient condition for the appearance of something: 'that and no other is to be called cause, at the presence of which the effect always follows, and at whose removal the effect disappears.'

When visual space transformed cosmology and the logos alike from resonant ground to rational figure, the mode of understanding of formal causality shifted from dynamic to abstract and ideal. Aristotle retains and confuses the oral nature of formal cause, which explains why he frequently confuses formal and final cause. Final cause, inherent in the thing from the outset, came to be misinterpreted in left-hemisphere terms as the end-point of a series of efficient causes. Bacon noted, in his *New Science*, how visual bias 'interferes mischievously in the discovery of causes' and distorts the understanding of final causes in particular.¹⁵ Such distortions he termed 'Idols of the Tribe,' and observed of sensory bias in general that 'the human understanding is like a false mirror, which, receiving rays irregularly, distorts and colors the nature of things by mingling its own nature with it' (*Novum Organum*, Bk. I, xli, 34). Formal cause is usually regarded as the

13 Mario Bunge, *Causality: The Place of the Causal Principle in Modern Science*, 32. Vide: *Metaphysics* Bk. I, ch. iii, 983a, b; Bk. V, ch. ii, and *Physics* Bk. II, ch. iii and vii.

14 George Steiner, *After Babel: Aspects of Language and Translation*, 149. He illustrates, 'We know what will happen to Agamemnon when he enters the house, each instant of the agon has been announced and prepared for. We know precisely what Oedipus will discover – in a crucial sense he too has known all along. Yet with each narration or performance of the fable our sense of shock is renewed. The tragic vision of Greek literature turns on this deep paradox: the event most expected, most consequent on the internal logic of action, is also the most surprising' (page 149).

15 *Novum Organum*, Book I, aphorism xlviii. See, too, his remarks in the *Advancement of Learning*, Book II, 5 and 7.

'defining formula' or definition of a thing's essence (its *form* or the 'whatness' whereby we know a thing). Prior to visual space, formal cause coincided with logos as a figure/ground concern with the thing, structurally inclusive of its whole pattern of side-effects on the ground of users.¹⁶

In the left hemisphere, however, formal cause is translated into a kind of Platonic abstract ideal blueprint that is never perfectly realized in any given material example. Such is the understanding of Northrop Frye, one of the principal modern exponents of Platonic and Aristotelian ideas as passed through Freud and Jung. He is consistent in his left-hemisphere approach. Referring to the Jungian doctrine of archetypes, Wimsatt and Brooks comment that 'For Northrop Frye the discovery points to the possibility of turning literary criticism for the first time into a true science. No true science, he argues, can be content to rest in the structural analysis of the object with which it deals. The poet is only the *efficient* cause of the poem, but the poem, having form, has a formal cause that is to be sought. On examination, Frye finds this formal cause to be the archetype.'¹⁷

Frye is adamant on the point:

An original painter knows, of course, that when the public demands likeness to an object, it generally wants the exact opposite, likeness to the pictorial conventions it is familiar with. Hence when he breaks with these conventions, he is often apt to assert that he is nothing but an eye, that he merely paints what he sees as he sees it, and the like. His motive in talking such nonsense is clear enough: he wishes to say that painting is not merely facile decoration, and involves a difficult conquest of some very real spatial problems. But this may be freely admitted without agreeing that the formal cause of a picture is outside the picture, an assertion which would destroy the whole art if it were taken seriously. (*Anatomy of Criticism*, 132).

There is absolutely no provision here for ground of any kind: his archetype is exactly a figure minus a ground (*vide* the discussion in *From Cliché to Archetype*). Otherwise it would be perfectly natural to observe, with the rhetoricians and grammarians, that the formal cause of the poem, painting, or whatever is its ground: the audience (the user) and the configuration of sensibilities in the culture at the time the artefact was produced.

The four causes as a mode of exegesis of nature had been regarded as parallel to the 'four levels' of interpretation of scripture by medieval

16 Aristotle, *Generation of Animals*, xlv, 3. Aristotle opens Book I by presenting formal cause as 'the *logos* of the thing's essence.'

17 W.K. Wimsatt, Jr. and C. Brooks, *Literary Criticism – A Short History*, 7–9. In their footnote, they cite Frye's 'My [Critical] Credo,' 91–110, and add: '"Archetype," borrowed from Jung, means a primordial image, a part of the collective unconscious, the psychic residue of numberless experiences of the same kind, and thus part of the inherited response-pattern of the race.'

grammarians (e.g., St Bonaventure).¹⁸ In each case, the 'fours' were simultaneous, and both systems were rendered obsolescent by the Renaissance push into visual space and left-hemisphere dominance. Figure/ground resonance and the interplay of levels and causes were eliminated, with the further advantage, from the standpoint of the *moderns*, of cutting all bondage and allegiance to the traditions. Bunge summarizes the practical left-hemisphere advantages of dumping manifold causality:

Some of the grounds for the Renaissance reduction of causes to the *causa efficiens* were the following: (a) it was, of all the four, the sole clearly conceived one; (b) hence it was mathematically expressible; (c) it could be assigned an empirical correlate, namely, an event (usually a motion) producing another event (usually another motion) in accordance with fixed rules; the remaining causes, on the other hand, were not definable in empirical terms, hence they were not empirically testable, (d) as a consequence, the efficient cause was controllable; moreover, its control was regarded as leading to the harnessing of nature, which was the sole aim of the instrumental (pragmatic) conception of science. (*Causality*, 32–3)

All Western 'scientific' models of communication are, like the Shannon-Weaver model, linear, logical, and sequential in accordance with the pattern of efficient causality.

These are all in the figure-minus-ground mode of the left hemisphere, and in contrast do not relate to the effects of simultaneity and discontinuity and resonance that typify experience in an electronic culture. For use in the

18 For over a thousand years, based on the Book of Genesis, the West had propounded a theory of nature as one of the forms of Divine revelation. There were two books, the Book of Nature and the Book of Scripture, parallel texts in different idioms as it were, both subject to exegesis. Shakespeare frequently alludes to this tradition of multilevel exegesis; in *As You Like It*, the exiled Duke remarks to his companions, the woods 'are counsellors / that fleetingly persuade me what I am . . . And this our life, exempt from public haunt / Finds tongues in trees, books in the running brooks, / Sermons in stones, and good in everything' (II, 1, 10–17). 'The Book of Nature was an encyclopedia of being: only God spoke in events. In the minds of the Middle Ages every event, every case, fictitious or historic, tends to crystalize, to become a parable, an example, a proof, in order to be applied as a standing instance of a general moral truth. In the same way every utterance becomes a dictum, a maxim, a text. For every question of conduct Scripture, legends, history, literature, furnish a crowd of examples or of types, together making up a sort of moral clan, to which the matter in question belongs.' J. Huizinga, *The Waning of the Middle Ages*, 227).

electric age, a right-hemisphere model of communication is necessary, both because our culture has nearly completed the process of shifting its cognitive modes from the left to the right hemisphere, and because the electronic media themselves are right-hemisphere in their patterns and operation. The problem is to discover such a model that yet is congenial to our culture with its residuum of left-hemisphere tradition. Such a model would have to take into account the apposition of both figure and ground instead of concentrating solely on an abstract sequence or movement isolated from any ground.

3

For the end which this science of mine proposes is the invention not of arguments but of arts; not of things in accordance with principles, but of principles themselves; not of probable reasons, but of designations and directions for works. And as the intention is different, so, accordingly, is the effect; the effect of the one [Old Science] to overcome an opponent in argument, of the other to command nature in action.

Francis Bacon, *The Great Instauration*

LAWS OF MEDIA

Sir Karl Popper's (right-brain) statement that a scientific law is one so stated as to be capable of falsification made it both possible and necessary to formulate the laws of the media.

All of man's artefacts – whether language, or laws, or ideas and hypotheses, or tools, or clothing, or computers – are extensions of the physical human body or the mind. Man the tool-making animal has long been engaged in extending one or another of his sense organs in such a manner as to disturb all of his other senses and faculties. But having made these experiments, men have consistently omitted to follow them with observations.

J.Z. Young, in *Doubt and Certainty in Science*, notes:

The effect of stimulations, external or internal, is to break up the unison of action of some part or the whole of the brain. A speculative suggestion is that the disturbance in some way breaks the unity of the actual pattern that has been previously built up in the brain. The brain then selects those features from the input that tend to repair the model and to return the cells

to their regular synchronous beating. I cannot pretend to be able to develop this idea of models in our brain in detail, but it has great possibilities in showing how we tend to fit ourselves to the world and the world to ourselves. In some way the brain initiates sequences of actions that tend to return it to its rhythmic pattern, this return being the act of consummation, or completion. If the first action performed fails to do this, fails that is to stop the original disturbance, then other sequences may be tried. The brain runs through its rules one after another, matching the input with its various models until somehow unison is achieved. This may perhaps only be after strenuous, varied, and prolonged searching. During this random activity further connexions and action patterns are formed and they in turn will determine future sequences. (pages 67–8)

The inevitable drive for 'closure,' 'completion,' or equilibrium occurs with both the suppression and the extension of human sense or function. It was Edward T. Hall who in our time first drew attention to the fact that all human artefacts are extensions of man. In *The Silent Language*, he wrote:

Today man has developed extensions for practically everything he used to do with his body. The evolution of weapons begins with the teeth and the fist and ends with the atom bomb. Clothes and houses are extensions of man's biological temperature-control mechanisms. Furniture takes the place of squatting and sitting on the ground. Power tools, glasses, tv, telephones, and books which carry the voice across both time and space are examples of material extensions. Money is a way of extending and storing labor. Our transportation networks now do what we used to do with our feet and backs. In fact, all man-made material things can be treated as extensions of what man once did with his body or some specialized part of his body.¹

Hans Hass, in *The Human Animal*, sees this power to create additional prosthetic organs as 'an enormity from the evolutionary standpoint ... an advance laden with unfathomable consequences' (page 101).

Our *laws of media* are observations on the operation and effects of human artefacts on man and society, since a human artefact 'is not merely an implement for working upon something, but an extension of our body, effected by the artificial addition of organs; ... to which, to a greater or

1 E.T. Hall, *The Silent Language*, 56–7. However, the notion is of a respectable age: Two generations ago, Emerson made the observation, 'The human body is the magazine of inventions, the patent office where are the models from which every hint was taken. All the tools and engines on earth are only extensions of its limbs and senses. One definition of man is "an intelligence served by organs"' ('Works and Days,' 151).

lesser degree, we owe our civilization.² Hass considered the advantages of our bodily extensions to be five:

- (a) They have no need of constant nourishment, thus saving energy.
- (b) They can be discarded or stored rather than carried (a further saving of energy).
- (c) They are exchangeable, enabling man to specialize and to play multiple roles: when carrying a spear, he can be a hunter, or with a paddle he can move across the sea
- (d) All of these instruments can be shared communally.
- (e) They can be made in the community by 'specialists' (giving rise to handicrafts). (*The Human Animal*, 103–4)

One thing Hass overlooks is the absence of biological or psychological means of coping with the effects of our own technical ingenuity. The problem is clearly indicated by A.T.W. Simeons in *Man's Presumptuous Brain*:

But when, about half a million years ago, man began very slowly to embark upon the road to cultural advance, an entirely new situation arose. The use of implements and the control of fire introduced artifacts of which the cortex could avail itself for purposes of living. These artifacts had no relationship whatever to the organization of the body and could, therefore, not be integrated into the functioning of the brain-stem.

The brain-stem's great body-regulating centre, the diencephalon, continued to function just as if the artifacts were non-existent. But as the diencephalon is also the organ in which instincts are generated, the earliest humans found themselves faced with a very old problem in a new garb. Their instinctive behaviour ceased to be appropriate in the new situations which the cortex created by using artifacts. Just as in the pre-mammalian reptiles the new environment in the trees rendered many ancient reflexes pointless, the new artificial environment which man began to build for himself at the dawn of culture made many of his animal reflexes useless. (page 43)

To put it briefly, man cannot trust himself when using his own artefacts. For example, Konrad Lorenz argues (*On Aggression*) that if man had more weaponry and armour as an organic part of himself, if he had tusks and

2 Hass, *The Human Animal*, 101. In the same vein, Karl Popper wrote, 'the kind of extra-personal or exosomatic evolution that interests me here is this: instead of growing better memories and brains, we grow paper, pens, typewriters, dictaphones, the printing press and libraries. These add to our language — what may be described as new dimensions. The latest development... is the growth of computers' (*Objective Knowledge*, 238–9).

horns, he would be less likely to kill his fellow men. Heavily armed animals have strong inhibitions against hurting their own species. Men, however, have few built-in restraints against turning their artificial weapons (extensions) upon one another. Firearms and bombs, which permit deadly action at great distances, seem to relieve the user of responsibility. Anthony Storr in *Human Aggression* observes:

It is obviously true that most bomber pilots are *no better and no worse* than other men. The majority of them, given a can of petrol and told to pour it over a child of three and ignite it, would probably disobey the order. Yet, put a decent man in an aeroplane a few hundred feet above a village, and he will, without compunction, drop high explosives and napalm and inflict appalling pain and injury on men, women and children. The distance between him and the people he is bombing makes them into an impersonal target, no longer human beings like himself with whom he can identify (page 112)

Lorenz speaks in a similar fashion:

Humanity would have indeed destroyed itself by its first inventions, were it not for the very wonderful fact that inventions and responsibility are both the achievements of the same specifically human faculty of asking questions.

The deep, emotional layers of our personality simply do not register the fact that the crooking of the forefinger to release a shot tears the entrails of another man. No sane man would even go rabbit-hunting for pleasure if the necessity of killing his prey with his natural weapons brought home to him the full emotional realization of what he is actually doing.

The same principle applies to an even greater degree to the use of modern remote-control weapons (On *Aggression*, page 242)

Quite apart from the use of weaponry at a distance, there is the effect of the changes in man himself that result from using his own devices to create environments of service.³ Any new service environment, such as those created by the alphabet or railways or motor cars or telegraph or radio, deeply modifies the very nature and image of people who use it. As electric media proliferate, whole societies at a time become discarnate, detached

3 Emerson put it similarly: 'These tools have some questionable properties. They are reagents. Machinery is aggressive. The weaver becomes a web, the machinist a machine. All tools are in one sense edge-tools, and dangerous. A man builds a fine house; and now he has a master, and a task for life: he is to furnish, watch, show it, and keep it in repair, the rest of his days. A man has a reputation, and is no longer free, but must respect that. A man makes a picture or a book, and, if it succeeds, 't is often the worse for him. I saw a brave man the other day, hitherto as free as the hawk or the fox of the wilderness, constructing his cabinet of drawers for shells, eggs, minerals, and mounted birds. It was easy to see that he was amusing himself with making pretty links for his own limbs ... The machine unmakes the man. Now that the machine is so perfect, the engineer is nobody' ('Works and Days,' 157-8).

from mere bodily or physical 'reality' and relieved of any allegiance to or sense of responsibility to or for it.

Radical changes of identity, happening suddenly and in very brief intervals of time, have proved more deadly and destructive of human values than wars fought with hardware weapons.

In the electric age, the alteration of human identity by new service environments of information has left whole populations without personal or community values to a degree that far exceeds the effects of food- and fuel- and energy-shortages.

Sir Peter Medawar has written a fine essay entitled 'What's Human about Man Is His Technology' in which he offers the straight hardware approach to considering microscopes and radio telescopes as sensory accessories, whereas cutlery, hammers, and automobiles 'are not sensory but motor accessories.' All such sensory and motor organs 'receive their instructions from ourselves.' Moreover, Medawar considers that although 'we are integrated psychologically with the instruments that serve us,' there is no question in his mind of our serving these instruments: to him they are neutral. He does not consider the total change of social surround created by environments of services brought into existence by these extensions of our bodily organs. Man and society remain essentially unchanged by these extensions which merely serve to enhance convenience or to lessen hardship. Such, at least, is Medawar's implication.

The main characteristic of man 'is not so much the devising of tools as the communication from one human being to another of the know-how to make them.' We cannot transmit our newly acquired 'organs' by any process of biological heredity: 'By no manner of means can the blacksmith transmit his brawny arms to his children, but there is nothing to stop him from teaching his children his trade, so that they grow up to be as strong and skillful as himself.' That is as far as Medawar is prepared to go. 'The evolution of this learning process ... represents a fundamentally new biological stratagem - more important than any that preceded it - and totally unlike any other transaction of the organism with its environment.' The transformational effects of our artificial organs - they generate totally new conditions of environmental service and of life - these are the concerns of *Laws of Media*.

The artist is the person who invents the means to bridge between biological inheritance and the environments created by technological innovation.

Without the artist's intervention man merely adapts to his technologies and become their servo-mechanism. He worships the Idols of the Tribe, of the Cave, and of the Market. The canoeist or the motorist achieves his equilibrium by the cultivation of reflexes, becoming an extension of these situations. In *Men without Art*, Wyndham Lewis explained that the role of art is to liberate man from the robot status imposed by 'adjusting' to technologies. Rimbaud had put the matter simply: the job of the artist is 'le dérèglement de tous les sens,' the upsetting of enslavements of equilibrium and homeostasis by awakening the faculties to full awareness. In 'The Caliph's Design II,' Lewis described art as perfecting the evolutionary process: 'The creation of a work of art is an act of the same description as the evolution of wings on the sides of a fish, the feathering of its fins; or the invention of a weapon within the body of a hymenopter to enable it to meet the terrible needs of its life' (*Wyndham Lewis the Artist: From 'Blast' to Burlington House*, 257). Lewis added: 'The artist is older than the fish, having access to primal sources of insight and design.'

Media, that is, the ground-configurations of effects, the service environments of technologies, are inaccessible to direct examination since their effects are mainly subliminal. Ferdinand de Saussure in his *Course in General Linguistics* makes the same point in saying that 'the concrete entities of language are not directly accessible,' and like media 'everywhere and always there is the same complex equilibrium of terms that mutually condition each other' (page 110).

Our laws of media are intended to provide a ready means of identifying the properties of and actions exerted upon ourselves by our technologies and media and artefacts. They do not rest on any concept or theory, but are empirical, and form a practical means of perceiving the action and effects of ordinary human tools and services. They apply to all human artefacts, whether hardware or software, whether bulldozers or buttons, or poetic styles or philosophical systems. The four laws are framed as questions:

- What does the artefact enhance or intensify or make possible or accelerate? This can be asked concerning a wastebasket, a painting, a

steamroller, or a zipper, as well as about a proposition in Euclid or a law of physics. It can be asked about any word or phrase in any language.

- If some aspect of a situation is enlarged or enhanced, simultaneously the old condition or unenhanced situation is displaced thereby. What is pushed aside or obsolesced by the new 'organ'?
- What recurrence or retrieval of earlier actions and services is brought into play simultaneously by the new form? What older, previously obsolesced ground is brought back and inheres in the new form?
- When pushed to the limits of its potential (another complementary action), the new form will tend to reverse what had been its original characteristics. What is the reversal potential of the new form?

This tetrad of the effects of technologies and artefacts presents not a sequential process, but rather four simultaneous ones. All four aspects are inherent in each artefact from the start. The four aspects are complementary, and require careful observation of the artefact in relation to its ground, rather than consideration in the abstract. Usually, 'media study' (and equally, promotion) covers only the first two aspects, enhancement and obsolescence, and these lightly.

In tetrad form, the artefact is seen to be not neutral or passive, but an active logos or utterance of the human mind or body that transforms the user and his ground.

Enhancement and obsolescence are obviously complementary actions. Any new technique or idea or tool, while enabling a new range of activities by the user, pushes aside the older ways of doing things. Money speeds transactions and gives rise to uniform pricing systems, obsolescing haggle and barter and much of the human relation to commodities. The motor car enhances private mobility, and pushes aside the old organization of the city in favour of the suburb. 'No-fault divorce' enhances the corporate sharing of risk and responsibility and displaces private responsibility. 'The pill' tends to banish insecurity and uncertainty, while enhancing the 'programmable machine' approach to the body and numbing the user to its more human (fallible) dimensions, thus providing an amoral base for promiscuity. The photograph enhances pictorial realism and obsolesces portrait painting. The vacuum cleaner obsolesces the broom and the beater; the dryer

pushes aside the clothes-line, and the washer the washboard and tub; the refrigerator replaces the icebox and the root cellar. Some forms are so evanescent they have their own built-in obsolescence. Nothing is as stale as yesterday's newspaper – until it can be retrieved as valuable documentary evidence or nostalgic treat. The computer speeds calculation and retrieval, obsolescing the 'Bob Cratchit' bookkeepers. Romanticism in poetry gave impetus to individual hyperaesthesia and pushed aside the eighteenth-century rationalist sensibility (left-hemisphere). 'In every fixed definition there is obsolescence or failed insight' (George Steiner, *After Babel*, 234). These are fairly easy aspects of the tetrad. The relation between obsolescence and retrieval is much more subtle. *From Cliché to Archetype* was written on this theme.

As outlined on the dust-jacket, the theme is 'new' archetype is 'ye olde cliché writ large.' Obsolescence is not the end of anything; it's the beginning of aesthetics, the cradle of taste, of art, of eloquence and of slang. That is, the cultural midden-heap of cast-off clichés and obsolescent forms is the matrix of all innovation. Petrarch's *Ruins of Rome* was the fount of a new humanist culture. Gutenberg technology retrieved the entire ancient world, while obsolescing the scriptoria and scholasticism of the Middle Ages. The needs of poet, musician, and artist for ever-new means of probing and exploring experience send them back again and again to the rag-and-bone shop of abandoned cliché.

The testimony of artists in this matter is impressive. The stages by which the literary archetype became substituted for the technical cliché as the means of creation is one of the subjects of this book [*From Cliché to Archetype*].

As a case in point, Yeats begins 'The Circus Animals' Desertion' by saying:

I sought a theme and sought for it in vain
 I sought it daily for six weeks or so.
 Maybe at last, being but a broken man,
 I must be satisfied with my heart, although
 Winter and summer till old age began
 My circus animals were all on show,
 Those stilted boys, that burnished chariot,
 Lion and woman and the Lord knows what.

This poem is a *ricorso* or rehearsal, a retrieval of Yeats's entire career. Seeing himself as an old man, he has thrown himself on the scrap heap. He has archetypalized himself, but first he rehearses all the clichés of his art, all the innovations that he had introduced into the drama and poetry of his time.

'What can I but enumerate old themes?'
 Having surveyed these stages of his art, his innovations and experiments, he simply says,

Those masterful images because complete,

Grew in pure mind, but out of what began?

His answer presents the main theme of *From Cliché to Archetype*: the new poetic techniques and images are retrieved from:

A mound of refuse or the sweepings of a street,

Old kettles, old bottles, and a broken can,

Old iron, old bones, old rags, that raving slut

Who keeps the till ...

Yeats brings in here the whole theme of commerce as part of the poetic process. His poetic exhibitionism under the big top is done. The images retrieved from 'the rag-and-bone shop' out of which he built his ladder for the high-wire act are now complete and cast aside. His 'Jacob's ladder' is gone.

'I must lie down where all the ladders start.' The theme in *From Cliché to Archetype* is simply the scrapping of all poetic innovation and cliché when it has reached a certain stage of use. Masterful forms and images, when complete, are cast aside to become 'the rag-and-bone shop of the heart' – that is, the world of the archetype.

What about Jacob's ladder? Jacob lay down only to climb a ladder, or to dream, at least, of a ladder of angels ascending and descending in heavenly hierarchy. Yeats regards the moment of poetic breakdown as a new breakthrough, the beginning again of the ascent and descent of Jacob's ladder of heavenly vision.

As his poetic clichés collapse and are scrapped, he turns to the retrieval of old forms for new clichés. It is the worn-out cliché that reveals the creative or archetypal processes in language as in all other processes and artifacts. (*From Cliché to Archetype*, 126–7)

Brunelleschi and Alberti introduced the mathematical science of perspective-illusion drawing to Renaissance Europe, obsolescing the medieval symbolist style of multiple perspective, and carefully retrieving the linear perspective of Ptolemy in the second century. Samuel Edgerton Jr has detailed this retrieval and its development as an updating of medieval and scholastic sensibility in his *The Renaissance Rediscovery of Linear Perspective*. Retrieval is not simply a matter of hauling the old thing back onto stage, holus-bolus. Some translation or metamorphosis is necessary to place it into relation to the new ground – as anyone can testify who has experienced 'revivals' in our culture, whether in fashion or music or any other form. The old thing is brought up to date, as it were. For archaic or tribal man, in acoustic space, there is no past, no history – always present. Today we experience a return to that outlook when technological breakthroughs have become so massive as to bring one environment into collision with another, from telephone to radio to tv to satellite to computer.

Interface, of the resonant interval as 'where the action is' in all structures, whether chemical, psychic, or social, involves touch.

Touch, as the resonant interval or frontier of change and process, is indispensable to the study of structures. It involves also the idea of 'play,' as in the action of the interval between wheel and axle, as the basis of human communication. Since electronic man lives in a world of simultaneous information, he finds himself increasingly excluded from his traditional (visual) world, in which space and reason seem to be uniform, connected and stable. Instead, Western (visual and left-hemisphere) man now finds himself habitually relating to information structures that are simultaneous, discontinuous, and dynamic. Hearing, as such, is from all directions at once, a 360-degree sphere. Electrically, knowing is now from all directions at once in a 360-degree sphere, so that knowing itself has been recast or retrieved in acoustic form, as it were.

In 1917, T.S. Eliot in his 'Tradition and the Individual Talent' stressed the view that all art from Homer to the present formed a simultaneous order and that this order was perpetually motivated, renewed, and retrieved by new experience. His symbolist approach to language and art and communication is well indicated in his celebrated definition of the auditory imagination:

What I call the 'auditory imagination' is the feeling for syllable and rhythm, penetrating far below the conscious levels of thought and feeling, invigorating every word: sinking to the most primitive and forgotten, returning to the origin, and bringing something back, seeking the beginning and the end. It works through meanings, certainly, or not without meanings in the ordinary sense, and fuses the old and obliterated, and the trite, the current, and the new and the surprising, the most ancient and the most civilized mentality. (*The Use of Poetry and the Use of Criticism*, 118–19)

The definition points to the endless process of change and transformation and retrieval implicit in this simultaneous and homeostatic structure, which is dedicated to eternal stability. Much of the confusion of our present age stems naturally from the divergent experience of Western literate man, on the one hand, and his new surround of simultaneous or acoustic knowledge, on the other. Western man is torn between the claims of visual and auditory cultures or structures.

Neo-acoustic space gives us simultaneous access to all pasts. As for

tribal man, for us there is no history. All is present, and the mundane becomes mythic:

If we can consider form the reversing of archetype into cliché, as for example the use of an archetypal Ulysses in James Joyce's novel to explore contemporary consciousness in the city of Dublin, then we may ask what would be the status of this pattern in primordial times, in the medieval period, and today. The answer would seem to be that in primordial times and today this archetype-into-cliché process is perfectly normal and accepted but that in the medieval period it is exceptional and unusual. The Balinese say, 'We have no art, we do everything as well as possible.' The artist in the Middle Ages, Renaissance, or the era up to the nineteenth century was regarded as a unique, exceptional person because he used an exceptional, unusual process. In primordial times, as today, the artist uses a familiar, ordinary technique and so he is looked upon as an ordinary, familiar person. Every man today is in this sense an artist – the administrator, the scientist, the doctor, as well as the man who uses paint or sculpts stone. Just as the archaic man had to follow natural processes of rhythm in order to influence and to purge, cleanse them by *ricorso*, so modern electric technologies require such timing and precision that only the following of processes in nature can be tolerated. The immediately preceding centuries of mechanization had been able to bypass these processes by fragmentation and strip-mining kinds of procedures. (From *Cliché to Archetype*, 118–19)

The fall or scrapping of a culture world puts us all into the same archetypal cesspool, engendering nostalgia for earlier conditions.

Perhaps previous phases of culture seem more secure because they are fixed and processed in memory. Initially, any cliché is a breakthrough into a new dimension of experience. Alfred North Whitehead mentions in *Science and the Modern World* that the great discovery of the nineteenth century was that of the technique of discovery. The art of discovery, the art of acoustic, probing awareness, is now a cliché, and creativity has become a stereotype of the twentieth century. Dis-covery, or uncovering, is a form of retrieval.

The archetype is retrieved awareness or consciousness. It is consequently a retrieved cliché – an old cliché retrieved by a new cliché. Since a cliché is a unit extension of man, an archetype is a quoted extension, medium, technology, or environment, an old ground seen as figure through

a new ground. The cliché, in other words, is incompatible with other clichés, but the archetype is extremely cohesive: the residues of other archetypes adhere to it. When we consciously set out to retrieve one archetype, we unconsciously retrieve others, and this retrieval recurs in infinite regress. In fact, whenever we 'quote' one consciousness, we also 'quote' the archetypes we exclude; and this quotation of excluded archetypes has been called by Freud, Jung, and others 'the archetypal unconscious' (see *From Cliché to Archetype*, 21–2).

Jung and his disciples have been careful to insist that the archetype is to be distinguished from its expression. Strictly speaking, a Jungian archetype is a power or capacity of the psyche. Nevertheless, even in Jung's writings the term is used with interchangeable senses. In *Psyche and Symbol* Jung declares that 'the archetype is an element of our psychic structure and thus a vital and necessary component in our psychic economy. It represents or personifies certain instinctive data of the dark primitive psyche: the real, the invisible *roots of consciousness*.' Jung is careful to remind literary critics to consider the archetype as a primordial symbol:

The archetypes are by no means useless archaic survivals or relics. They are living entities, which cause the praeformation of numinous ideas or dominant representations. Insufficient understanding, however, accepts these praeformations in their archaic form, because they have a numinous appeal to the underdeveloped mind. Thus Communism is an archaic, primitive and therefore highly insidious pattern which characterizes primitive social groups. It implies lawless chieftainship as a vitally necessary compensation, a fact which can only be overlooked by means of a rationalistic one-sidedness, the prerogative of the barbarous mind.

It is important to bear in mind that my concept of the 'archetypes' has been frequently misunderstood as denoting inherited patterns of thought or as a kind of philosophical speculation. In reality they belong to the realm of the activities of the instincts and in that sense they represent inherited forms of psychic behaviour. As such they are invested with certain dynamic qualities which, psychologically speaking, are designated as 'autonomy' and 'numinosity' (*Psyche and Symbol*, xvi).

Jung accounts for his theory of archetypes by means of the hypothesis of a collective race memory, although he is well aware that there is no scientific acceptance for such an idea. His justification, however, for using the concept of a collective memory is based on the recurrence over a wide area of archetypal patterns in artefacts, literatures, arts, and so on, apart from the shaky scientific basis (see *From Cliché to Archetype*, 22–3). While a new form or technology pervades the host culture as a new cliché, it simultaneously consigns the former and now obsolete cliché or homeostasis to the cultural rag-and-bone shop.

Older clichés are retrieved both as inherent principles that inform the new ground and new awareness, and as archetypal nostalgia figures with transformed meaning in relation to the new ground.

The automobile ended the age of the horse and buggy, but these returned with new significance and experience as the movie 'Western.' The tetrad – the four laws considered simultaneously, as a cluster – is an instrument for revealing and predicting the dynamics of situations and innovations. Nevertheless the usual 'archetypal' explanations are inadequate because they regard the archetype as a figure minus a ground. In this regard, Jean Piaget observed:

Before we go on, we should stress the importance of this notion of equilibration, which enables us to dispense with an archetypal explanation for the prevalence of good forms. Since equilibration laws are coercive, they suffice to account for the generality of such processes of form selection; heredity need not be called in at all. Moreover, it is equilibration which makes Gestalten reenter the domain of structure ... for whether physical or physiological, equilibration involves the idea of transformation within a system and the idea of self-regulation. Gestalt psychology is therefore a structuralist theory more on account of its use of equilibration principles than because of the laws of wholeness it proposes.⁴

Both the retrieval and reversal aspects of the tetrad involve metamor-

- 4 *Structuralism*, 57. Harold Innis, in *The Bias of Communication* and in *Empire and Communications*, made many historical observations on the differing Gestalt patterns and structures in human organization as they related to different means available for shaping situations. One of his most frequent illustrations of this principle concerned the types of bureaucracy that grew from the use of stone, on the one hand, and paper, on the other hand, as materials for writing. When stone or brick or clay are used as writing materials, the bureaucracy or human organization of interests and energies tends to take a priestly form dedicated to stability in time. When paper is available, the bureaucracy tends to become military, with a strong interest in the control of space. Innis was not only concerned with the study of changes in the outer patterns of human organization resulting from different means of communication in time and space, but he was much interested in the changes that took place in the perceptual lives of the people involved in these changes. He played the inner and outer aspects of innovation and change back and forth across each other as a figure/ground inter'ace.

phosis. The tired cliché, movies, became available as an art form when it replaced them as the entertainment surround. Likewise the entire planet has been retrieved as a programmable resource and art form (i.e., ecology) as a side-effect of the new satellite ground. Money obsolesces barter, but retrieves potlatch in the form of conspicuous consumption. The digital watch displaces the old circular dial, and retrieves the sundial form, which likewise used light itself to tell the time and which also had no moving parts. In the West, electronic technology displaces visual space and retrieves acoustic space in a new form, as the ground now includes the detritus of alphabetic civilization. However, the effect in the East is quite different, to the degree that its culture does not include a ground of phonetic literacy and industrial hardware. Harold Innis showed (*Empire and Communications*) how a shift in the media of writing, from clay tablets or stone to papyrus, was sufficient to displace temple bureaucracies by military ones with expansionist programs of conquest. The new speed of the lightweight medium was enough to release left-hemisphere outward drive and aggression. At present, Iran is enjoying the impact of electric media and driving inward at a furious rate, having shifted from a military- to a temple-controlled government, and spearheading a revival of ancient Islamic mores that is more than latent in many of Iran's neighbours.

The principle that during the stages of their development all things appear under forms opposite to those that they finally present is an ancient doctrine. Interest in the power of things to reverse themselves by evolution is evidenced by a great diversity of observations, sage and jocular. Alexander Pope wrote, in 'Essay on Man' (Epistle II):

Vice is a monster of such frightful mien
As to be hated needs but to be seen;
But seen too oft, familiar with its face,
We first endure, then pity, then embrace.

The resonant juxtapositions of Pope's epigrammatic style automatically induce comprehensive awareness of whole situations: alert readers will have noted that Pope has covered all four of the tetrad processes.

In *Take Today: The Executive as Drop-out* the main themes were the three principal reversals of Western form wrought by electric information: from hardware to software, from job-structure to role-playing, and from centralism to decentralism. In the age of electric information and programmed production, commodities themselves assume more and more the character of information, although this trend appears mainly in the advertising budget. In his *A Study of History* Arnold Toynbee notes a great many reversals of form and dynamic, as when, in the middle of the fourth century AD, the Germans in the Roman service began abruptly to be proud of their tribal names and to retain them.

Such a moment marked new confidence born of saturation with Roman values, and it was a moment marked by the complementary Roman swing toward primitive values. (As Americans saturate with European values, especially since tv, they begin to insist upon American coach lamps, hitching posts, and colonial kitchenware as cultural objects.) Just as the barbarians got to the top of the Roman social ladder, the Romans themselves were disposed to assume the dress and manners of tribesmen out of the same frivolous and snobbish spirit that attached the French court of Louis *xvi* to the world of shepherds and shepherdesses. It would have seemed a natural moment for the intellectuals to have taken over while the governing class was touring Disneyland, as it were. So it must have appeared to Marx and his followers. But they reckoned without understanding the dynamics of the new media of communication. Marx based his analysis most untimely on the machine, just as the telegraph and other implosive forms began to reverse the mechanical dynamic.

... in any medium or structure there is what Kenneth Boulding calls a 'break boundary at which the system suddenly changes into another or passes some point of no return in its dynamic processes'...

One effect of the static photo had been to suppress the conspicuous consumption of the rich, but the effect of the speed-up of the photo had been to provide fantasy riches for the poor of the entire globe.

Today the road beyond its break boundary turns cities into highways, and the highway proper takes on a continuous urban character. Another characteristic reversal ... is that the country ceases to be the center of all work, and the city ceases to be the center of leisure. In fact, improved roads and transport have reversed the ancient pattern and made cities the centers of work and the country the place of leisure and recreation.

Earlier, the increase of traffic that came with money and roads had ended the static tribal state (as Toynbee calls the nomadic food-gathering culture). Typical of the reversing that occurs at break boundaries is the paradox that nomadic mobile man, the hunter and food-gatherer is socially static. On the other hand, sedentary, specialist man is dynamic, explosive, progressive. The new magnetic or world city will be static and iconic or inclusive. (*Understanding Media*, 37-8)

The reversal aspect of the tetrad is succinctly exemplified in a maxim from information theory: data overload equals pattern recognition. Any word or process or form, pushed to the limits of its potential, reverses its characteristics and becomes a complementary form, just as the airplane reverses its controls when it passes the 'sound barrier.' Money (hardware), pushed to its limit, reverses into the lack of money, that is, credit (software or information), and the credit card. At high speed or in great quantity, the motor car reverts to nautical form, and traffic (or a crowd) 'flows.' By repetition, an archetype can become a cliché again; or an individual man a

crowd (with no private, but rather corporate, identity). Breakdown becomes breakthrough.

In ‘“Labour-Saving” Means More Work,’ Ruth S. Cowan points to the reversal that every labour-saving device is a new and larger form of work in disguise. ‘Homemakers,’ she writes, ‘log about the same number of hours at their work as their grandmothers did in 1910, 1920, and 1930. The average homemaker, now armed with dozens of motors and thousands of electronic chips, can still spend up to 50 hours a week doing housework’ (page 77). All four aspects of the tetrad can be found in her discussion of the vacuum cleaner, which is a grotesque extension of lungs.

For decades prior to the turn of the century, inventors had been trying to create a carpet-cleaning system that would improve on the semi-annual ritual of *hauling rugs outside and beating them*

But the vacuum cleaner’s introduction coincided almost precisely with the virtual disappearance of the domestic servant. For the most economically comfortable segment of the population, this meant one thing: The female head of the household was doing more housework than she had ever done before. What Maggie had once done with a broom, Mrs. Smith was now doing with a vacuum cleaner

... As living quarters grew, standards for their upkeep increased; rugs had to be vacuumed daily or weekly, rather than semiannually. The net result was that when armed with a vacuum cleaner, homemakers could keep more space cleaner than their mothers and grandmothers would have believed possible. (page 78)

Another reversal occurs because of the proliferation of ‘household technology’: the homemaker leaves the home:

And then there is the automobile. We do not usually think of our cars as household appliances, but that is precisely what they are, since housework, as currently understood, could not be performed without them. The average homemaker is now more likely to be found behind a steering wheel than in front of a stove. She may have to drive her children to school and after-school activities, her husband to work or to public transport. She must shop for groceries. Meanwhile, as more homemakers acquired cars, more businessmen discovered the profitable joys of dispensing with delivery services.

The iceman, in other words, no longer cometh. Nor doth the baker, the butcher, the grocer, the knife sharpener, the seamstress, nor the doctor. Thus a new category has been added to the homemaker’s job description: chauffeur. (pages 78–9)

The next stage in reversal is to the ‘working homemaker’ who retrieves either the job or the home as the aesthetic base.

At electric speed, all forms are pushed to the limits of their potential.

On the telephone or on the air, it isn't messages that travel at electric speed: the sender is sent, minus a body, as information and image, and all the old relationships of speaker and audience tend to be reversed.

The laws of the media in tetrad form reveal some of the subliminal and previously inaccessible aspects of technology. To the extent that these observations reveal the hidden effects of artefacts on our lives, they are endeavours of art, bridging the worlds of biology and technology.

H.J. Eysenck, the British psychologist, observes:

In some form or other, the law of effect has been one of the most widely recognized generalizations in the whole of psychology. 'The belief that rewards and punishments are powerful tools for the selection and fixation of desirable acts and the elimination of undesirable ones' (Postman, 1947) is almost universal, and although the law itself is usually associated with the name of Thorndike (1911) who first used this phrase, he had precursors, e.g. Bain (1868) and Spencer (1870), who brought together the contributions of Associationism, Hedonism, and the Evolutionary Doctrine in a coherent form closely resembling Thorndike's own formulation. This formulation was as follows:

Of several responses made to the same situation, those which were accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that when it returns, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connection with the situation weakened so that, when it recurs, they will be less likely to occur. The greater the satisfaction or discomfort the greater the strengthening or weakening of the bond.

('Personality and the Law of Effect,' 133)

The law of effect is strangely concentrated on the figure and its encounter with other figures, rather than on the figure in relation to the ground, or the total situation. 'Connections' are visual: there is no connection between figure and ground, but only interface. The left-hemisphere bias in Western thought, which directs attention to the figure or the idea or the concept, is typical not only of psychology but of philosophy and of science. Anthropology, in contrast, began by using the ground or the total culture itself as a figure for attention, thus seeming to

break with the two-thousand-year tradition of considering figure-minus-ground. In Thomas Kuhn's study, *The Structure of Scientific Revolutions*, the paradigms or extended metaphors which he sees as channelling scientific endeavours in various fields and times are considered as isolated figures without any social or cultural ground whatever. The only interplay that he allows them is with other paradigms, past or present. (In the Kuhn-Popper debate about legal innovation in science, Popper as it were embodies the obsolescence phase – 'falsification' – and Kuhn the reversal phase: who, one might ask, speaks for the rest of the tetrad?) Moreover, T.S. Eliot's 'Tradition and the Individual Talent' was revolutionary precisely because he considered the totality of language and culture as a unified ground to which the individual talent had to be related. Indeed, a basic assumption of Old Science is the left-hemisphere need for abstract measurement and quantification of effects.

The left-hemisphere paradigm of quantitative measurement and of precision depends on a hidden ground, which has never been discussed by scientists in any field. That hidden ground is the acceptance of visual space as the norm of science and of rational endeavour. The implementors and users of visual space had, and have, the hidden phonemic ground of their discoveries or of their left-hemisphere preferences in the organization of thought and exploration. Today it is easy for us to perceive what programmed them as a hidden ground, because that ground has itself become a figure starkly portrayed against the new ground of the electric information environment. Instant information, as an environment, has the effect of pushing all other subliminal effects up into consciousness. That is, it has this effect with regard to all forms except itself, since the effect of an electric environment is to turn people inward and to substitute the inner trip for outer exploration, being for becoming.

That the hidden grounds of other cultures should now be available for inspection creates the worlds of structural linguistics and of anthropological and ecological studies on a world scale. For 'the structural' is constituted by the simultaneous and is antithetic to the visual, which it now makes perceptible as an exotic figure. When the environment of instant information becomes the hidden ground of all perception, choice, and preference, the ground that underlays the world of precise and quantifiable scientific study is pushed aside or dissolved. All of our other senses create spaces peculiar to themselves, and all of these spaces are indivisible and immeasurable. Tactile space is the space of the resonant interval, as acoustic space is the sphere of simultaneous relations. They are as indivisible as osmic or kinetic space (smell or stress). The study of 'the law of effect' has been the area of scientific study since Galileo; but when data became available at electric speeds of retrieval, pattern recognition and

transformation tended to supplant the exclusive concern with quantifiable results.

The field of 'information theory' began by using the old hardware paradigm of transportation of data from point to point

Since electric information is simultaneously everywhere, the transportation theory yields its relevance to the awareness of transformation of 'software.'

The Western world is hung-up on the problem of visual versus acoustic space, seeming unable to let go of the 'common-sense' visual, even as it flounders in the acoustic ground. Gestalt psychology took a step away from visual space with its figure/ground paradigm. However, most psychologists still assume that both figure and ground are visual components in visual situations. In fact, they form an iconic or tactile relationship, defined by the resonant interval between them.

The degree of confusion that exists in many fields of study with regard to the visual and the acoustic is apparent in Ferdinand de Saussure's *Course in General Linguistics*, with his division of language and speech. For Saussure, language is a total and inclusive world of simultaneous structures (that is, right-hemisphere and acoustic), whereas speech, which is sequential, is a relatively superficial and visual form. With these divisions of language and speech, Saussure associated the *diachronic* and *synchronic*:

But to indicate more clearly the opposition and crossing of two orders of phenomena that relate to the same object, I prefer to speak of *synchronic* and *diachronic* linguistics. Everything that relates to the static side of our science is *synchronic*; everything that has to do with evolution is *diachronic*. Similarly, *synchrony* and *diachrony* designate respectively as language-state and an evolutionary phase ...

The first thing that strikes us when we study the facts of languages is that their succession in time does not exist insofar as the speaker is concerned. He is confronted with a state. That is why the linguist who wishes to understand a state must discard all knowledge of everything that produced it and ignore diachrony. He can enter the mind of speakers only by completely suppressing the past. The intervention of history can only falsify his judgment. (*Course in General Linguistics*, 8)

It probably would have done nothing to clarify these divisions if Saussure had said that the *synchronic* concerns the acoustic world of the inclusive, the simultaneous, and the unchanging. Even now, the futility of referring to visual as opposed to acoustic space resides in the fact that Western man still equates all space with the visual, just as in the eighteenth century all gases were considered variants or pollutions of air. When anthropologist E.R. Leach turns to the thought of Lévi-Strauss, he says: 'Lévi-Strauss is distinguished among the intellectuals of his own country as the leading exponent of "Structuralism," a word which has come to be used as if it denoted a whole new philosophy of life on the analogy of "Marxism" or "Existentialism." What is this "Structuralism" all about?' (*Claude Lévi-Strauss*, 15). When Leach comes to examine the matter, he remarks: 'Two features in Lévi-Strauss' position seem crucial. First, he holds that the study of history diachronically and the study of anthropology cross-culturally but synchronically, are two alternative ways of doing the same kind of things' (pages 7–8). What emerges at once from Leach's approach to Lévi-Strauss is the fact that Leach does not know that the *diachronic* is visual (or left-hemisphere) in structure, and the *synchronic* is acoustic (or right-hemisphere) in structure. Having fallen off the rails completely at that early point in his tour of Lévi-Strauss, he not surprisingly fails to relate to Lévi-Strauss in any way whatever. A great deal of what emerges is ignorance of the character of the *diachronic* and the *synchronic*, including the fact that these categories, used in linguistics and anthropology alike, are not understood as presenting the structural clash between the visual and the acoustic. Elsewhere Leach takes a look behind the work of Lévi-Strauss and discovers:

This, in itself, is no new idea. A much older generation of anthropologists, notably Adolf Bastian (1826–1905) in Germany and Frazer in England held that because all men belong to one species there must be psychological universals (*Elementargedanken*) which should manifest themselves in the occurrence of similar customs among peoples 'who had reached the same stages of evolutionary development' all over the world. Frazer and his contemporaries assiduously compiled immense catalogues of 'similar' customs which were designed to exhibit this evolutionary principle. This is not what the structuralists are up to. (page 22)

The advantage of this passage is that it reveals another set of hang-ups: namely, that the archetypal and transcendental position, where it concerns 'psychological universals,' is itself based on the use of the paradigm of visual structure to the detriment of acoustic structure.

When Coleridge said that all men are born either Platonists or Aristotelians, he was saying that all men tend to be either acoustic or visual in their sensory bias.

But now that this bias has divided the culture of the entire Western World in the electric age, it is no longer a matter of personal temperament or preference, but concerns the very fate of the intelligible, as such. When Leach says 'this is *not* what the structuralists are up to,' he is also declaring his own unawareness of the difference between visual and acoustic structures. He proceeds to relate the work of Roman Jakobson to that of Lévi-Strauss and of Noam Chomsky: 'The influence of Jakobson's style of phonemic analysis on the work of Lévi-Strauss has been very marked; it is therefore relevant that although certain aspects of Jakobson's work have lately been subjected to criticism, Noam Chomsky specifically recognizes the fundamental importance of Jakobson's main theory of distinctive-feature analysis (which reappears in Lévi-Strauss' *Structuralism*) is now rejected by many leading linguists' (page 23).

The inability of Leach to grasp the different structures of the visual and the acoustic is matched by the similar inability of Jakobson, Lévi-Strauss, and Chomsky, all of whom are unwittingly committed to the structures of visual space with its continuities and homogeneities, rather than to the resonant intervals of acoustic space. In spite of the failure to recognize the antithetic nature of the visual and the acoustic, those who feel attracted to structuralism tend to strive to discover inclusive interrelationships in the situations they study.

Visually biased, or left-hemisphere people, accustomed to the abstract study of figures minus their ground, are commonly upset by any sudden intrusion of the forgotten or hidden or subliminal ground:

The human biocomputer is constantly being programmed, continually, simply and naturally, below its levels of awareness, by the surrounding environment.

We noticed that some subjects were quite upset with these effects, which were beyond their immediate control. They would not accept the fact that their brain was reading a word and registering the meaning of that word below their levels of awareness. No matter how hard they tried they could not read the word unless they put their visual axis directly on the

word, thus spoiling the experiment. To avoid such effects, of course, we had an observer looking at their eyes and any cases in which they let their eyes move were discounted. This kind of upset was easily corrected by continuing the demonstrations. As the person got used to such results and accepted them, he no longer became upset by the unconscious operations of his biocomputer. (John C. Lilly, *The Center of the Cyclone*, 67)

It is the role of the artist to keep the community in conscious relation to the changing and hidden ground of its preferred objectives. Anaïs Nin writes of D.H. Lawrence:

Lawrence's characters, whether in poetry, allegory or prophecy, are actors who speak with the very accents of our emotions; and, before we are aware, our feelings become identified and involved with theirs. Some have recoiled from such an awakening, often unpleasant; many have dreaded having to acknowledge this power of their physical sensations, as well as to face in plain words, the real meaning of their fantasies.

Lawrence was reviled for going so far. *There are always those who fear for that integral kernel in themselves, for that divine integrity which can be preserved by ignorance (before psychology) or by religion (before and after psychology) or by the cessation of thought (by the modern paroxysm of activity).* (D.H. Lawrence, 33)

The task confronting contemporary man is to live with the hidden ground of his activities as familiarly as our literate predecessors lived with the figure minus ground.

In his *Propaganda*, Jacques Ellul explains that the basic conditioning or shaping of populations is done, not by programs for various media, but by the media themselves, and by the very language that we take for granted: 'Direct propaganda, aimed at modifying opinions and attitudes, must be preceded by propaganda that is sociological in character, slow, general, seeking to create a climate, an atmosphere of favorable preliminary attitudes' (page 15). After this preparation of the ground, the whole cultural ground itself must be mobilized, not messages but the new configuration of the whole ground constitutes propaganda: 'Propaganda must be total.

The propagandist must utilize all of the technical means at his disposal – the press, radio, tv, movies, posters, meetings, door-to-door canvassing' (page 9). That is, the media themselves, and the whole cultural ground are forms of language and of what Bacon termed Idols of the Marketplace. The transforming power of language is recognized by contemporary phenomenology and linguistics as well:

Further, the usurpation of language does not merely involve the social degradation of words, nor the abuse of our listener's confidence. More profoundly, language inserts itself into the self-consciousness of each man as a screen that distorts him in his own eyes. The intimate being of man is in fact confused, indistinct, and multiple. Language intervenes as a power destined to expropriate us from ourselves in order to bring us into line with those around, in order to model us to the common measure of all. It defines and perfects us, it terminates and determines us. The control of consciousness it exercises makes it the accomplice of having, in its monolithic poverty, as opposed to the plurality of being. To the degree that we are forced to resort to language we renounce our interior life because language imposes the discipline of exteriority. The use of speech is thus one of the essential causes of the unhappy conscience, all the more essential because we cannot be without it. It is this which Bruce Parain has strongly emphasized:

At every moment, each consciousness destroys a little bit of the vocabulary it has received and against which it cannot fail to revolt, because it is not its; but immediately it recreates another vocabulary in which it once again disappears.

(Georges Gusdorf, *Speaking*, 42–3)

The degree to which language as ground biases awareness was very vivid in the experience of Jacques Lusseyran. In his autobiography, *And There Was Light*, he provides an excellent structural or equilibrium approach of his own. The book is an account of the reordering of all of his sensory life as the result of a violent childhood accident in which he lost his sight. Loss of sight greatly enhanced the activity of his other senses and led to the development (or retrieval) of an inner sight as well. Altogether, he became aware that, in the sighted world in which he lived, there were a great many assumptions about perception that needed questioning:

How should I explain the way objects approached me when I was the one walking in their direction? Was I breathing them in or hearing them? ... as I came closer, their mass was modified, often to the point of defining real contours ...

As with the sense of touch, what came to me from objects was pressure ... When I became really attentive and did not oppose my own pressure to my surroundings, then trees and rocks came to me and printed their shape upon me like fingers leaving their impression in wax.

This tendency of objects to project themselves beyond their physical limits produced sensations as definite as sight or hearing. (pages 31 -3)

In presenting the laws of media in tetrad form, our object is to draw attention to situations that are still in process, situations that are structuring new perception and shaping new environments, even while they are restructuring old ones: the structures of media dynamics are inseparable from performance. Our effort has been to draw attention to the laws of composition as well as to the factors of regulation and interplay.

In *The Study of Human Communication*, Nan Lin stated, 'The ultimate goal of science is to explain by means of a set of theories, events that are observed' (page 192) The tetrads of our science are not based on a theory or set of concepts, but rather rely on observation, and on experience, and on percepts. While empirical, they provide a basis for prediction, for example, that retrievals or reversals of a certain form will occur.

As indicated earlier, all human artefacts are extensions of man, outerings or utterings of the human body or psyche, private or corporate. That is to say, they are speech, and they are translations of us, the users, from one form into another form: metaphors.

Etymology is so crucial that it deserves a host of separate studies. Etymology reveals a process of transformation of culture and sensibility and is also a matter of retrieval and of structure: the ground pattern of forces at the levels of molecular and atomic structure. At and beyond this level lies the structure of experience of the utterer; so grammatical flips into rhetorical investigation.

Aristotle first noted that the Greek invention of Nature was made possible when they had left behind a savage or barbaric state (first nature) by putting on an individualized and civilized one (second nature). And A.T.W. Simeons has discussed at length how disruptive the second nature has been to the first. Made discarnate by our electric information media, the West is furiously at work retrieving its obsolesced organic first nature in a spectrum of new aesthetic modes, from feminism to phenomenology. As our second nature consists entirely in our artefacts and extensions and the grounds and narcoses they impose, their etymologies are all to be found in first nature, the wild body. They have no hierarchy or orderly sequence; they subsume, obsolesce, retrieve, extend each other, burrow on each other, hybridize, and miscegenate endlessly. The following list is representative:

club hammer	extends	forearm, fist
clothing	"	skin
house	"	skeleton (as carapace)
saw, knife, bullet	"	teeth
writing	"	eye
mirror, telescope, microscope, camera, spectacles	"	eye
cup, bowl	"	hands (cupped)
refrigerator	"	stomach
weapons	"	arms, legs, teeth, nails
rope	"	sinew
wheel	"	feet (in motion)
crowd	"	group, individual
tribe	"	family
automobile	"	whole body
chair	"	head, eyes (numbs rest)
bed	"	flesh
satellite	"	whole culture
spacecraft	"	planet
stairs	"	legs
number	"	hand, fingers

Whereas mechanical forms extend the limbs and organs, electric technologies beginning with the telegraph extend the nervous system and the conscious and unconscious in one or another manner and degree. (From the etymology of 'technology' it appears that the family extends the individual as the Greek for art, *techne*, and for child, *technon*, have common ancestry.) Technologies are the brain-children of the uttering left hemisphere, so the problem of what any one or group *means* has to be studied also in the way each adjusts the relation between left and right hemispheres and the diencephalon.

In other words, the crucial study that remains is that of working out in precise detail the relations between second and first natures: which organs or faculties are extended or stressed or numbed and in which pattern or degree by each one of our artefacts. This is to make explicit, via etymology, the analogical ratios that constitute our being and our cultures. Language is one resource and, as Joyce found, infallible when handled properly. In the case of the chair, for example, each part is named for the part of the body that it extends and replaces (first nature): feet, legs, seat, back, arms, and so on. Each of these is systemically numbed in the user as the chair diverts energy from it in the direction of the head and eyes. Are nails an extension

of fingernails? of teeth? Our artists have spent endless hours exploring these same matters as they relate to changes in sensibility, so their work may be mined for further clues. Shakespeare saw the Court as the heart of the state, the body politic. The belly addresses the members:

True is it my Incorporate Friends (quoth he)
That I receiue the generall Food at first,
Which you do liue vpon; and fit it is,
Because I am the Store-house, and the Shop
Of the whole Body. But, if you do remember,
I send it through the Riuers of your blood,
Even to the Court, the Heart, to th'seat o' th'Brain ...

(*Coriolanus*, I, i, 137–43)

Perhaps now, in a democracy the pollster is the pacemaker? When James Joyce wrote *Ulysses*, he played on the analogical ratios between texts (his and Homer's) and also between situations, arts, symbols, and organs of the body in organizing his own text.⁵ So he saw, for example, the house as extended skeleton, the bed as deriving from the principle of flesh (padding), the streets as circulation (of blood), and the newspaper as lungs (obsolescing the town crier and retrieving the figures of eloquence). In *Finnegans Wake* he saw the internal-combustion engine as a metaphor for the stomach, which likewise converts fuel into energy.

To date, linguistics, philosophy, and semiotics have all stopped short of etymology (relation between figure and ground), at the limits of denotation or connotation – content and concept. Without ground or the aid of rhetoric or grammar or both they are prevented from making the leap into percepts and true science: media study remains restricted to content and moralism. Similarly with exegesis of words or things dialectic is stopped at the level of description or of matching signifier and signified: only the technique of resonant interplay of figures and grounds will make sense of metaphor, the basis of all words and all speech. Technology – second nature – recapitulates first nature in new forms; that is, it translates from one nature to another; the user is the content and the utterer; technology, as extension/outering, is speech. George Steiner sums up some of the foregoing themes in the light of hemispheric asymmetry:

Some anthropologists argue that the emergence of 'true language' was more sudden, that it coincided with the abrupt forward leap in the elaboration and diversity of tool-making towards the end of the last Ice Age. Neither hypothesis can be verified. But it might be that neither sees the

5. *Vide* his chart of 'Correspondences' reproduced entire in James Joyce. *The Poetry of Conscience* by Mary Parr.

full import of asymmetry. Pavlov's often-reiterated belief is worth recalling. the processes of learning and of language in men are different from those in animals ... The sources of superfluity, with their anatomical analogue in the asymmetries of the cortex, generate new surpluses. Asymmetry, in the central sense of which the configurations of the brain are the enacting form, was the trigger. It set in motion the dissonance, the dialectic of human consciousness. Unlike animal species we are out of balance with and in the world. Speech is the consequence and the maintainer of this disequilibrium. (*After Babel*, 281)

Steiner holds that it is speech that keeps us human and saves us from, as Lewis has it, becoming robots. (Certainly it and our technologies as other speech – we speak our selves – have enacted our two natures, effectively hoicking us out of servitude to Nature, but leaving us slaves to the vagaries of second nature.) The asymmetry he refers to is physical: in 65 per cent of cases studied, the *planum temporale* on the left side of the brain was one-third longer than that on the right.⁶ 'This asymmetry, which seems to be genetically determined, is dramatized by the fact that the great majority of human beings are right-handed. Evidence for this goes back to the earliest known stone tools. No such cerebral unbalance has been found in primates or any other animal species' (*After Babel*, 280–1). This finding strongly suggests a direct relation between an imbalance in first nature and the origin of speech and artefacts – second nature. Steiner is also acutely aware of the enhancement (cognition) and retrieval (re-cognition, re-making) aspects of language and suggests that it was the discovery of the retrieval function that enabled speakers to flip language out of content and into technology:

Then, it may be towards the end of the last Ice Age, occurred the explosive discovery that language is making and re-making, that statements can be free of fact and utility ... There is, to be sure, no evidence that this discovery, with which language as we know it truly begins, was explosive. But interrelated advances in cranial capacity, in the making of tools, and, so far as we can judge, in the lineaments of social organization do suggest a quantum jump. The symbolic affinities between words and fire, between the live twist of flame and the darting tongue, are immemorially archaic and firmly entrenched in the subconscious. (page 230)

6 Steiner, *After Babel*, 280, gives these references: cf. Norman Geschwind and Walter Levitsky, 'Human Brain: Left-Right Asymmetries in Temporal Speech Regions,' *Science*, CLXI, 1968, and Norman Geschwind, 'Language and the Brain,' *Scientific American*, CCXXVI, 1972.

All words, in every language, are metaphors.

Structurally speaking, a metaphor is a technique of presenting or of observing one situation in terms of another situation. It is a technique of awareness, of perception (right hemisphere) not of concepts (left hemisphere). As two situations are involved, there are two figure/ground relations in apposition. Normally, only two of the four elements are made explicit; the others remain implicit.

All metaphors have four components in analogical ratio. 'Cats are the crabgrass of life' presents 'cats are to (my) life as crabgrass is to an otherwise beautiful lawn.' Or, 'she sailed into the room' presents 'her motion entering the room' in terms of a ship's swift (perhaps forceful or graceful) motion under sail. To say that metaphor has four terms that are discontinuous, yet in ratio to one another, is to say that the basic mode of metaphor is resonance and interval – the audile-tactile.

Apropos the four-part structure that relates to all human artefacts (verbal and non-verbal), its existence is certainly not deliberate or intentional. Rather, it is a testimony to the fact that the mind of man is structurally active in all human artefacts and hypotheses. That these appositional ratios are not also present in the structure of the 'natural' world raises an entirely separate question. It is perhaps relevant to point out that the Greeks made no entelechies or observations of the effects of man-made technology, but only of what they considered the objects of the natural world.

The usual approach to metaphor is purely verbal rather than operational or structural, that is, in left-hemisphere terms of the figures only, minus their grounds. Thus, metaphor is discussed as a form of 'sort-crossing' or of 'category mistake' or of 'mis-naming.' For example, as C.M. Turbayne points out:⁷

However appropriate in one sense a good metaphor may be, in another sense there is something inappropriate about it. This inappropriateness results from the use of a sign in a sense different from the usual, which use I shall call 'sort-crossing'. Such sort-crossing is the first definite feature of metaphor and, according to Aristotle, its genus:

Metaphor (meta-phora) consists in giving the thing a name that belongs to something else; the transference (epi-phora) being either from genus to species, or on the grounds of analogy. (*Poetics* 1457b)

7 C.M. Turbayne, *The Myth of Metaphor*, 11. A complete bibliography of the literature on metaphor is presented in *Metaphor: An Annotated Bibliography and History* by Warren A. Shibles.

Elsewhere in the *Rhetoric*, Aristotle betrays his left-hemisphere visual bias in his confusion of metaphor and simile. He regards both of these rhetorical figures as concepts and as prepositional, whereas metaphor is discontinuous, abrupt and appositional. His approach is descriptive rather than structural or perceptual.

Paul Ricoeur's *The Rule of Metaphor* is devoted to an examination and discussion of recent approaches to metaphor from various disciplines, including linguistics, semantics, the philosophy of language, literary criticism, and aesthetics. In discovering the Aristotelian notion of metaphor as 'alien usage' – the 'substitution theory' – he makes a revealing slip regarding his own assumptions about words:

Now the fact that the metaphorical term is borrowed from an alien domain does not imply that it substitutes for an ordinary word which one could have found in the same place. Nevertheless, it seems that Aristotle himself was confused on this point and thus provided grounds for the modern critiques of the rhetorical theory of metaphor. The metaphorical word takes the place of a non-metaphorical word that one could have used (on condition that it exists), so it is doubly alien, as a present but borrowed word and as substitute for an absent word. (page 19)

However, all words are metaphor (except, in a special sense, the word 'word' itself): the non-metaphorical word is a feature only of primitive tribal thought and experience about words. The native hunter or Inuit says, 'Of course "stone" is stone, else how could I know stone?'

Language always preserves a play or figure/ground relation between experience, and perception and its replay in expression.

Poets regard language as the storehouse of experience. It is this same left-hemisphere approach to the right-hemisphere (appositional) properties of language that prompts Ricoeur to relegate all technology to the domain of logos rather than to that of mythos.

At the heart of Ricoeur's approach to metaphor is the 'transportation theory' of communication. It is, he remarks, 'the relationship between Aristotle's embryonic classification and the concept of transportation, which constitutes the unity of meaning of the genus "metaphor"' (page 21). Ricoeur continues:

Two facts should be noted. First, transposition operates between logical poles. Metaphor occurs in an order already constituted in terms of genus and species, and in a game whose relation-rules – subordination, co-ordination, proportionality or equality of relationships – are already given. Second, metaphor consists in a violation of this order and this game. In giving to a genus the name of a species, to the fourth term of the proportional relationship the name of the second term, and vice versa, one simultaneously recognizes and transgresses the logical structure of language (1457b 12–20). The *anthy*, discussed earlier, applies not just to the substitution of one word for another, but also to the jumbling of classification in cases that do not have to do only with making up for lexical poverty. Aristotle himself did not exploit this idea of a categorical transgression, which some modern authors compare to Gilbert Ryle's concept of 'category mistake'. Doubtless this was because he was more interested, within the perspective of his *Poetics*, in the semantic gain attached to the transference of names than in the logical cost of the operation. The reverse side of the process, however, is at least as interesting to describe as the obverse. (page 21)

Ricoeur is trying to hold the discussion of metaphor in terms of the matching rather than the making process, in terms of logic and dialectic instead of poesis, in terms of (descriptive) concepts instead of percepts. To do so, it is necessary to ignore ground and to create a dialectic of polar figures, to reduce proportion to mere equalities (which robs them of resonance), and to interpolate a 'logical structure' of language. In consequence, he speaks of (Aristotelian) analogy, 'which, as we have seen, is analysed as an identity or similarity of two relations' (page 21) and of 'the logical moment of proportionality' (page 34).

A contemporary, Jacques Derrida, sees metaphor as a connected triad of signs progressing from savage to civilized, from first nature to second nature. Working from Rousseau's *Essay*, he proposes that 'it is not fear itself that the word *giant* expresses literally,' but rather 'the idea that the passion presents to us':

The idea 'giant' is at once the literal sign of the representer of the passion, the metaphoric sign of the object [the terrifying man that one calls a giant] and the metaphoric sign of the affect (fear). That sign is metaphoric because it is *false* with regard to the object; it is metaphoric because it is *indirect* with regard to the affect; it is the sign of a sign, it expresses emotion only through another sign, through the representer of fear, namely through the *false* sign. It represents the affect literally only through representing a false representer. (*Of Grammatology*, 277)

Derrida insists on visual matching and connection of figures that contain or point to or represent each other in the triadic chain A:B:C. In this variety of the transportation theory, meaning is carried via matching and connection.

George Steiner confirms that present-day dialecticians are still mired in the transportation approach:

It is worth noting that the development of modern phenomenology has accentuated the areas of overlap between translation theory and the general investigation of sense and meaning. The conceptual claims, the idiom of Husserl, Merleau-Ponty and Emmanuel Levinas force on anyone concerned with the nature of translation a fuller awareness of, a more responsible discomfort at, notions of identity and otherness, of intentionality and signification. When Levinas writes that 'le langage est le dépassement incessant de la Sinnggebung par la signification' (significance constantly transcends designation), he comes near to equating all speech-acts with translation in the way indicated at the outset of this study. [*Totalité et infinie*, 273.] Phenomenological ontologies look very much like meditations on the 'transportability' of meanings. (*After Babel*, 278)

Steiner's own approach, and his entire study, *After Babel*, is based on the grammatical awareness both of metaphor as translation and of translation as transformation of sensibility.

Ricoeur's main problem, and that of most contemporary 'rhetorical' criticism, is related to the confusion that arises from not dealing with something on its own terms. Throughout his discussion, Ricoeur leans on Aristotle's distinction of metaphor as part of rhetoric on the one hand, and as part of dramatic mimesis on the other. His essential point is contained in Aristotle's statement, 'to metaphorsize well implies an intuitive perception of the similarity in dissimilars.' Full explication of the unresolved and unquestioned assumptions in Ricoeur's, and for that matter, all modern examination of metaphor would require an extensive history of the trivium – grammar, dialectic, and rhetoric. As yet, no such history exists, though portions of it are available; for example, in the work of Werner Jaeger, W.S. Howell, Walter Ong, Henri de Lubac, and H.I. Marrou, to mention a few. However, these suffer from not accounting for the interdependence and interaction of the 'three roads' (the trivium).

Intense rivalry characterized the trivium from the outset Plato's and Aristotle's dialectical accounts of rhetoric are severely biased.

The trivium, the arts or sciences of the logos, was born of the phonetic alphabet. As shown in chapter one, the effect of phonetic literacy on the Greek psyche and culture was catastrophic. Mimesis gave way to

individualized detachment, and the integral resonating oral logos was broken into multiple fragments, each bearing some one or another of its original properties. For more than a century a great number of these systems were invented by poets, exegetes, philosophers, rhetors, and so on, but it was the fifth-century Stoics who formulated the essential tripartite relationship. The Stoics developed a 'threefold logos' that served as the pattern for the trivium, although the trivium itself was not formally recognized as the basis of education and science for some time. The pre-alphabetic logos was retrieved in two ways: it informed the Patristic 'doctrine of the logos,' and it was recapitulated in the overlapping structures of the threefold Stoic logos.

Briefly, the relation between the Stoic system and the trivium is as follows: the Stoic *logos hendiathetos* is the inner, abstract word in the mind prior to (or minus) speech. Its pattern appears in dialectic (logic and philosophy) via emphasis on abstraction (figure minus ground) and absolutes, and on correct thought form (sequence), irrespective of audience. The Stoic *logos prophorikos* is the 'uttered word' and corresponds to rhetoric as the science of transforming audiences with speech. Their *logos spermatikos* is the (uttered) logos as 'seeds' embedded in things animate or inanimate that structure and inform them and provide the formal principles of their being and growth (becoming). This third logos is the root of grammar (which meant 'literature') with its twin concerns of etymology and multiple-level exegesis, the ground-search for structure and roots. All of the sciences of the later *quadrivium* (of music, arithmetic, geometry, and astronomy) were subdivisions of grammar, as forms of exegesis of the Book of Nature. Ancient rhetoric and grammar, then, are principally right-hemisphere activities: a dialectical rendering of either one (such as Plato's or Aristotle's), quite aside from partisanship, would be at best a metaphor for, or a biased translation of, the original.

The wars of the Ancients and the Moderns were grounded in a rivalry between the hemispheres.

Throughout its history, the trivium was beset by rivalries, later known as the 'wars of the Ancients and the Moderns.' Grammar (the encyclopedic tradition of learned exegesis and commentary) and rhetoric together usually held control of the trivium against the conflicting claims of the dialecticians.

Following the Greek rhetorician Isocrates, Cicero, and after him Quin-

tilian, established the basic pattern for Western civilized education, reaffirmed by St Augustine four centuries later as the alignment of encyclopedic wisdom and eloquence. That is, with the trivium as a retrieval of the oral logos on the new ground of writing, the conjunction of grammar and rhetoric on the one hand, and dialectic on the other, provided a balance of the hemispheres. For these men, 'tradition' had the same right-hemisphere figure-ground resonance and simultaneity that was proposed by T.S. Eliot (a modern grammarian of ancient ilk). For more than fifteen centuries, most of our Western history, the Ciceronian program, itself a retrieval of the old Greek liberal educational system, the 'egkuklios paideia' (vide Marrou, *A History of Education in Antiquity*) was the basis of liberal education and Christian humanism. With print, via Gutenberg, the visual stress of the alphabet gained new ascendancy.⁸ Spearheaded by the French dialectician Peter Ramus, a new battle of the Ancients (rhetoricians and grammarians) and Moderns (dialecticians) was waged, and dialectic 'Method' obsolesced tradition. Since that time grammar and rhetoric have been cast in a dialectic or left-hemisphere mould, along with all of our arts and sciences. It is only with the return to acoustic space in this century, to right-hemisphere multisensory forms of awareness, that the tables begin to turn once more.

Laws of Media offers a bridge between the hemispheres, a dialogue-structure in accordance with the role of the *corpus callosum*, which neurosurgeons identify as the organ that facilitates interplay between the two types of cognition. Until now, the conventional form in analysis or exposition has been triadic and logical, as in the syllogism. It is ultimately a propositional left-hemisphere form, rigid and connected, in the pattern of efficient cause.

The logical syllogism has the connected triadic or triangular form

All As are Bs.

C is an A.

Therefore C is a B.

as in

8 Cf. *The Gutenberg Galaxy* for a detailed discussion; also cf. *The Coming of the Book*, by Lucien Paul Victor Febvre and Henri-Jean Martin; and Walter Ong, *Ramus, Method and the Decay of Dialogue*, Bogen notes ('Some Educational Implications of Hemispheric Specialization,' 145): 'Although humans of any culture, so far as we know, have the potential for reading and writing, many remain non-literate and thus fall short of acquiring the most special of left-hemisphere functions. Conversely, we can readily comprehend the concept of a society in which right-hemisphere illiteracy is the rule. Indeed, our own society (admittedly complex) seems to be, in some respects, a good example - a scholastized, post-Gutenberg-industrialized, computer-happy exaggeration of the Graeco-Roman penchant for propositionizing.'

All men are mortal.
 All dialecticians are men.
 Therefore all dialecticians are mortal.

Hegel's great *triad* is equally a connected form by virtue of the identity of opposition, of sameness-in-reverse. He set out his writings in dialectical triads comprising a thesis, an antithesis, and a synthesis. Thus, he viewed and reviewed history; thus, he organized his *Encyclopedia*, where he set forth his triadic system, in three sections – 'Logic,' 'Philosophy of Nature,' and 'Philosophy of Mind.' Hegel regarded thought and nature (software and hardware, as we say now) as opposites united in mind and society. The nineteenth century, as Maurice Merleau-Ponty points out, regarded Hegel as 'the possessor of a marvelous secret which enabled him to speak of all things without a thought by mechanically applying dialectical order and connection to them.'⁹

Hence, the grammarian George Steiner inveighs against the sterile triad while he proposes his own tetrad for translation – metaphor writ large:

This view of translation as a hermeneutic of trust (*élancement*), of penetration, of embodiment, and of restitution, will allow us to overcome the sterile triadic model which has dominated the history and theory of the subject. The perennial distinction between literalism, paraphrase and free imitation, turns out to be wholly contingent. It has no precision or philosophic basis. It overlooks the key fact that a fourfold *hermeneia*, Aristotle's term for discourse which signifies because it interprets, is conceptually and practically inherent in even the rudiments of translation. (*After Babel*, 303)

- 9 Maurice Merleau-Ponty, *Signs*, 156. Quite a different Hegel is the subject of the current 'Hegelian Revival.' Merleau-Ponty notes that 'Hegel is the only one who thinks that his system can contain the truth of all the others, and the man who knew the others only through Hegel's synthesis would not know them at all' (page 81). He elaborates: 'Hegel is the Museum. He is if you wish all philosophies, but deprived of their finiteness and power of impact, embalmed, transformed, he believes, into themselves, but really transformed into Hegel. We only have to see how a truth wastes away when it is integrated into different ones (how the Cogito, for example, in going from Descartes to the Cartesians, becomes almost a listlessly repeated ritual) to agree that the synthesis does not effectively contain all past systems of thought, that it is not all that they have been, and finally that it is never a synthesis which is both "in and for itself" – that is, a synthesis which in the same movement is and knows, is what it knows, knows what it is, preserves and suppresses, realizes and destroys. If Hegel means that as the past becomes distant it changes into its meaning, and that we can trace an intelligible history of thought in retrospect, he is right, but on condition that in this synthesis each term remain the whole of the world at the date considered, and that in linking philosophies together we keep them all in their place like so many open significations and let an exchange of anticipations and metamorphoses subsist between them' (page 82).

So he proposes a fourfold 'hermeneutic motion,' and emphasizes 'that the hermeneutic motion is dangerously incomplete, that it is dangerous because it is incomplete, if it lacks its fourth stage, the piston-stroke, as it were, which completes the cycle ... The enactment of reciprocity in order to restore balance is the crux of the metier and morals of translation. But it is very difficult to put abstractly.'¹⁰ Whether syllogistic or Hegelian-dialectical, for some mysterious inherent reason the triad form itself eliminates ground. But when a fourth term is added to a triad, making a tetrad, the form flips into a new one – resonant and appositional and metamorphic.

The tetrads of *Laws of Media* present not sequential but simultaneous facets of media effects. That is to say, they are right-hemisphere in character, and each tetrad comprises two figures and two grounds in proportion to each other. This proportion of ratios is not made of imposed theoretical classifications (as are, say, Hegel's three terms) but are structurally inherent in each of our artefacts and procedures. All four are processes. The tetrads render obsolete all groundless dialectical and systematic Marxist approaches to interpretation of social processes and technological transformations of culture by flipping the discussion into a kind of linguistic of real words.

The laws of the media, in tetrad form, bring logos and formal cause up to date to reveal analytically the structure of all human artefacts.

All words (and languages) are artefacts, each of which manifests this same four-part structure. There are no exceptions. This is the right-hemisphere aspect of language. All non-verbal artefacts – whether safety pins or ICBMs, including also laws of science and institutions – share this same four-part logos-structure in their manifestations and effects. (The tetrad is only applicable to human artefacts, and not, for example, to birds' nests or spiders' webs.) 'Media determinism,' the imposition willy-nilly of new

10 Steiner, *After Babel*, 300. He explains: 'The a-prioristic movement of trust puts us off balance. We "lean towards" the confronting text (every translator has experienced this palpable bending towards and launching at his target). We encircle and invade cognitively. We come home laden, thus again off-balance, having caused disequilibrium throughout the system by taking away from "the other" and by adding, though possibly with ambiguous consequence, to our own. The system is now off-tilt. The hermeneutic act must compensate' (page 300).

cultural grounds by the action of new technologies (e.g., the imposition of visual space and left-hemisphere dominance following our adoption of the alphabet, or the imposition of the feudal system as a 'side-effect' of the stirrup), is only possible while the users are 'well-adjusted' – sound asleep. The vortex of side-effects was pinned by Joyce: 'willed without witting, whorled without aimed.' There is no inevitability where there is a willingness to pay attention.

Insofar as the tetrads are a means of focusing awareness of hidden or unobserved qualities in our culture and technology, they act phenomenologically. From Hegel to Heidegger, phenomenologists have engaged in an attempt to get at the hidden properties or hidden effects of language and technology alike. In other words, they have tackled a right-hemisphere problem using left-hemisphere techniques and modes of cognition. With the tetrads this dilemma is resolved.

All human artefacts are human utterances, or outerings, and as such they are linguistic and rhetorical entities. At the same time, the etymology of all human technologies is to be found in the human body itself: they are, as it were, prosthetic devices, mutations, metaphors of the body or its parts. The tetrad is exegesis on four levels, showing not the mythic, but the logos-structure of each artefact, and giving its four 'parts' as metaphor, or word.

The laws of media in tetrad form belong properly to rhetoric and grammar, not philosophy. Our concern is etymology and exegesis.

This is to place the modern study of technology and artefacts on a humanistic and linguistic basis for the first time.

4

Moreover I have one request to make. I have on my own part made it my care and study that the things which I shall propound should not only be true, but should also be presented to men's minds, how strangely soever preoccupied and obstructed, in a manner not harsh or unpleasant. It is but reasonable however (especially in so great a restoration of learning and knowledge) that I should claim of men one favor in return, which is this: -- If anyone would form an opinion or judgment either out of his own observation, or out of the crowd of authorities, or out of the forms of demonstration (which have now acquired a sanction like that of judicial laws), concerning these speculations of mine, let him hope not that he can do it in passage or by the by; but let him examine the thing thoroughly; let him make some little trial for himself of the way which I describe and lay out; let him familiarize his thoughts with that subtlety of nature to which experience bears witness; let him correct by seasonable patience and due delay the depraved and deep-rooted habits of his mind, and when all this is done and he has begun to be his own master, let him (if he will) use his own judgment.

Francis Bacon, Preface to the *Novum Organon*

TETRAADS

The following tetrads are presented in appositional, poetic form. Every one is tentative. In each, the four laws are in bold face, around them there may be glosses on one or another law:

(gloss)

(gloss)

ENHANCES

REVERSES INTO

RETRIEVES

OBSOLESCE

(gloss)

(gloss)

To minimize clutter and to make the proportional relations between the laws easier to see, the terms 'enhances,' 'obsolesces,' 'retrieves,' and 'reverses into' have been omitted.

There is no 'right way' to 'read' a tetrad, as the parts are simultaneous.

But when 'read' either left-right or top-bottom (Enhance is to Retrieve as Reverse is to Obsolesce, etc.), or the reverse, the proportions and metaphor- or word-structure should appear. (That they may appear more readily in some tetrads than in others suggests the need for a little further tuning.) The subject of the tetrad appears in the top corner.

In this chapter, we have grouped tetrads according to surface characteristics: first, fairly simple ones; then more complex (more glosses); third, a few with alternate versions; and, fourth, chains and clusters. Alternates should be considered simultaneously, as versions of each other. Chains and clusters work through one or another law. A chain forms when, for example, one tetrad's reversal (or retrieval, etc.) provides the subject of the next tetrad, or provides the enhancement (etc.) of the next tetrad. Clusters form where a group of tetrads has one or another of the four laws in common, as when several different media each obsolesce visual bias, or retrieve oral forms, or reverse into the same mode of culture.

**GROUP I:
SIMPLER TETRAIDS**

Booze

Brothel

Cigarette

Crowd

Drugs

Hermeneutics

High-Rise

Kinetic Space

Microphone/PA System

Perspective in Painting

Pipe

Refrigerator

Semeiotics

Tactile Space

Xerox

PERSPECTIVE IN PAINTING

single point
of view

specialism
in high
definition

cubism:
multiple points
of view at once

panoramic
scanning



PIPE

mask and ritual
via operational process

group participation
via environmental smell

contemplative
inner trip

solitary smoker;
need for consideration
of audience

individual
nervous haste



CIGARETTE

calm and poise	nervousness, addiction
ritual, group security	awkwardness, loneliness



BROTHEL

going through the motions

sentimentalism

sex act as
package deal

hallucination for
lonely hearts

the siren as
institution

involvement
and privacy

dreams that money can buy

A house is not a home



SEMEIOTICS

multi-directional

direction	anarchy
cryptic	total field

medievalism

runic;
mysterious

The Name of the Rose



KINETIC SPACE

'Where there is no strain,
there is no history.'
R.G. Collingwood, *Metaphysics*

drive

posture,
pose,
pressure

relaxation

gesture and jest;
'signatures of things,'
the sign

the natural,
casual

body language,
semiotics



HIGH-RISE
(Apartment)

Automobile and electric
media are indispensable
ground.

solitude and
crowding

catacomb

slum

community

An apartment is not a home?

Everybody is a nobody.

cave dweller



REFRIGERATOR

availability of wider range of foods	homogeneity – of flavour and texture
leisure of cook and provider	dried food; salted, spiced;

principle of storage	taste of fresh food
-------------------------	------------------------

stomach

memory



HERMENEUTICS

awareness of
textual difficulty

clarity
depth

obscurity
naïveté

profundity (magical)

innocence

simplistic
interpretation



DRUGS
e.g., tranquillizer

in harmony with electric speed

addictive

tolerance of
pain via instant
relief

from remedy to way of life,
from figure to ground

foetal security

symptoms

disease as art form

narcissism

hypochondria

enjoy your next cold...



TACTILE SPACE

up-beat,
interval

play

up-tight;
the kinetic
(‘he froze ...’)

the connected

the ‘common sense’;
meeting place of all the senses



MICROPHONE / PA SYSTEM

the torch-singer,
who whispers
into everybody's ear

the inflated persona
for everyone to wear

'private'
individual voice

close group
(tribal mode)

intimacy:
the cozy
nightclub

the wrap-around sound-bubble
I'll cuckold the cockeyed world

closed,
collective space

private space,
privacy

the big band
old-fashioned orator
(big-mouth)



BOOZE

private outlook,
energy and zest,
aggressiveness

group sentiment,
songs

depression,
hangover

integral sensibility,
private inhibitions



XEROX

just as the fast
Gutenberg press enlarged
the reading public,
now the speed of printing
becomes the speed of light
(via photographic
process)

**the speed of
the printing
press**

**the oral
tradition**

The (tribal) committee, via
position papers (the happening)
Familiarity breeds. Consensus,
e.g., the 'Pentagon Papers.'

With reader as
publisher, the
reading public
disappears.

**everybody becomes
a publisher**

the assembly-line book

you make your own book:
books no longer uniform and
repeatable



CROWD

E. Canetti noted in
Crowds and Power that
 all crowds have these
 properties: a fear
 of getting smaller
 a sense that they
 are getting smaller,
 and a need to get
 larger.

aggregates,
 groups

equality
 and
 corporate
 power

the many
 into
 the One

the individual,
 private identity

With ecology,
 there is a sense
 of resources
 getting smaller
 and populations
 getting much too
 large;
 the Club of
 Rome wants the
 world to get
 bigger and
 fears it is
 getting
 smaller.

Everybody in
 a crowd is a
 nobody; the
 crowd is
 mask.



**GROUP II:
MORE ELABORATE
TETRA DS**

Acoustic Space

Aristotelian Causality

Car

Cliché

Clock

Computer

Copernican Revolution

Cubism

Electric Light

Law of Effect

Law of the Jungle

Law of New Genetics

Maslow's Rule

Number

Pollsters

Press

Radio

Satellite

Slang

Spoken Word

Stirrup

Telegraph Press

Telephone

TV

Washing Machine

Written Word

CAR

the ego trip

going outside to be alone

mobile home

alone at a drive-in movie

city (urb)
into suburb

pedestrian:
the invader of
the motorist's privacy

privacy
knight in
shining
armour

traffic jam
corporate privacy
horse-and-buggy

the countryside

with river as the mode
of traffic flow
traffic lights as locks?
helicopter as canal control tower?



PRESS

all news is pseudo-event
(Dan Boorstin)

'The Artillery of the Press'
used to be levelled at individuals,
now gets turned on the whole public
by the (Patty) Hearsts:
the audience is hijacked.

'He made the news.'

and, mosaic of events

advertising.
garment of abundance
good news

today,
via date-line

'coverage'

into 'soft news'

yesterday,
the sequential

news as corporate clothing
for naked egos,
for entire community

communal awareness
vs point-of-view

(cf. Pirandello's
To Clothe the Naked)

Only the paranoid
can find connections
between the items
in a newspaper.

symbolist discontinuous
oral and structure
headlines SHOUT.



the first extension-of-earth

earth goes inside itself

the planet

the vibes

ecology

'Primitive man is,
inevitably, ecological.'

In *The Savage Mind*, C. Lévi-Strauss
noted that the primitive regards
everything as related to everything
– a condition we recognize as paranoia.

SATELLITE

population reverses
from content/spectator
to actor/participant

participating in
their own
audience participation

the crowd dynamic

the orb urbs; the globe as theatre

implosion

Nature

nature: an invention of the Greeks

Lewis Mumford (*Technics and Civilization*, page 69)
called the mine 'the first completely organic
environment created by man.'

Like the space capsule,
the submarine is also a
completely programmed environment.
And the scientific laboratory,
whether for Pavlovian conditioning,
or routine controlled-condition
experiences.



person-to-person

After many a test, Bell has rejected
the videophone as socially unacceptable
though physically feasible.

dialogue

instant access to users

dialogue as gesture:
Many kids conduct whole
conversations without
once using words; rather
mumble, giggle, grunt.

TELEPHONE

... the mythic world of the
discarnate, disembodied
intelligences. you *can* be
in two places at once

'phoney' - 'as unreal as a
telephone conversation'

hang-ups - no put-down

the sender is sent

privacy by universal cable access

the old barriers between
physical spaces: there is here
and here is there



The visual faculty is fissioned
off from the other senses.

Letters are an extension of the teeth,
the only lineal and repetitive part
of the body.

'King Cadmus sowed the Dragon's teeth
and they sprang up armed men'

Montaigne felt the situation
of print as like putting
messages in bottle:
'Amusing notion: many things
that I would not want to tell
anyone, I tell the public;
and for my most secret
knowledge and thoughts, I
send my most faithful friends
to a bookseller's shop'
(D.M. Frame, *Montaigne, A Biography*, 82).

private authorship,
the ego

élitism

An older language is retrieved
for use and tidied up: Rome
spoke Greek; the twelfth
century spoke Latin; vulgarity
becomes snobbism for the in-group.

WRITTEN WORD

'...in those neutral modes of writing,
 called here "the zero degree of writing,"
 we can easily discern a negative momentum,
 and an inability to maintain it...
 Colourless writing like Camus's... or
 conversational writing like Queneau's,
 represents the last episode of a Passion
 of writing, which recounts stage by
 stage the disintegration of bourgeois
 consciousness.'
 (Roland Barthes, *Writing Degree Zero*, 11)

with the corporate
 reading public and
 'historical sense'

vulgar slang,
 dialects;
 separates
 composition
 and performance

The integral 'common sense'
 of interplay and ambiguity
 is displaced.



re-enter the simultaneous;
exit the one-thing-at-a-time

a collage of many points
of view: the eye used in
terms of other senses,
moving, penetrating

multilocal eye

**the viewer
the making process
(the genuine fake)**

the multisensuous:
iconic image

the complex sensibility of
many levels simultaneously

Cf. Picasso's *Les Femmes d'Alger*
(ca. 1909)

The viewer has to complete the
image, thereby becoming co-creator.

rediscovers and up-dates primitive values in everyday objects

the mode of light-through

CUBISM
(painting)
e.g., Picasso, Braque

with no 'object' presented,
nothing to look at, the
painting becomes a mask
for the user to wear,
to see by

sculpture

Icon demands an educated audience?

iconic image
the non-visual

Representation:
visual space;
objectivity

Single, fixed point of view, perspective,
foreshortening, chiaroscuro.

the passive viewer and
photographic realism:
the cell for citters to sit in.

Standing on a Paris street in 1914, watching
a parade of military vehicles using the new
camouflage, Picasso said, 'Braque and I
invented that'



In his *The Responsive Chord*, Tony Schwartz explains just how. Watching television, the eye is for the first time functioning like the ear. Film began the process of fracturing visual images into bits of information for the eye to receive and the brain to reassemble, but television completed the transition. For this reason it is more accurate to say that television is an auditory-based medium. Watching TV, the brain utilizes the eye in the same way it has always used the ear. With television, the patterning of auditory and visual stimuli is identical.

**the multisensuous
using the eye as
hand and ear**

the occult

one sense *through* another – ear
and hand through eye

the intensities of
specialism of the senses

the Seer

inner trip:
exchange of inner and outer

radio,
movie,
point of view



the Protean and transformational

...most surprising of all
was the discovery that
sounds never came from one
point in space, and never
retreated into themselves.

the tribal

There was the sound, its

the multisensory

echo, and another sound

into which the first sound

melted and to which it had

given birth, altogether an

endless procession of sounds '

(Jacques Lusseyran, *And There Was Light*, 24)

**the simultaneous,
resonant,
multilocational**

**the resonant
interval between
figure and ground**

the mode of mimesis

Enter the
Flower People

goalless

astounded

'What I call the "auditory imagination" is
the feeling for syllable and rhythm, penetrating
far below the conscious levels of thought and feeling,
invigorating every word; sinking to the most primitive and
forgotten, returning to the origin and bringing something back,
seeking the beginning and the end.'

(T.S. Eliot, 'Matthew Arnold,'

The Use of Poetry and The Use of Criticism, 118-19)

ACOUSTIC SPACE

exchanges outer for
inner sensibility

the Rock sound bubble is not for
listening to, but for wearing
and participating in

all the senses
at once

flat mosaic,
tactility

the connected,
rational,
static,
lineal,
homogeneous

i.e., the civilized, the detached *civis*

Plato warred on the poets because
mimesis destroyed objectivity



'Slang' applies to more than speech: of dress, it is
'loud, extravagant, more showy or obtrusive than
accords with good taste.' 1828 *Sporting Magazine* ...
'without the slightest appearance of slang or flash
toggerly about him...' 1849 ... 'A smart scarf, a very
new hat, a slang coat and a massive watch-chain'
(*Oxford English Dictionary*).

Our current technologies are slang –
tetrads explore their verbal character.

All words, in every language, are metaphors.

'...our concern was speech, and speech impelled us
To purify the dialect of the tribe...'

'Words, after speech, reach into the silence...'

(new) percept

unconventional feeling

Slang is the *frontier of perception in ordinary*
living – part of the updating process

... And so each sentence
Is a new beginning, a raid on the inarticulate
With shabby equipment always deteriorating
In the general mess of imprecision of feeling,
Undisciplined squads of emotion.
(T.S. Eliot, 'East Coker V')

Meaning: 'The dance of the intellect among the words'
(Ezra Pound)

SLANG

Remy de Gourmont
observed (*Decadence*) that
cliché is what prevents language
from becoming algebra.

No child ever made a mistake in slang?
What happens to slang when it is written?

Is it the coarse mix of senses in slang
that is unacceptable to the literati?

conventional concept

conventional vagueness

Before writing, all speech is slang?



(private power)
man-plus-horse-plus-armor

'Few inventions have been so simple as the stirrup, but few have had so catalytic an influence on history. The requirements of the new mode of warfare which it made possible found expression in a new form of western European society dominated by an aristocracy of warriors endowed with land so they might fight in a new and highly specialised way. Inevitably this nobility developed cultural forms and patterns of thought and emotion in harmony with its style of mounted shock combat and its social posture; as Denholm-Young has said: "it is impossible to be chivalrous without a horse."

user's weight
and power

centaur

The Man on Horseback, as we have known him during the past millennium, was made possible by the stirrup, which joined man and steed into a fighting organism. Antiquity imagined the Centaur; the early Middle Ages made him the master of Europe' (Lynn White, Jr., *Medieval Technology and Social Change*, 30).

with the knight and chivalry,
retrieves the fabulous and adventurous,
the hieratic vs. the hierarchic

STIRRUP

(corporate power)
the feudal system

‘Fighting in
the new manner
involved
large expenditures.
Horses were costly, and
armour was growing heavier
to meet the new violence
of mounted shock combat. In 761
a certain Isanhard sold his ancestral lands
and a slave for a horse and sword.
In general, military equipment for one man
seems to have cost about twenty oxen, or the plough-teams
of at least ten peasant families. But horses got killed:
a knight needed remounts to be effective; and his squire should
be adequately mounted. And horses eat large quantities
of grain, an important matter in an age of more slender agricultural
production than ours.’
(White, *Medieval Technology and Social Change*, 29)

tank

infantry

The solution was to recognize the new
technology of warfare as necessitating
a new class structure:
‘Those economically unable to fight on
horseback suffered from a social infirmity
which shortly became a legan inferiority’
(White, *Medieval Technology and Social Change*, 30).



The clock ... is a piece of power –
machinery whose “product” is seconds
and minutes: by its essential
nature it dissociated time from
human events, and helped create the
belief in an independent world of
mathematically measurable sequences’
(Lewis Mumford, *Technics and Civilization*, 15).

work

‘I listory as her is harped’
(James Joyce)

history as
art form
cast in a
fixed
chronology

‘The contrast between silence and sound, darkness and light,
like that between summer and winter, was more strongly
marked than it is in our lives. The modern town hardly
knows silence or darkness in their purity, nor the effect
of a solitary light or a single distant cry.

All things presenting themselves to the mind in violent
contrast and impressive forms, lent a tone of excitement
and of passion to everyday life and tended to produce that
perpetual oscillation between despair and distracted joy,
between cruelty and pious tenderness which characterize life
in the Middle Ages.

the oral history
gets ironed out
and tidied up

One sound rose ceaselessly above the noises of busy life
and lifted all things unto a sphere of order and serenity:
the sound of bells. The bells were in daily life like good
spirits, which by their familiar voices, now called upon the
citizens to mourn and now to rejoice, now warned them of
danger, now exhorted them to piety. They were known by their
names: big Jacqueline, or the bell Roland. Every one knew
the difference in meaning of the various ways of ringing.
However continuous the ringing of the bells, people would seem
not to have become blunted to the effect of their sound’
(J. Huizinga, *The Waning of the Middle Ages*, 10).

CLOCK

'Opposed to the erratic fluctuations
and pulsation of the worldly life was the
iron discipline of the rule.

Benedict added a seventh period to the
devotions of the day, and in the seventh century, by a bull of
Pope Sabinianus, it was decreed that the bells of the
monastery be rung seven times in the twenty-four hours.

These punctuation marks in the day were
known as the canonical hours, and some
means of keeping count of them and ensuring
their regular repetition became necessary'
(Mumford, *Technics and Civilization*, 13).

**the eternal present;
the 17th century
'Sacrament of the
Present Moment'**

Proust:
A La Recherche Du Temps Perdu

**leisure;
bells and
sundials**

In the Orient,
time is 'told'
by smell rather
than by eye.

'To live without clocks would
be to live forever.'
(R.L. Stevenson)



Who am I? – Let’s take a poll.

The providence that’s in a watchful state
Knows almost every grain of Plutus’ gold,
Finds bottom in th’uncomprehensive deeps,
Keeps pace with thought, and almost, like the gods,
Does thoughts unveil in their dumb cradles.
(Shakespeare, *Troilus and Cressida*, III, ii, 196 – 200)

**user curiosity
and insecurity**

**tribal/corporate
state of
communal
awareness**

The popularity poll as navigators
handbook for politicians?

POLLSTERS

i.e., the ground (audience)
becomes figure (statistical profile)

the audience becomes actor

the many into
the one
(the typical)

privacy

Does the president really have
17 per cent more charisma than Campbell's soup?



... the same shift in time-sense that produced
Kierkegaard's *The Concept of Dread*, Heisenberg's
Uncertainty Principle, and Bohr's theory of the atom

The NEWS presents a corporate
collage, a mosaic image of
today. Bankers, stock brokers, commodity brokers, and
newspapers were the largest purchasers of telegraphic service.
The railroads did not try to employ the new device
systematically until the basic wire network had
been completed. The Erie railroad, which began to
use the telegraph for the dispatching of trains in
1851, was the first to do so. (Mazlich, ed., *The Railroad and the Space Program*, p. 96).

**the present
via date-line**

**mosaic image
of the public**

Georg von Bekesy, attempting to find a visual image that
would present the same characteristics as acoustic sensibility,
chose as an example 'a persian miniature painting
of a betrothal';
it had the requisite flat, perspectiveless,
mosaic and iconic sense of simultaneity.
He forgot the newspaper.

The newspaper is structured
as a symbolist poem.

epigrammatic style:
the headline compression

TELEGRAPH PRESS

‘It must be remembered that by speeding
up the distribution of mail, railroads
provided consumers with a better
substitute for the telegraph than would
otherwise have been available.’ (Mazlich, p. 95)

dateline (today)
into
deadline (tomorrow)

perspective,
point-of-view
essay-style,
detachment,
objectivity

A new style appears, one of immersion,
of human interest: prose that does
your feeling for you. Nothing is
more obsolete than yesterday’s newspaper.



RADIO

Orson Welles's
Invasion from Mars

'diffusion' broadcasting:
the multilocal

world reverses
into talking picture:
audience as actors
participating in their own
audience participation

**access to entire planet
everybody
everywhere**

Global Village Theatre

**tribal ecological environment:
trauma, paranoia**

**wires and connections
and physical bodies**

RADIO was an invasion of Western
culture, phasing out 2,500 years
of culture and literacy. It
brought to the surface an
instinctive tribal sensitivity
to the dangers of alcohol...
a hypersensitivity to 'the
Demon RUM.' Radio
was the hidden
ground to the
figure of
retrieved
Prohibition.

end of rational and lineal:

end of Euclidean space:

end of Western time
and space



NUMBER

possessions	pattern recognition
fractioning figures out of their ground	kinetic line of the graph: the language of gesture
plurality, quantity	mere graph, statistic, profile of the crowd
zero, blank	holism
interval	notches
math, algebra: the hidden ground of number is letters	knots
	symbols
	tallies



If such locutions
were banished,
literature would
become a kind of
algebra, and could
no longer be understood
without the aid of
long analytical operations'
(Remy de Gourmont, *Decadence*, 175).

new
corporate
awareness

language
as
algebra

abstraction: semantics disappear

jargon

sign language
semiotics

the present
(experiences)

This process is examined
by Yeats in his
rag-and-bone shop:

Those masterful images because complete
Grew in pure mind, but out of what began?
A mound of refuse or the sweepings of a street,
Old kettles, old bottles, and a broken can ...
(W.B. Yeats, 'The Circus Animals' Desertion').



the mechanical
code-view of life

of observable/behavioural factors

**one-to-one
matching**

uncertainty

the 'sport'

blood will tell...

LAW OF NEW GENETICS

the new dogma:
all life-‘data’ or ‘information’
are encoded in DNA and RNA:
the job is to puzzle out
the code.

from logical to allegorical

Animism

Vitalism

the mysterious
the unobservable

pushes aside the ecological
and environmental



But the demand for more and much more
of material satisfactions has also been
accompanied by a change in values
that does not fit Maslow's scheme at all.

**satisfaction of
need**

**increased demand
for satisfaction
and rewards**

The crowd dynamic:
satisfaction guaranteed,
even at four times the
cost to you.

MASLOW'S RULE

'... the closer a need comes
to being satisfied, the larger
an increment of additional
gratification will be required
to produce the same satisfaction.'

economic incentives are becoming
rights rather than rewards

'To deny a merit raise, or to grant only
a small one, becomes a punishment'
(Peter F. Drucker, *Management*, 239).

need
becomes right

the need

Merit raises are always
introduced as rewards
for exceptional performance



the reward system

**selection of a single
effect**

**completely controlled
environment**

i.e., via elimination of
variables and interplay
(e.g., Pavlov)

matching of input and output

all variables are 'noise'

LAW OF EFFECT

Programmable organism
equals robot:
the 'well-adjusted man'

Cf. behaviourism
propaganda
education theory
advertisements
brainwashing

organism becomes toy

all-but-one cause
for that effect

via punishment

'In some form or other,
the law of effect has been
one of the most widely recognized
generalizations in the whole
of psychology. The belief that
rewards and punishments are
powerful tools for the selection
and fixation of desirable acts and the
elimination of undesirable ones
(Postman, 1947) is almost universal,
and although the law itself is usually
associated with the name of
Thorndike (1911), who first used this
phrase, he had precursors, e.g., Bain (1868)
and Spencer (1870), who brought together
the contributions of Associationism,
Hedonism, and Evolutionary Doctrine in a
coherent form closely resembling
Thorndike's own formulation.
This formulation was as follows:
Of several responses
made to the same situation,
those which are accompanied
or closely followed by
satisfaction to the animal will,
other things being equal,
be more firmly connected with the
situation, so that when it returns,
they will be more likely to recur;
those which are accompanied or
closely followed by discomfort to
the animal will, other things
being equal, have their connection
with the situation weakened, so that,
when it recurs, they will be
less likely to occur. The greater
the satisfaction or discomfort, the
greater the strengthening or
weakening of the bond (Thorndike, 1911, p. 244)
(D. Berlyne, *Pleasure, Reward, Preference*, 133).



the user is the content

Final Cause

Material Cause

the 'matter peculiar to
the thing,'
retrieved for use

ARISTOTELIAN CAUSALITY

‘But if there are several sciences of the causes,
and a different science for each different
principle, which of these sciences should be
said to be that which we seek, or the people
who possess them, has the most scientific
knowledge of the object in question?
The same thing may have all the kinds of causes,
e.g., the moving cause of a house is the art
of a builder, the final cause is the function it
fulfills, the matter is earth and stones,
and the form is the definition’
(Aristotle, *Metaphysics*, Book III, ch. 2, sec. 996).

‘There is no difference
that does not make
a difference.’

the user again: ‘definition’
in the sense of establishing
structural figure/ground relationships,
not blueprints

Formal Cause

Efficient Cause

the ‘mover’ or ‘maker’
who ‘paved the way’

It is noteworthy that
the Western scientific
establishment has for
centuries opted for
exclusive use of efficient
causality, as it is the
only cause that operates
sequentially.

As structural form,
the Causes in Aristotle’s
tetrad also display
the complementary ratios
of metaphor, so that:
‘Material is to Final as
Efficient is to Formal’
and
‘Material is to Efficient as
Final is to Formal.’



This move broke the traditional view
of the integrity of creation,
pushed aside the whole cosmology
based on the crystalline spheres
and their music and resonance;
obsolesced also such sciences
as astrology and the traditional modes
of medicine and management,
political and social.

**role of the sun
as central**

**Aristarchus
(sun-centred)**

'Tis all in peeces, all cohaerence gone;
All just supply, and all Relation:
Prince, Subject, Father, Sonne, are things forgot,
For every man alone thinkes he hath got
To be a Phoenix, and that then can bee
None of that kinde, of which he is, but hee.
This is the worlds condition now ...'
(John Donne, 'An Anatomie of the World')

THE COPERNICAN REVOLUTION


asserted that the sun,
and not the earth,
was the centre of our
solar system

From centralism into decentralism
centres everywhere
and margins nowhere

relativity

the earth



When two men sit together they
open their
mouths, 

now written –

THE MOUTH



And from their mouths stream



sound waves,

which become –

WORDS



The man of greater knowledge
and experience speaks to the
other as to a younger brother.

He becomes a big mouth of

authority



on two legs




and calls himself –

ELDER BROTHER:

A SENIOR



Here is a sign which gives an
idea of 

separating

Elder brother



clearly separating

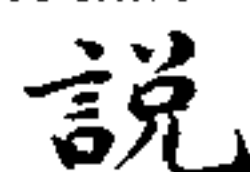
his words,



means –

TO SPEAK,

TO SAY, SAID



Chinese Written Characters, Their Wit and Wisdom by Rose Quong

‘Without language thought is a vague uncharted nebula.
There are no pre-existing ideas, and nothing is distinct
before the appearance of language’
(F. de Saussure, *Course in General Linguistics*, 112).

Outering of self:
Logos: utterance
that transforms,
that IS

shaping
and sharing
the world

The word as evocative power
not a sign
a new VORTEX
of energy

replay of
perception
and experience

a raid on the inarticulate

The Nominalist has lost the primitive’s integral awareness.
Eskimo says.
how would I know walrus unless (the word)
walrus were walrus

‘Psychologically our thought - apart from its expression
in words – is only a shapeless and indistinct mass’
(Saussure, *Course in General Linguistics*, 111).

‘We had the experience but missed the meaning.
And approach to the meaning restores the experience
In a different form ...’ (T.S. Eliot, ‘The Dry Salvages II’)

MEANING – ‘The dance of the intellect among the words’
(Ezra Pound)

SPOKEN WORD

Slang and cliché are what prevent language from becoming algebra. They dispense with semantic content and retrieve gesture.

'Language is made of words and gesture in modes of motion . . . Words are made of motion, made of action and repose, at whatever remove; and gesture is made of language – made of the language beneath or beyond or alongside of the language of words. When the language of words fails, we resort to the language of gesture . . . When the language of words most succeeds, it becomes gesture in its words' (R.P. Blackmur, *Language as Gesture*, 3).

cliché
solidifying meanings
via recyclage

Before writing, no slang/all is slang

integral
gesture

'...our concern was speech; and speech impelled us to purify the dialect of the tribe.'

'music begins to atrophy
when it departs too far from the dance,
poetry begins to atrophy when it gets too
far from music' (Ezra Pound, *The ABC of Reading*, 14).

'I understand the fury in your words
but not the words'

manacled, an Italian becomes speechless

Words, after speech reach
Into the silence. Only by the form, the pattern
Can words or music reach
The stillness, as a Chinese jar still
Moves perpetually in its stillness.
(T.S. Eliot, 'Burnt Norton V')

'Speak, that I may know thee'



... you tell me what it is you
say the computer can't do and
I'll build you one that will do it ...'
(harried designer)

Six-guns and silicon

Using raw materials supplied by Hollywood, most of us formed, in our childhood years, an image of the sheriff. The typical sheriff was lean, tough, armed, and frequently on the side of the angels. He was trying, against heavy odds, to establish law and order, and if this meant drawing his gun, well, he killed only with reluctance. The morality plays in which he participated derived their strength from the simplicity of the conflict between good and evil, and that was just fine by a six-year-old movie-goer.

That sort of sheriff, however, came from an era that really never was. If it had been, it would have been over by now – mowed down by a steady stream of electrons and city silicon. The sheriff's office with the rickety chair, the barred cells at the back, and the strong smell of sweating horses, has been supplanted by one with a memory bank, attached to a printer, linked to county files.

The fastest data retrieval in the West now excites awe along the two-dimensional facade of saloon doors, the hotel with the balcony, Wells Fargo, gunsmith, blacksmith, lounging cowboys, hired guns, hitching posts, and horse troughs. Scuttlebutt around the poker game has it that the computer has a faster draw than the sheriff, but that it fires indiscriminately and with erratic aim. They wonder who would walk away from a showdown.

Well, today they need wonder no longer. There are reports from the United States that a computer was recently left in smoking ruins, plugged by bullets from the sheriff's gun. Some say it was murder; others are more inclined to a finding of justifiable computericide because, at the time of its death, it was "uncontrollably spewing out arrest records."

The sheriff of old is a man of considerable patience and coolness, but he is, above all, human. Thus, when he finds himself up to his holsters in printed detail of every offender for miles around, pouring from an incontinent computer, he has no alternative but to put a bullet in its brain. Someone, after all, has to demonstrate where the authority really lies.

There isn't a jury in the land that would send him to jail.

Editorial in *The Globe and Mail* (Toronto, July 14, 1980), p. 6.

**speeds of
calculation
and retrieval**

**perfect
memory –
total
and exact**

projections of present as future,
of future as present;
retrieval of now as alltime

General Systems

anarchy via the
overlay of
bureaucracy

sequence,
approximation,
perception,
the present

obsolescence
of hardware
via the new
etherealizing speeds
and sizes,
e.g., micro-dot library,
minute programs



The washing machine illustrates a similar phenomenon. No one who has ever laundered a sheet by hand, and without the benefits of hot running water, would want to return to the scrubboard and tub. But the popularity of the electric home washer in the 1920s doomed both the laundress and the commercial laundry. In the process, the time spent on laundry work by the housewife who had previously employed such services was bound to increase.

The electric washer also meant an upgrading of household cleanliness. Men gave up removable collars and cuffs, which meant that the whole shirt had to be washed and then ironed. Homemakers began changing two sheets every week, instead of moving the top sheet to the bottom and adding only one that was fresh.

In the late 1950s, when synthetic no-iron fabrics were introduced, the size of the household laundry load increased again: shirts, skirts and blouses that had once been sent to the dry cleaner were now being tossed into the household wash basket. By the 1980s the average homemaker, equipped now with an automatic washer and dryer, was processing roughly ten times the amount of laundry that her mother had been accustomed to doing. Drudgery had disappeared, but the laundry hadn't.

— Ruth Schwartz Cowan.
“‘Labour-Saving’ Means More Work,” 78

speed of doing
laundry

antiseptic
house

ideal container

WASHING MACHINE

involvement

process:
continuous
laundry

scrubboard
and tub



The law of the jungle
– where there is no law

kill or be killed

kangaroo court

lynch law

‘Nature red in tooth and claw’
(Tennyson)

lawlessness

artlessness
noble savage

Power politics:
‘When Pack meets with Pack in the jungle,
and neither will go from the trail,
Lie down till the leaders have spoken
– it may be fair words will prevail.’
(R. Kipling, *The Second Jungle Book*)

off with restraint!

Tarzan’s last yell:
‘Who greased my vine?’

LAW OF THE JUNGLE

Survival of the fittest:
i.e., survival of the survivors

Law and
ordure (ordeal)

equilibrium

**everybody
and everything**



ELECTRIC LIGHT

Figure and ground
merge – inner trip

Homer
and Milton

specialist knowledge
as flashlight in the face

after such
knowledge, what
forgiveness?

blinding light vs.
organized ignorance

Without Edison, we'd be
watching TV by candlelight

organized ignorance: surfaces as
figure revealing hidden ground

**space as visual figure
and turns it into ground**

**blinding: outer light to inner,
seer**

**daytime activities:
night baseball, etc.**

the non-visual

puts outer (sun)light inside,
enabling, e.g., brain surgery

limitation by night and day

candles, lamps, oil and gas



GROUP III:
ALTERNATE VERSIONS

Airplane

Credit Card

Romanticism

Symbolist Poetry

Visual Space

Wine

CREDIT CARD
(two versions)

with the credit card,
the public is poured
into the computer,
as information

image of user

corporate services
awareness
audience
credit card as stage

computer as tribal
memory bank

you need another card to
validate your card ...
loss of card is loss of
identity: requires that
you make a new persona

**barter –
inflation**

money

user, transaction, and goods
alike are obsolesced and
become information and imagery

CREDIT CARD

masks that
money can buy

great danger
is loss of
face

private imagery

barter, haggle

nothing fixed beforehand:
the identities are as
fluid as the haggle

bargain hunting: occupation
of the rich

the corporate image

the creditor as cop

bankruptcy

money, the body

the breakdown of
hardware



Of genius, power,
 Creation and divinity itself
 I have been speaking, for my theme has been
 What passed within me. Not of outward signs
 Done visible for other minds, words, signs,
 Symbols or actions, but of my own heart
 Have I been speaking, and my youthful mind.
 O Heavens! how awful is the might of souls,
 And what they do within themselves while yet
 The yoke of earth is new to them, the world
 Nothing but a field where they were sown.
 (William Wordsworth, 'The Prelude,' III: 173 – 83)

For not to think of what I needs must feel,
 But to be still and patient, all I can;
 And haply by abstruse research to steal
 From my own nature all the natural man
 This was my sole resource, my only plan:
 Till that which suits a part infects the whole,
 And now is almost grown the habit of my soul.
 (Samuel Taylor Coleridge, 'Dejection,' 87 – 93)

**individual
 hyperaesthesia;
 spontaneity of
 emotion**

Of the one Life within us and abroad,
 Which meets all motion and becomes its soul,
 Alight in sound, a sound-like power in light,
 Rhythm in all thought, and joyance every where –
 (Coleridge, 'The Eolian Harp,' 26 – 9)

**Nature as poet;
 as analogue,
 way of seeing**

For I have learned
 To look on nature, not as in the hour
 Of thoughtless youth: but hearing oftentimes
 The still, sad music of humanity,
 Nor harsh nor grating, though of ample power
 To chasten and subdue. And I have felt
 A presence that disturbs me with the joy
 Of elevated thoughts; a sense sublime
 Of something far more deeply interfused,
 Whose dwelling is the light of setting suns,
 And the round ocean and the living air,
 And the blue sky and in the mind of man:
 A motion and a spirit, that impels
 All thinking things, all objects of all thought,
 And rolls through all things.
 (Wordsworth, 'Tintern Abbey,' 88 – 101)

i.e., innering of the
 'Book of Nature'
 'The Pansy at my feet
 Doth the same tale repeat.'
 (Wordsworth, 'Intimations
 of Immortality,' 54 – 5)

ROMANTICISM
(this version)

The awful shadow of some unseen Power
Floats though unseen among us – visiting
This various world with an inconstant wing
As summer winds...
(Percy Bysshe Shelley, 'Hymn to Intellectual Beauty,' 1 – 4)

Fade far away, dissolve, and quite forget...
...for I will fly to thee.
Not charioted by Bacchus and his pards,
But on the viewless wings of Poesy,
Though the dull brain perplexes
and retards...
(John Keats, 'Ode to a Nightingale,' 21, 31 – 4)

**solipsism; abstractness;
gush, just
sentimentalism**

**Rhetoric, 'technique'
(18th century) – via
antinomianism**

Hence, viper thoughts, that coil around my mind,
Reality's dark dream!
I turn from you, and listen to the wind,
Which long has raved unnoticed.
(Coleridge, 'Dejection,' 94 – 7)

... I still had loved
The exercise and produce of a toil,
Than analytic industry to me
More pleasing, and whose character I deem
Is more poetic as resembling more
Creative agency.
(Wordsworth, 'The Prelude,' II: 377 – 82)



The Inner Eye:
I wandered lonely
as a cloud...

...a steadfast peace...
So once it would have been, 'tis so no more:
I have submitted to a new control;
A power is gone which nothing can restore;
A deep distress hath humanized my Soul.
(William Wordsworth, 'Peel Castle,' 32 – 6)

e.g., Samuel Taylor Coleridge's
'Frost at Midnight' or Keats's 'Ode on a Grecian Urn')

**epiphanic
aesthetic moment;
'negative capability'**

**synesthesia in
high definition**

Wordsworth remarked,
'I was often unable to
think of external things as
having external existence,
and I communed with all
that I saw as something not
apart from but inherent in,
my own immaterial nature.'

ROMANTICISM
(that version)

The awful shadow of some unseen Power
Floats though unseen among us - visiting
This various world with an inconstant wing
As summer winds...
(Percy Bysshe Shelley, 'Hymn to Intellectual Beauty,' 1 - 4)

Fade far away, dissolve, and quite forget...
...for I will fly to thee,
Not charioted by Bacchus and his pards,
But on the viewless wings of Poesy,
Though the dull brain perplexes and retards...
(John Keats, 'Ode to a Nightingale,' 21, 31 - 4)

the occult

**Eastern discarnate
mysticism, gnostic;
poet as priest**

**Rhetoric, 'technique'
(18th century) – via
antinomianism**

Hence, viper thoughts, that coil around my mind,
Reality's dark dream!
I turn from you, and listen to the wind,
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Is more poetic as resembling more
Creative agency.
(Wordsworth, 'The Prelude,' II: 377 - 82)



AIRPLANE

(two versions)

Haven't seen your friends for months?
Go to some out-of-the-way place in
Europe and find them.

Just as computers create committees, so jets
create conferences. A new kind of
circulating population is introduced.

**vertical
(and horizontal)
locomotion**

**aerial
perspective**

Each city becomes the
suburb of other cities.

projectile

**the wheel and
the road**

the suburb made
by the car

AIRPLANE

‘On the very day that the Wright brothers took wing, newspapers refused to report the event, because their sober, solid, feet-on-the-ground editors simply could not bring themselves to believe it had happened. After all, a famous American astronomer, Simon Newcomb, had not long before assured the world that “No possible combination of known substances, known forms of machinery and known forms of force, can be united in a practical machine by which man shall fly long distances”’
(Alvin Toffler, *Future Shock*, 191).

equipoise, balance	air into ocean, flying into swimming
levity: works by vacuum (above the wings) not by push (under the wings); glide and float	stasis, four-legged (wheeled) equilibrium

Many times the population of big cities like Chicago and Toronto *leave* those places by air each year. The city functions as hotel with resident staff, maintenance crew. Toronto (3 million) is host to over 19 million visitors annually; the population of Canada is the sum – 22 million.



VISUAL SPACE
(two versions)

Nationalism: private
identity on a corporate
scale

the 'inner world'

Cubism
Surrealism

figures detach
from ground

creates the
'outer world'
- i.e., Nature

Locke sank into a swoon
The garden died:
God took the spinning jenny
Out of his side.
- W.B. Yeats

**private aggression,
goal-obsession;
specialism, objectivity,
single point of view
rationalism**

**anonymous fragmented
mosaic: the crowd;
conformity and
insecurity; multiple
points of view at once;
irrationalism**

**the (outer) world-as-
plenum - a container to
be plundered,
conquered, exploited.**

**the tribal corporate
group; the inner;
'participation mystique'**

mimesis

where the hand
of man never set foot

VISUAL SPACE

The binding of Proteus
source of Newtonian Absolute Space,
and Cartesian Space.

The phonetic alphabet provides a
technique for translating all of the
senses into terms of just one sense,
which is further isolated and intensified
by sublimating those other senses.

**the continuous, connected,
linear, static;
homogeneous:
the eye alone, queen
of the senses.**

**kinetic depth perception
as perspective: all senses
translated into eye terms.**

language becomes
aesthetic object

return of the *ground* –
of interplay and
transformation

**the iconic mosaic;
tactility;
the eye used as
ear or hand**

**the resonant
multilocal,ational,
multisensory,
transformational**

mimesis
the animate universe



WINE
(Two Versions)

WINE

grape juice	cooking wine
via	vinegar
fermentation	
ritual	the commonplace
observance	flavours

WINE

food	hangover,
the occasion	insult
festive	inhibition
spontaneity	
of speech and	
gesture	



SYMBOLIST POETRY
(three versions)

SYMBOLIST POETRY

Finnegans Wake

the image	image-less pure sound
multisensory awareness	logic

SYMBOLIST POETRY

role of reader as co-creator	reader as tyrant solipsism robotism
discontinuity	classical/Augustan objectivity

SYMBOLIST POETRY

poet or seer; inwit, percept	Hermeticism the occult
Homer: poet as teacher	editorial poet concept



GROUP IV:
CHAINS AND CLUSTERS

A Loop

Hyperbole and Litotes

Clusters

Feminist/Suffragette

The Trivium

Chains

Aristotle: Law of Motion/Impetus

Einsteinian Space-Time Relativity

Newton's Laws of Motion

HYPERBOLE AND LITOTES

HYPERBOLE

grandness, size	litotes
iconic awareness, involvement	literal/realistic scale

LITOTES

smallness, size	hyperbole
iconic awareness, involvement	literal/realistic scale



FEMINIST/SUFFRAGETTE

FEMINIST
(**extremist**)

matriarch	male
corporate identity	individual sexes

the tribe of women

SUFFRAGETTE

I'm a person too, you know.	individual rights, identity	'women's lib' the tribe of women
	equality responsibility	'weaker sex' featherbrain male monopoly



THE TRIVIUM

GRAMMAR (scripture)
(interpretation)

writing literature
and tradition

logos the logos
spermatikos
as art

the word as seeds,
buried deep

RHETORIC

advertising

speech oratory

logos the logos
prophorikos
as art

the uttered
word

DIALECTIC

philosophy

dia-lexis 'Idea'

logos the logos
hendiathetos
as art

the word in
the mind



ARISTOTLE: LAW OF MOTION

prime mover Zeus	impetus
the moral order Heraclitus	animism

IMPETUS

transitory character of motion	Inertia – stasis
animism Divine Animal	the Prime Mover

By 1319–20 a novel theory of impetus, transitional between that of Aristotle and Newton's inertial motion. Under the older concept, nothing moved unless it were constantly pushed by an outside force. Under the new physical theory, things kept moving by means of forces originally imprinted upon them, by *vis impressa*. Moreover, regularity, mathematically predictable relationships, facts quantitatively measurable, were looming larger in men's picture of the universe. And the great clock, partly because its inexorability was so playfully masked, its mechanism so humanized by its whimsicalities, furnished the picture. It is in the works of the great ecclesiastic and mathematician, Nicholas Oresmus, who died in 1382 as Bishop of Lisieux, that we first find the metaphor of the universe as a vast mechanical clock created and set running by God so that "all the wheels move as harmoniously as possible." It was a notion with a future: eventually the metaphor became a metaphysics. (Lynn White, Jr., *Medieval Technology and Social Change*, 125).



NEWTON: FIRST LAW OF MOTION

Every body continues in its state of rest or uniform motion until acted upon by some external, unbalanced force.

isolation abstraction of the figure (the body) from its ground	acceleration (Second Law)
homeostasis	change: interaction of figure and ground

NEWTON: SECOND LAW OF MOTION

The net force applied to an object equals the rate of change of momentum of the object.

causative sequence continuous force	simultaneity; interaction-retroaction (Third Law)
kinetic equilibrium	inertia



NEWTON: THIRD LAW OF MOTION

Every action has an equal and opposite reaction.

action/reaction simultaneously; equilibrium	relativity disequilibrium quantum mechanics
Euclidean geometry connections Aristotle	the sequential

EINSTEINIAN SPACE-TIME RELATIVITY

interchangeability of figure and ground	(not discovered yet)
the interplay and flux of space and time	the next Law of Physics
the non-measurable void resonant interval	Newtonian measuring sticks
	Absolute space and Absolute time



5

MEDIA POETICS

When determining the principles on which his *Scienza Nuova* would rest, Giambattista Vico, the last great pre-electric grammarian, decided to use cultures themselves as his text: 'We must reckon as if there were no books in the world' (page 85). In shunning conventional science and returning to direct observation of the page of Nature, Vico pursued the same course Francis Bacon had charted in the *Novum Organum*, the same course Joyce proclaimed in *Ulysses* as proper to the poetic sensibility: 'Ineluctable modality of the visible: at least that if no more, thought through my eyes. Signatures of all things I am here to read, seaspawn and seawrack, the nearing tide, that rusty boot. Snotgreen, bluesilver, rust; coloured signs. Limits of the diaphane ...' (page 37). Such men are not isolated eccentrics but links in a continuous tradition that extends from the present work back to the schools of manifold interpretation of the preliterate poets, including Homer and Hesiod.

Interpretation of the logos was ever held by the Ancients as a sure route to wisdom: the techniques employed were etymology and symbology. The

tradition of grammatical and patristic interpretation by allegory has its roots in the work of Anaxagoras and his school:

In Anaxagoras himself the allegory was probably ethical. he found in Homer a symbolical account of the movements of mental powers and moral virtues: Zeus was mind, Athene was art. But the method which, though it is found in germ among earlier or contemporary writers, seems to have been first formulated by his disciple, Metrodorus, was not ethical but physical. By a remarkable anticipation of a modern science, possibly by a survival of memories of an earlier religion, the Homeric stories were treated as a symbolical representation of physical phenomena. The gods were the powers of nature: their gatherings, their movements, their loves, and their battles, were the play and interaction and apparent strife of natural forces. *The method had for many centuries an enormous hold upon the Greek mind; it lay beneath the whole theology of the Stoical schools, it was largely current among the scholars and critics of the early empire.*¹

From here the development of the tradition of grammatical encyclopedism passes through the Stoics (e.g., Cornutus) to the Romans (e.g., Varro, Priscian, Donatus, Jerome, Augustine). 'Cornutus writes in vindication not so much of the piety of the ancients as of their knowledge: they knew as much as men of later times, but they expressed it at greater length and by means of symbols. He rests his interpretation of those symbols to a large extent upon etymology. The science of religion was to him, as it has been to some persons in modern days, an extension of the science of philology' (Edwin Hatch, *The Influence of Greek Ideas on Christianity*, 63) The pattern for science had already been set by Empedocles, whose theory of the elements was an etymological approach to the governing/informing logos.

His four elements Empedocles allegorically calls by the names of gods and goddesses of popular Greek religion:

First, therefore, let me tell you of all that there is in the four roots: Zeus the resplendent, the life-bearing Hera, and Aidoneus, and Nestis who in her tears is spilling man's fountain of life.

(F.M. Cleve, *The Giants of Pre-Sophistic Greek Philosophy*, 342–3).

In addition to being a poet and allegorizer and etymologist, Empedocles was priest, physician, orator, and politician. In the work of Ernst R. Curtius is detailed the continuity of the trivium and the quadrivium in the study of scripture and of nature alike:

1 Edwin Hatch, *The Influence of Greek Ideas on Christianity*, 60 1. Diogenes Laertius, 2 11, quotes Favorinus as saying that Anaxagoras was the first to show that the poems of Homer 'had virtue and righteousness for their subject.'

It is a favourite cliché of the popular view of history that the Renaissance shook off the dust of yellowed parchments and began instead to read in the book of nature or the world. But this metaphor itself derives from the Latin Middle Ages. We saw that Alan [of Lille] speaks of the 'book of experience.' For him, every creature is a book:

Omnis mundi creatura

Quasi liber et pictura

Nobis est et speculum. (Migne, *P.L.*, CCX, 579a).

In later authors, especially the homilists, 'scientia creaturarum' and 'liber naturae' appear as synonymous. (*European Literature and the Latin Middle Ages*, 319–20)

Curtius, however, mistakenly reports that this trope, the Book of Nature, 'originated in pulpit eloquence, was then adopted by medieval mystico-philosophical speculation, and finally passed into common usage' (page 321).

The logos of creation, 'And God Said ...,' formed the basis of Christian interpretation of the 'Book of Nature.'

The logos of creation explicitly presents us with the created order as a speech in which the words are things and things are words, an awareness central to the present work. Medieval theologians and philosophers were simply updating the most ancient understanding of physics and cosmology. Aristotle set forth fourfold causality as exegetical science of Nature for dialectic, whereas grammarians would rather proceed by etymology and manifold interpretation. Since the schools of Anaxagoras, various techniques for the interpretation of written as well as natural texts had been practised. It is, then, easy to see why Etienne Gilson exclaimed, 'No wonder then that the greatest among the Church Fathers of the Church – Justin Martyr, Clement of Alexandria, and Origen – built up theological doctrines in which the fundamental agreement of natural and revealed knowledge was everywhere either stated or presupposed. Yet, by far the most perfect representative of this group was ... Saint Augustine' (*Reason and Revelation in the Middle Ages*, 16).

To the patristic grammarian, the two modes of exegesis, one for each divine text, world and Writ, were in perfect correspondence. The simultaneity of all levels in ancient *grammatica* coincides with twentieth-century

quantum mechanics, which is concerned with the physical and chemical bond of nature as the 'resonant interval.' The acoustic simultaneity of the new physics coexists with 'synchrony' and structuralism in language and literature and anthropology, as understood in Ferdinand de Saussure and Lévi-Strauss. For St Bonaventure, likewise, 'synchrony' or acoustic and simultaneous structuralism presented no problems. A few words from Gilson's study of *The Philosophy of St. Bonaventure* indicates Bonaventure's complete accord with traditions of interpretation:

Since the universe was offered to his eyes as a book to read and he saw in nature a sensible revelation analogous to that of the scriptures, the traditional methods of interpretation which had always been applied to the sacred books could equally be applied to the book of creation. Just as there is an immediate and literal sense of the profane text, but also an allegorical sense by which we discover the truths of faith that the letter signifies, a tropological sense by which we discover a moral precept behind the passage in the form of an historical narrative, and an anagogical sense by which our souls are raised to the love and desire of God, so we must not attend to the literal and immediate sense of the book of creation but look for its inner meaning in the theological, moral and mystical lessons that it contains. The passage from one of these two spheres to the other is the more easily effected in that they are in reality inseparable. (page 17)

The four causes of Aristotle and the four levels of literary interpretation are in perfect correspondence:

Formal Cause	Literal level
Material Cause	Figurative (Allegorical) level
Efficient Cause	Tropological (Moral) level
Final Cause	Anagogical (or Eschatological) level

It is hardly surprising then that present-day media analysts find it impossible not to moralize, or that they substitute moralism for understanding. Old Science affords only abstract method and the Shannon-Weaver pipeline and its variants – both of these are based on left-hemisphere elaborations of efficient cause and lack the ground that is supplied by formal cause and by interaction with the other causes. Since the four levels, like the four causes, are simultaneous, it is obvious that to perform any one level to the exclusion of the others, as a visual figure minus a ground, is to produce grievous distortion. This goes far towards explaining how heresies are produced, or the recent collapse and maunderings of moral theology, or the helplessness of Old Science or philosophy to deal with the new transforming ground of electric information.

Now that we have the work of Henri de Lubac (*Exégèse Médiévale: les Quatre sens de l'Ecriture*), it is easier to trace how multilevelled exegesis of scripture blended with the scientific work of the interpreters of the Book

of the World in an unbroken tradition from the early exegetes of Homer, to Varro, to the *Novum Organum* of Francis Bacon, to the *Scienza Nuova* of Giambattista Vico, to the *Four Quartets* of T.S. Eliot; from the *Marriage of Mercury and Philology* of Martianus Capella, to the *Plaint* of Alan of Lille, to Joyce's *Finnegans Wake*.

As is periodically necessary, Bacon, like Vico, abandoned prevailing scientific methodology for having exhausted its potential usefulness and ruined the language as a tool of investigation. Dialecticians continually strive to strip words of their resonant powers, to fix or embalm them into lifeless, neutral signs, which is death for a poet or exegete. Interpretation and thought are thus reduced to algebra. Even without such depredations, language is headstrong, unruly enough to disconcert even the master poet:

So here I am, in the middle way, having had twenty years –
 Twenty years largely wasted, the years of *l'entre deux guerres* –
 Trying to learn to use words, and every attempt
 Is a wholly new start, and a different kind of failure
 Because one has only learnt to get the better of words
 For the thing one no longer has to say, or the way in which
 One is no longer disposed to say it. And so each venture
 Is a new beginning, a raid on the inarticulate
 With shabby equipment always deteriorating
 In the general mess of imprecision of feeling.
 Undisciplined squads of emotion. And what there is to conquer
 By strength and submission, has already been discovered
 Once or twice, or several times, by men whom one cannot hope
 To emulate – but there is no competition –
 There is only the fight to recover what has been lost
 And found and lost again and again: and now, under conditions
 That seem unpropitious. But perhaps neither gain nor loss;
 For us, there is only the trying ... (T.S. Eliot, 'East Coker,' V)

Or, again

Words strain.
 Crack and sometimes break, under the burden.
 Under the tension, slip, slide, perish,
 Decay with the imprecision, will not stay in place.
 Will not stay still. Shrieking voices ...
 (T.S. Eliot, 'Burnt Norton,' V).

Much of the serious poet's struggle is to keep the language in good working order. Francis Bacon evidently judged it wiser to circumvent the intellectual currents of his time by beginning with the other text:

A collection of all varieties of Natural Bodies ... where an Inquirer ... might peruse, and turn over, and spell, and read the Book of Nature, and observe the *Orthography, Etymologia, Syntaxis, and Prosodia* of Nature's Grammar, and by which as with a *Dictionary*, he might readily turn to and find the true Figures, Composition, Derivation, and Use of the Characters, Words, Phrases and Sentences of Nature written with indelible, and most exact, and most expressive Letters, without which Books it will be very difficult to be thoroughly a *Literatus* in the Language and Sense of Nature.

'Incomplete as it is,' comments Elizabeth Sewell, 'Bacon's doctrine of forms has given rise to accusations of slovenliness and imprecision. It is certainly not easy, but we must remember that Bacon is, after all, trying to say something new' (*The Orphic Voice*, 134). In fact, his 'new' approach was the familiar one of manifold interpretation, together with scrupulous observation, that is, 'reading' and comparison of natural 'texts.'

With Bacon, Vico continuously asserts the claims of grammar as true science precisely because it has not yielded to specialism and method.

Sewell continues:

Nature as language appears in Vico as the central concept of ancient mythological thought: 'All of nature was the language of Jupiter. Every pagan nation believed that it knew this language through divination, which the Greeks called *theology*, which is to say, knowledge of the speech of the gods.' Goethe in his turn thinks of nature sometimes as a sibylline language, and makes the wonderful statement, 'Man is the first speech that nature holds with God.' This language is not language-as-science; nor is it a code. It is here given its full complement of metaphor and figure and myth: if nature is language, it is language-as-poetry. This is the speech which the human mind, gifted as it is with powers of speech of its own, has to apprehend and interpret. Insofar as man's own language is poetic, it conforms to the workings of nature considered under this figure of language. (page 151)

Vico's technique is set forth in the second of his five books as the practical heuristic application of not philosophical but poetic wisdom. For method, 'We must therefore go back with the philologists and fetch it from the stones of Deucalion and Pyrrha, from the rocks of Amphion, from the men

who sprang from the furrows of Cadmus or the hard oak of Vergil' (*New Science*, 89).

Vico's Science went one essential step beyond Bacon's. Meditating on the relations between the two books, he found a new correspondence, an interplay that raised a new 'text' for grammatical scrutiny.

But in the night of thick darkness enveloping the earliest antiquity, so remote from ourselves, there shines the eternal and never-failing light of a truth beyond all question: that the world of civil society has certainly been made by men, and that its principles are therefore to be found within the modifications of our own human mind. Whoever reflects on this cannot but marvel that the philosophers should have bent all their energies to the study of the world of nature, which, since God made it, He alone knows; and that they should have neglected the study of the world of nations or civil world, which, since men made it, men could hope to know. This aberration was a consequence of that infirmity of the human mind, noted in the Axioms, [see next quote] by which, immersed and buried in the body, it naturally inclines to take notice of bodily things, and finds the effort to attend to itself too laborious; just as the bodily eye sees all objects outside itself but needs a mirror to see itself. (*New Science*, 85)

The new text is man's social artefacts and their correspondence to the consequent modifications of his sensibilities. James Joyce used language itself as the index of these modifications and explored them fully in *Finnegans Wake*. Vico brings to bear all of the resources of grammar, both as regards exegesis of the two books and as regards the processes of etymology: 'The human mind is naturally inclined by the senses to see itself externally in the body, and only with great difficulty does it come to attend to itself by means of reflection. This axiom gives us the universal principle of etymology in all languages: words are carried over from bodies and from the properties of bodies to express the things of the mind and spirit' (page 70). This passage puts on display the standard grammatical awareness of the correspondence of words and things, though seldom has it been made so explicit.

As poetic (rhetorical) wisdom focuses on the sensibilities as crucial, Vico asserts that there must exist a mental dictionary, not of abstract philosophical *ideas*, but of concrete poetic-philological sensibilities conformal to the things and artefacts of common experience:

There must, in the nature of human things be a mental language common to all nations, which uniformly grasps the substance of things feasible in human social life, and expresses it with as many diverse modifications as these same things may have diverse aspects. A proof of this is afforded

by proverbs or maxims of vulgar wisdom, in which substantially the same meanings find as many diverse expressions as there are nations ancient and modern.

This common mental language is proper to our Science, by whose light linguistic scholars will be enabled to construct a mental vocabulary common to all the various articulate languages living and dead ... As far as our small erudition will permit, we shall make use of this vocabulary in all the matters we discuss. (*New Science*, 60)

Concluding his discussion of poetic wisdom, Vico accorded it 'two great and sovereign tributes.' One is 'that of having founded gentile mankind'; the other concerned the 'wisdom of the ancients,' as sketched in the fables: 'And it may be said that in the fables the nations have in a rough way and in the language of the human senses described the beginnings of this world of sciences, which the specialized studies of scholars have since clarified for us by reasoning and generalization. From this we may conclude what we set out to show in this [second] book: that the theological poets were the sense and the philosophers the intellect of human wisdom' (page 265). In this last statement there echoes the tacit knowledge of the harmony of the causes with the patristic levels of exegesis.

Vico aimed to heal the rift in the trivium between the Ancients and the Moderns.

Vico sought to avoid the faults that had accumulated in both philology and philosophy, since they were split in the twelfth and sixteenth centuries, by blending them:

Philosophy contemplates reason, whence comes knowledge of the true; philology observes the authority of human choice, whence comes consciousness of the certain.

This axiom by its second part defines as philologists all the grammarians, historians, critics, who have occupied themselves with the study of the languages and deeds of peoples: both their domestic affairs, such as customs and laws, and their external affairs, such as wars, peaces, alliances, travels and commerce.

This same axiom shows how the philosophers failed by half in not giving certainty to their reasonings by appeal to the authority of the philologists, and likewise how the latter failed by half in not taking care to give their authority the sanction of truth by appeal to the reasoning of the philoso-

phers. If they had both done this they would have been more useful to their commonwealths and they would have anticipated us in conceiving this Science. (pages 56–7)

Vico's contemporaries were no more able to carry forward his work than were their successors, and so the problem has remained to this day: 'Vico's *vocabolario mentale*, his mental dictionary, contains the special letters of the book of humanity which we can learn to read by *fantasia*. Galileo's magnificent art of reading degenerates into the dominance of method and technological procedure, and Vico's art of reading the hieroglyphics of the *sensus communus* of humanity has its degenerate components in historicism and the contemporary concern with methodology in the humanities' (D.P. Verene, *Vico's Science of Imagination*, 204).

In the end, it eluded him for he was caught in a dilemma that had been building for centuries before him and that was then environmental. While change was slow and technologies few, the matter was less important and less visible than it is now. With our accelerating cascade of new media it is borne upon us that each represents not an appendix to but a complete retranslation of the Book of the World, and of the reader. As W.B. Yeats sang, in 'Sailing to Byzantium':

Once out of nature I shall never take
My bodily form from any natural thing.
But such a form as Grecian goldsmiths make
Of hammered gold and gold enamelling ...

Vico simply had not distinguished between first and second nature for separate study: nothing in his experience suggested such a distinction would be of any use. Second nature is nature made and remade by man as man remakes himself with his extensions. Separate them: the first is the province of traditional grammar; the second, that of Bacon, Vico, and *Laws of Media*.

At bottom, Vico insisted, because poetic wisdom deals with real things and with sensibilities rather than with conceptual abstractions, it alone is the touchstone of truth: 'So that, if we consider the matter well, poetic truth is metaphysical truth, and physical truth which is not in conformity with it should be considered false' (*New Science*, 66).

The key to Vico's science was the mental dictionary, the bridge between the two books as recorded in the modulations of human sensibility. Our four laws in tetrad – verbal – form bring to a conclusion this part of the labour of grammar begun with the Ancients and carried forward by Bacon and Vico. The previous chapter of tetrads comprises the first entries in the dictionary of real words that Vico sought; it is, as he anticipated, a 'mental' dictionary in that it displays patterns and transformations of sensibility.

Each tetrad gives the etymology of its subject, as an uttering or outering of the body physical or mental, and provides its anatomy in fourfold-exegetical manner.

Further, the tetrad form is verbal in nature, consisting, like metaphor and like every word, of two conformal situations, two figures and two grounds. Our new dictionary includes all human artefacts as human speech, be they hardware or software, physical or mental or aesthetic entities, arts or sciences. Such former distinctions have no scientific relevance. As utterances, our artefacts are submissible to rhetorical (poetic) investigation; as words, they are susceptible to grammatical investigation. The tetrads are verbal structures and poetic science in one. The elements of the tetrad are proportional, using the analogical ratios of A is to B as C is to D (and the complementary ones, A is to C as B is to D, and the reverse of both). That is why they must be presented and studied in the appositional form,

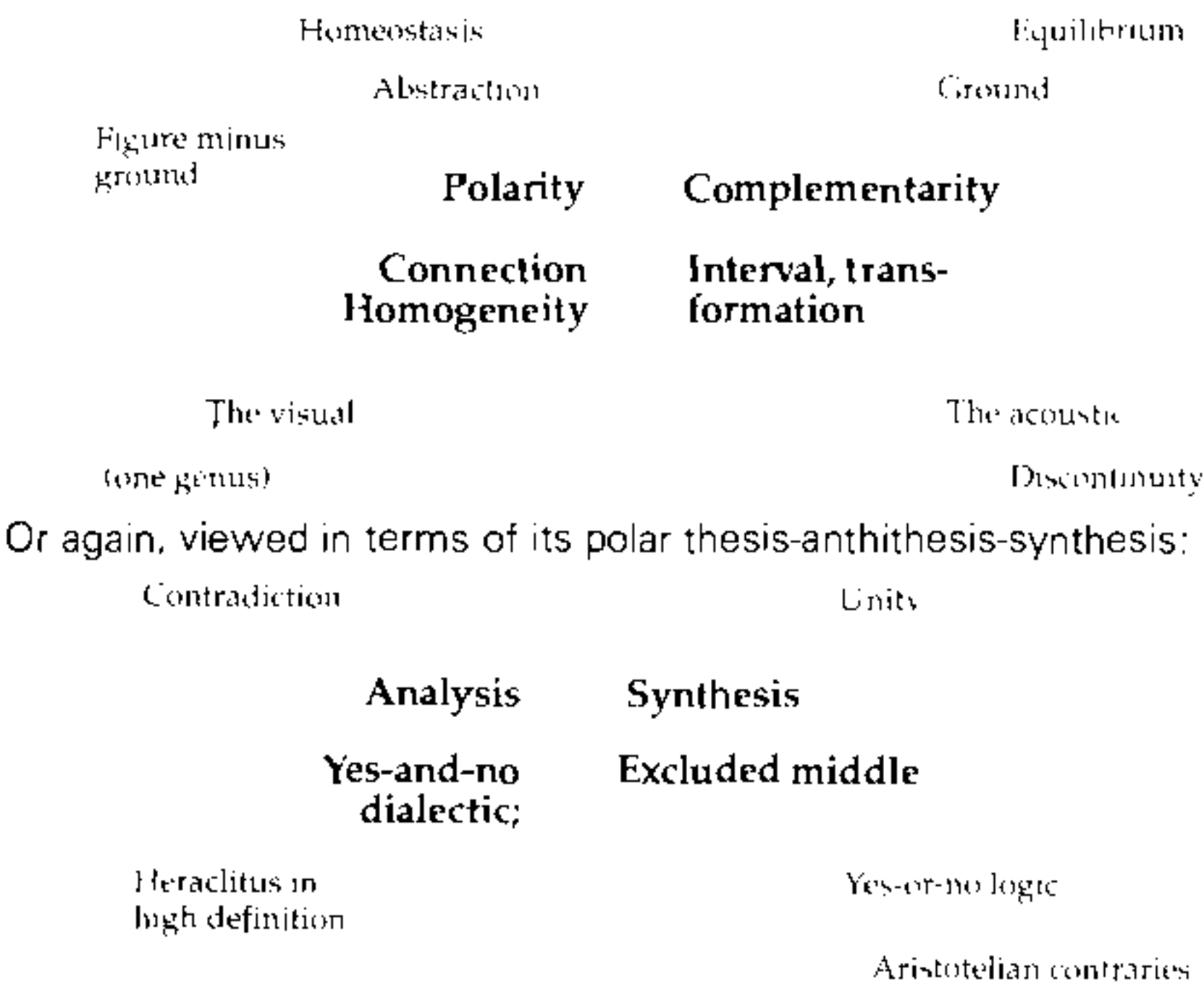
Enhances	Reverses into
Retrieves	Obsolesces

Nor do they exclude philosophy, as is evident when the tetrad examines itself and its own four parts.

The tetrad-word itself, as an artefact, presents this pattern:

figure emerging from ground	Awareness of inclusive, structural process	Technology (hardware) becomes software word	figure and ground in interchange
	Metaphor, logos	Dominance logical method,	
	Formal Cause,	Efficient cause	
	poesis		

By contrast, the sequential triad of dialectic (scientific) method:



The triadic form, whether typified by Hegel's polar thesis-antithesis-synthesis or the container-structured logical syllogism, is nevertheless a connected form that depends on a ground stress of visual space to give it salience and validity. As a visual form, it has blinded the West to the metaphysical and verbal properties of human artefacts as metaphors and as extensions of ourselves. The literature on metaphor suffers equally from the hardware approach, which sees it only in conceptual, left-hemisphere terms. When the break with grammar and rhetoric was made at the time of Peter Ramus the sense was lost of metaphor as perceptual technique for seeing one whole situation *through* another whole situation.

***Medieval and ancient sensibility now dominates
our time as acoustic and multisensory awareness
displaces the merely visual.***

Language is metaphor in the sense that it not only stores but translates experience from one mode into another. Money is metaphor in the sense that it stores skill and labour and also translates one skill into another. But

the principle of exchange and translation, or metaphor, is in our rational power to translate each of our senses into the others: this we do every instant of our lives. But the price we pay for special technological extensions, whether wheel of alphabet or computer, is that these massive extensions of sense become closed systems. Our private senses are not closed systems but endlessly translated into each other in that experience which we call consciousness. Our extended senses, tools, technologies, mental constructs, through the ages have been closed systems incapable of interplay or collective awareness. Now, in the electric age, the very instantaneous nature of coexistence among our technological instruments has created a crisis quite new in human history. Our extended faculties and senses now constitute a single field of experience that demands that they become collectively conscious. Our technologies, like our private senses, now demand an interplay and ratio that makes *rational* coexistence possible. As long as our technologies were as slow as the wheel or the alphabet or money, the fact that they were separate, closed systems was socially and psychically supportable. Now, sight and sound and touch and movement are simultaneous and global in extent. A ratio of interplay among these extensions of our human functions is now necessary collectively as it has always been for private and personal rationality.

The strategy to which any modern culture must resort was indicated by Wilhelm von Humboldt: 'Man lives with his objects chiefly – in fact, since his feeling and acting depends on his perceptions, one may say exclusively – as language presents them to him. By the same process whereby he spins language out of his own being, he ensnares himself in it; and each language draws a magic circle round the people to which it belongs, a circle from which there is no escape save by stepping out of it into another' (Cassirer, *Language and Myth*, 9). The ground that envelops the user of any new technological word completely massages and reshapes both user and culture. In this way too these words (extensions) have all the transforming power of the primal logos. Westerners' only escape or antidote has hitherto been by means of artistic enterprise. All serious art, to use Pound's phrase, functions satirically as a mirror or counter-environment to exempt the user from tyranny by his self-imposed environment, just as Perseus's shield enabled him to escape stupefaction by the Gorgon. The art historian has long puzzled over the question: at what point do primitive cultures develop arts? Evidently the Balinese had not yet confronted the problem when they answered, 'We have no art; we do everything as well as possible.' Art is a response to a situation that has reached a certain intensity. It may well be that intensity, or paralysis, comes about as a result of left-hemisphere stress. But at what point do developed cultures discard their arts? – the question would seem entirely relevant to our present condition.

In *The Problem of Form* Adolf von Hildebrand observed, 'In true art, the

actual form has its reality only as an effect.’ The same observation may be made with respect to all human artefacts as utterances.

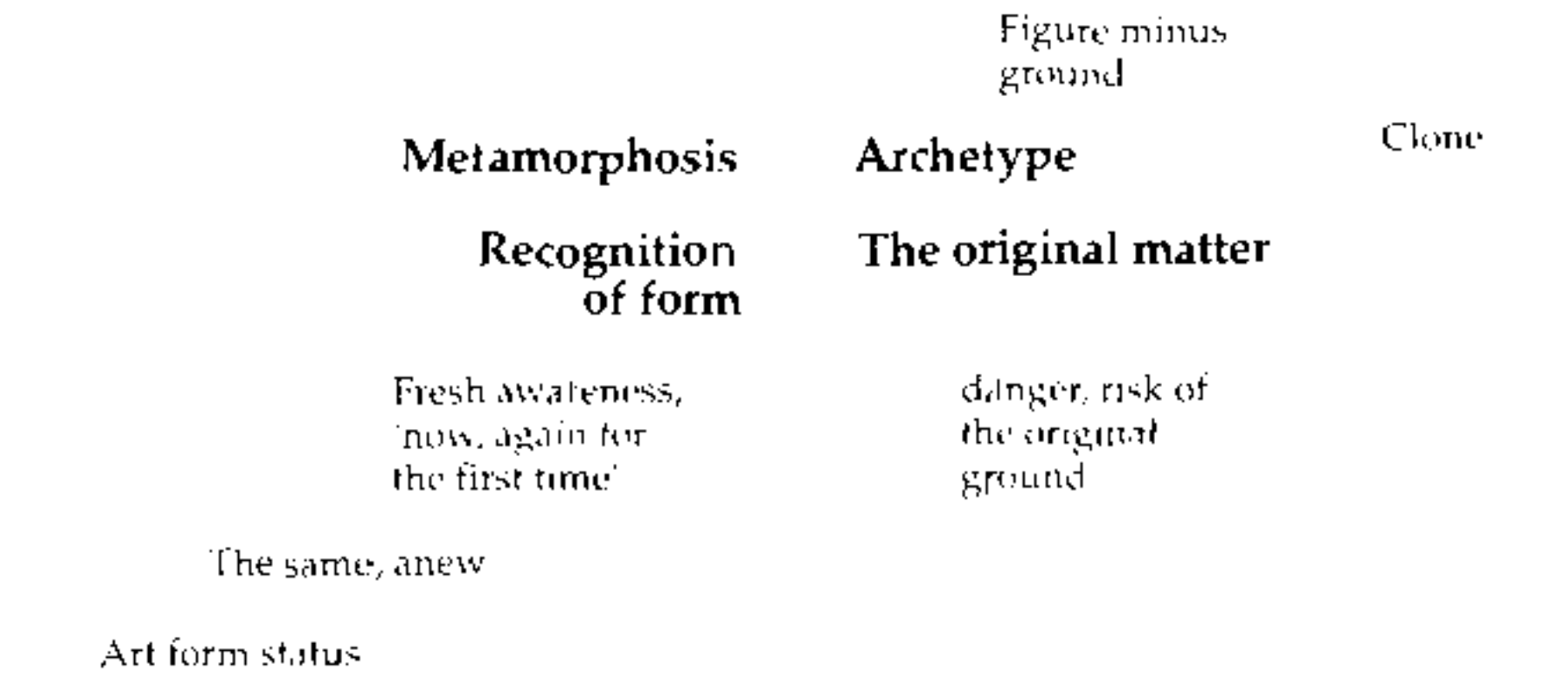
Formal cause, as logos, incorporates the patterns of side-effects as part of essential nature: tetrads restore poesis and the making process to the study of artefacts.

When tetrads are made for each of the parts of a tetrad – each one a dimension of formal cause – the metaphysical results serve to indicate the proper bridge between grammatical humanism and dialectic.

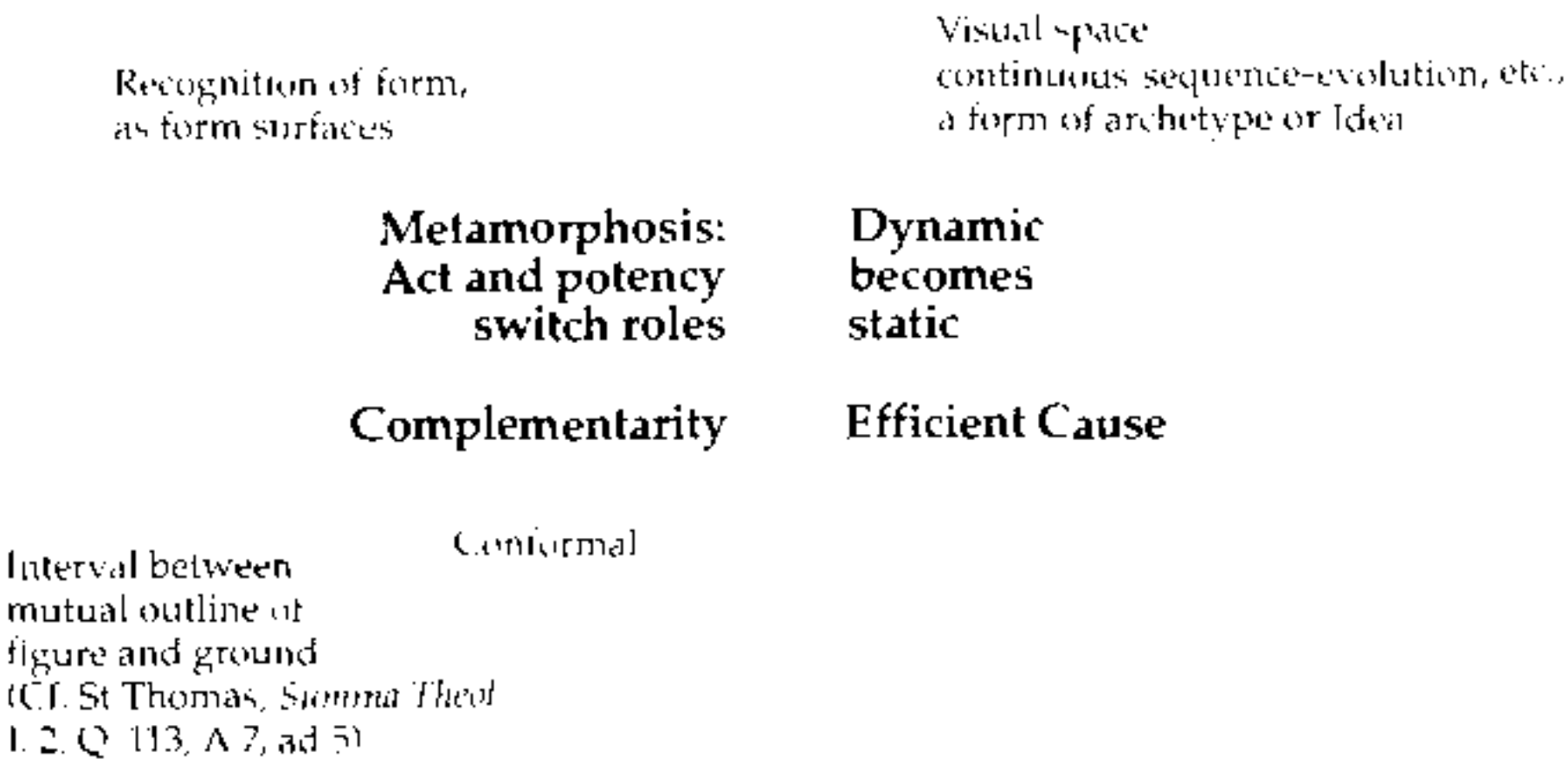
A. *Enhancement* consists in intensifying some aspect of a situation, of extending a sense or configuration of senses, of turning an element of ground into figure or of further intensifying something already figure.

	Potency into Act	Final Cause
	Old logos returns as new mythos	Privation of alternative potentials
	B. <i>Obsolescence</i> refers to rendering a former situation impotent by displacement: figure returns to ground.	
		Resurrection of the junk yard: ‘Throw something lovely away today’
Its Material Cause surfaces as cliché, junk		‘A terrible beauty is born’ (Yeats)
	Act returns to potential	Retrieval mode: ground becomes figure; all potency raised into act at once
	Awareness of ground as all potential	The ground of the old item
Potential as a ground of hidden treasure and opportunity: junk heap as dynamic resource. Cf. Dr Johnson, on the sale of Mr Thrale’s brewery: this is not a mere collection of vats and boilers, but ‘the means of becoming rich beyond the dreams of avarice!’		

C. *Retrieval* is the process by which something long obsolete is pressed back into service, revived, a dead disease now made safe; ground becomes figure *through* the new situation.



D. *Reversal* involves dual action simultaneously, as figure and ground reverse position and take on a complementary configuration. It is the peak of form, as it were, by overload.



With this in hand it becomes apparent that, as in a hologram, in the tetrad the whole is reflected in every part. Retrieval always seems to provide the keynote or dominant mode of each tetrad, which may explain why it is often the most difficult of the four to discover. It also appears, from the above, that while the 'enhance' and 'obsolesce' parts seem to concern morphology, 'retrieval' and 'reversal' seem to concern metamorphosis – the embedding of one situation in another.

New media are new languages, their grammar and syntax yet unknown.

Every tetrad presents in Gestalt form the logos or formal structure of its subject, whether hardware or software artefact. In so doing, and because every artefact as a human utterance has its etymology in the body it extends, the tetrad forms an icon of the verbal nature of the artefact.

This new science of language and forms gives renewed salience to the accumulated knowledge of rhetoric and grammar. Tetrads reunite both of these sciences with dialectic (philosophy and logic and their children) and point towards the development of a rhetoric of grammar as well as towards a grammar of rhetoric, as a next stage. First, a certain amount of accumulated misunderstanding needs to be cleared away.

As Aristotle's is the oldest extant treatise on rhetoric, it has been used for centuries as the ur-text. This is a basic mistake, for Aristotle was not a rhetorician nor was he concerned to present the subject of rhetoric on its own terms. He was busy using dialectic and the newly released left hemisphere to explore and retrieve everything in sight. His *Rhetoric* is in reality a dialectic of rhetoric, an account in purely dialectical terms of the activities of a rival group. His account of metaphor, consequently, is given in terms that agree mainly with the interests of logic and philosophy, but that make no attempt to satisfy the needs or biases of rhetoric or of grammar. He set out to write what philosophers would find most pertinent or most useful in rhetoric; it has been misconstrued as the 'philosophy' of rhetoricians. Equally, his *Poetics* is a philosophy of poetics, that is, an account of what a dialectician sees or finds pertinent when he brings his tools to bear on that activity: it certainly is not a poet's handbook on poetry or poetics.

Aristotle ... wrote 'apt use of metaphor indicating swift perception of relations' – Ezra Pound, poet's-eye view (ABC of Reading, 84).

For Aristotle, metaphor belongs to both domains, grammar (literature) and rhetoric, so he discusses it in both his *Rhetoric* and his *Poetics*. It is

Aristotle, notes Paul Ricoeur, 'who actually defined metaphor for the entire subsequent history of Western thought, on the basis of a semantics that takes the word or the name as its basic unit. Furthermore, his analysis is situated at the crossroads of two disciplines – rhetoric and poetics – with distinct goals: "persuasion" in oral discourse and the *mimesis* of human action in tragic poetry' (*The Rule of Metaphor*, 3). It is no accident that Aristotle chose to dissect the point of maximal interface of rhetoric and grammar, dramatic poetry. The heart of the discussion is found, as noted earlier (page 120), in the *Poetics* (1457b, 6–9):

Metaphor consists in giving the thing a name that belongs to something else: the transference being either from genus to species or from species to genus, or from species to species, or on grounds of analogy.²

Dialectic functions by converting everything it touches into figure. But metaphor is a means of *perceiving* one thing in terms of another. The concepts come after, often long after, the percepts. On closer examination, we find that Aristotle's celebrated anatomy of metaphor has nothing to do with metaphor itself. It is instead an anatomy of synecdoche.

Synecdoche is exactly this kind of name-swapping and sort-crossing: it consists of using (naming) the part for the whole or the whole for the part – genus and species. It is exactly metaphor minus its ground-elements. Only one of the four kinds of metaphor mentioned by Aristotle is actually metaphor: the one 'on grounds of analogy.' As he expands, in the same passage in *Poetics*,

Analogy or proportion is possible whenever there are four terms so related that the second (B) is to the first (A) as the fourth (D) to the third (C): for one may then metaphorically put D in lieu of A and B in lieu of C. Thus a cup is in relation to Dionysus what a shield is to Ares. The cup accordingly will be ... the 'shield of Dionysus,' and the shield the 'cup of Ares.' Or to take another instance: As old age is to life, so is evening to day. One will accordingly describe evening as the 'old age of the day' – or by the Empedoclean equivalent: and old age as the 'evening' or the 'sunset of life.' (1457b; McKeon, *Basic Works*, 1477)

2 Aristotle, *Poetics*, 1457b 6-9; in McKeon, *The Basic Works of Aristotle*, 1476. Aristotle immediately illustrates: 'That from genus to species is exemplified in "Here stands my ship"; for lying at anchor is the "standing" of a particular kind of thing. That from species to genus in "Truly ten thousand good deeds has Ulysses wrought," where "ten thousand," which is a particular large number, is put in place of the generic "a large number." That from species to species in "Drawing the life with the bronze," and in "Severing with the enduring bronze"; where the poet uses "draw" in the sense of "sever" and "sever" in that of "draw," both words meaning to "take away" something' (1457b; pages 1476-7).

He saw the same four-part analogy or proper proportion in psychological operations and in perception:

With what part of itself the soul discriminates sweet from hot I have explained before and must now describe again as follows: That with which it does so is a sort of unity, but in the way just mentioned, i.e., as a connecting term. And the two faculties it connects, being one by analogy and numerically, are each to each as the qualities discerned are to one another (for what difference does it make whether we raise the problem of discrimination between disparates or between contraries, e.g., white and black?). Let then c be to d as A is to B: it follows *alternando* that c:A::d:B. If then c and o belong to one subject, the case will be the same with them as with A and B; A and B form a single identity with different modes of being; so too will the former pair. The same reasoning holds if A be sweet and B white. (*De Anima*, 431a–b; McKeon, *Basic Works*, 594)

Perhaps the confusion is understandable when another set of ratios is examined.

Metaphor has traditionally been regarded as the matrix and pattern of the figures of speech.

Metaphor has three companions: together they form the foundation of the 'figures' – the schemes and tropes of classical eloquence. Vico terms metaphor 'the most luminous and therefore the most necessary and frequent' of the figures' (*New Science*, 116). Next in order of importance and priority he places synecdoche and metonymy (page 117).³ The former

- 3 Each figure of speech adjusts the sensibility of the user in the process of bringing it to bear on the content.

Metaphor presents one thing or situation dressed as or seen *through* another. A leap has to be made, across the interval between the two situations, each composed of a figure and ground.

Synecdoche presents the part for the whole or whole for part: 'All hands on deck!'; 'The law is on the way'; 'The grape was my undoing.' It is an oblique manner of speaking. Part for whole or species for genus (a scaling-down): 'hands' for 'helpers'; 'bread' for 'food' (our daily bread); 'wheels' for 'car.' A material may present what is made from it: 'grape' for 'wine'; 'threads' for 'clothes.' Whole for part or genus for species (scaling up): 'Canada Beats Russia in Best-of-Five Series'; 'arms' for 'rifles' or 'missiles'; 'the law' for a policeman.

With synecdoche, a thing is seen in some greater or lesser aspect of itself, so the

is quantitative and abstract (part for whole, genus for species); the latter is qualitative (attribute or quality for thing, agent for act) and can move in the direction of abstract iconography, such as 'ugly Poverty,' 'sad Old Age,' but at this extreme it flips into a different figure, prosopopoeia (personification). Last in order of development is irony: 'Irony certainly could not have begun until the period of reflection, because it is fashioned of a falsehood by dint of a reflection which wears the mask of truth' (page 118).

Moreover, these four stand in the familiar analogical relationship:

Metaphor	Irony
Metonymy	Synecdoche

Though indeed the complementarities are present, this quartet or grouping is not a tetrad. That is, it does not analyse some artefact of which synecdoche is the obsolescence phase, irony the reversal, and so on. Yet the ratios are present. The left side of the group is integral or right-brain in structure: metaphor uses two figures and two grounds: metonymy uses qualities, which do not admit of fragmenting or measurement but are pervasive, aspects of ground, as it were. The right side of the group is fragmentary or left-brain in structure: synecdoche is part-whole quantifiable, irony 'splits' in another way. Irony splits figure from ground and splits

figure is quantitative and connected, continuous rather than discontinuous. It is the most visual and left-brain of the figures. No leap is made: the thing is still there, and only it, writ large or small. Litotes (understatement) and hyperbole (overstatement) are among the firstborn of synecdoche.

Metonymy presents for the thing either its quality or attribute or something closely related to it. Metonymy's rather loose, right-brain nature has caused great confusion among the literati: what synecdoche is to the left brain metonymy is to the right: 'Here's Mr. Big'; 'We are loyal to the crown'; 'I owe allegiance to the flag'; 'Amazement seized the rebel thrones' (Milton); 'The pen is mightier than the sword' (Bulwer-Lytton); 'Her voice is full of money' (Fitzgerald); 'He tilts with piercing steel at bold Mercutio's breast' (*Romeo and Juliet*). However, St Paul does a metonymic two-step when he speaks of 'preaching the cross,' the cross being an instrument of crucifixion, and the crucifixion of Jesus the means of redemption: he meant preaching redemption. Such double metonymy is called *metalepsis*.

Irony (Greek, *eironeia*, dissimulation, playing dumb) plays with double signification: it may work by reversal or by using terms of praise to imply condemnation or contempt. 'That's just wonderful, that is', 'A fine state of affairs'; 'For Brutus is an honourable man' (*Julius Caesar*); 'Honest Iago' (*Othello*). Irony can also lean towards sarcasm or ridicule. It can be situational – remember *Life's Little Ironies*? – and include most of what we call poetic justice. In dramatic irony, characters on the stage are aware of but one meaning of their words or actions (or both), and the audience of that and of another, often malign, significance.

the consciousness of the knowers. On the stage, for example, an irony will have one meaning (restricted) for the characters, another and fuller one for the audience (and perhaps for some other characters as well), though the words – figures – are identical. Thus:

figure/ground			figure/two grounds
figure/ground	Metaphor	Irony	
	Metonymy	Synecdoche	
ground/ground			figure/figure

Top-bottom resonance is preserved as well: the top row is two-levelled, the bottom row, in higher definition, is one-levelled (no play between figure and ground).

Aristotle’s confusion is not only understandable, it points to a discovery of the first importance. Since dialectic derives from the interiorized logos (the *logos hendiathetos* in the mind before speech and minus hearer) it works by abstracting figures from their grounds in order to isolate essences and pure forms – the good, the beautiful, the right arrangement, the test for truth. Viewed thus, stripped of its grounds, metaphor *is* synecdoche or metonymy. (Metonymy, with its qualities in high enough definition that they approach the intensity of quantifiable figures, may account for Aristotle’s species-to-species and genus-to-genus types.) By another route, the further confusion with simile can be accounted for.

Dialectic – logic and philosophy – represents in the trivium the extreme of left-hemisphere operation as it uses no ground but alphabetic writing itself.

The left brain provides both abstraction and sequence, and dialectic is justly famous for its ability to generate long sequential chains of logical argument and of philosophical reasoning. Yet metaphor, with its apposition of double figure and ground, is formally discontinuous and resonant. However, put it into the left brain, raise the definition to figure-figure level, and the metaphoric ‘The lion of Athens sprang on the foe’ or some such

immediately converts into 'He sprang like a lion' (simile/analogy) or into the extreme 'He is a lion' (copula). The last two are connected and linear. They are not at all metaphor, but they are what the left brain produces when it is given metaphor to process in *its* terms. So, Aristotle, in the *Rhetoric*:

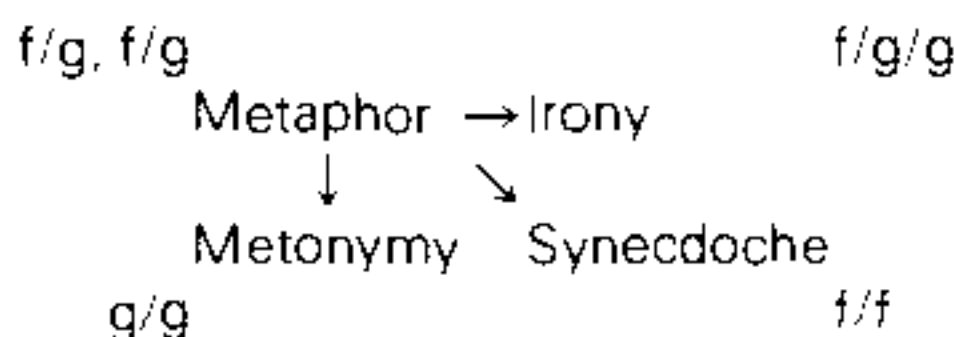
The simile also is a metaphor, the difference is but slight. When Homer says of Achilles (*Iliad* 20.164),

He sprang at the foe as a lion,
that is simile. When he says of him, 'The lion sprang at them,' it is a metaphor; here, since both are courageous, the poet has transferred the name of 'lion' to Achilles. Similes are to be employed in the same way as metaphors, from which they differ only in the point just mentioned (1406b, 3.4; Lane Cooper trans., 192)

A bit later, he expands:

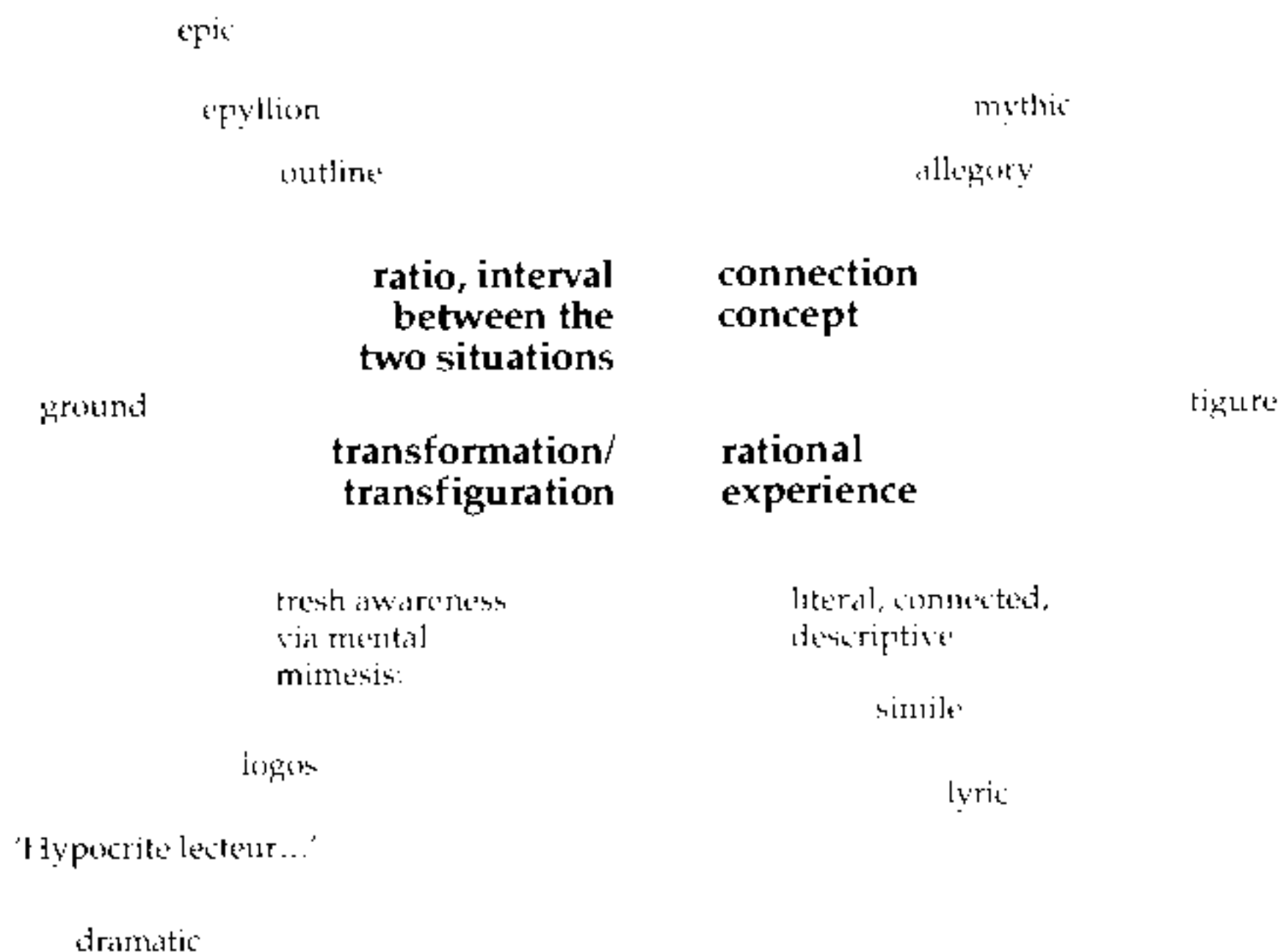
The simile, as we said before, is a metaphor, differing from it only in that the simile adds the phrase of comparison, which makes it longer, and hence less pleasing. Nor does it, like the metaphor, say 'this *is* that'; and hence the mind of the hearer does not have to seek the resemblance, [The simile being longer, using more words, you do not learn the same thing so rapidly from it as from the metaphor; and, being explicit (saying 'this is *like* that'), does not bring, as does the metaphor, the easy and pleasant operation of finding the resemblance – which is implicit in the metaphor.] (*Rhetoric*, 1410b, 3.10; Cooper, 207)

Although he errs in calling simile, metonymy, copulas, and synecdoche types of metaphor, Aristotle is as usual being clear and precise. That is, he reports that, under left-hemisphere visual stress of a high order, metaphor transforms either into the connected form, simile or copula, or into the abstract form, synecdoche. In other words, our grammarians' quartet of figures, which is not a tetrad but which still exhibits the proportional relations, behaves thus:



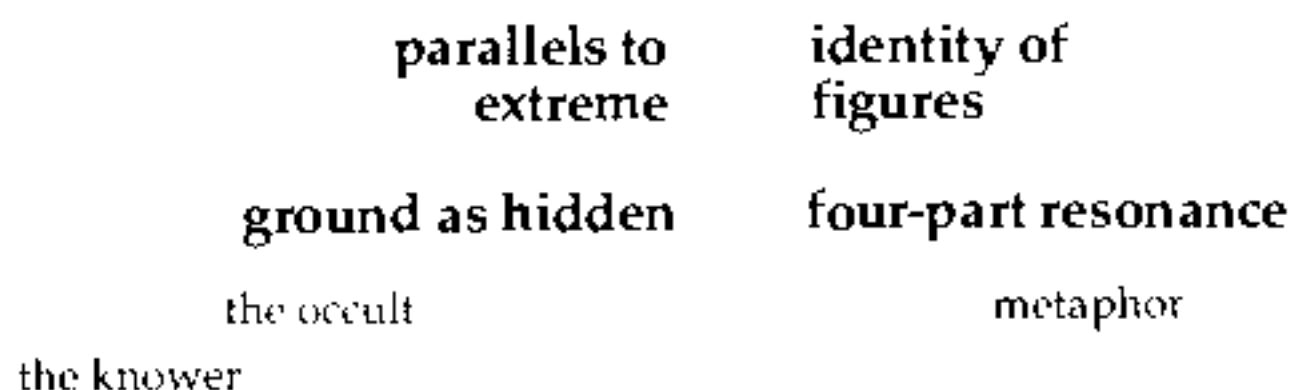
Of the four basic figures of speech, one (metaphor), under various kinds and degrees of stress, transforms into the others. They, in turn, in simple operation or under stress, intensify the operation of, and displace, retrieve, and transform into, yet other figures of speech. Metaphor itself (one situation through another):

METAPHOR



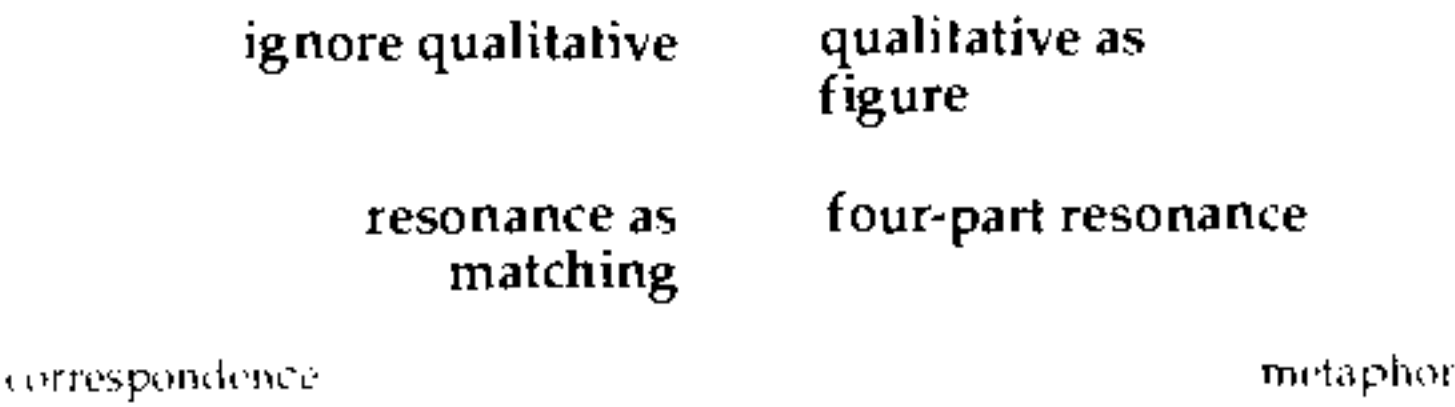
The tetrad can be employed to reveal how these first-level transformations occur as one or another aspect of the harmonic balance of metaphor is stressed or distorted. First, when the resonance of figures is pressed to **intensity of operation** so that they merge and unite into one figure, leaving the **two grounds**, irony results. This tetrad gives the stress pattern.

IRONY



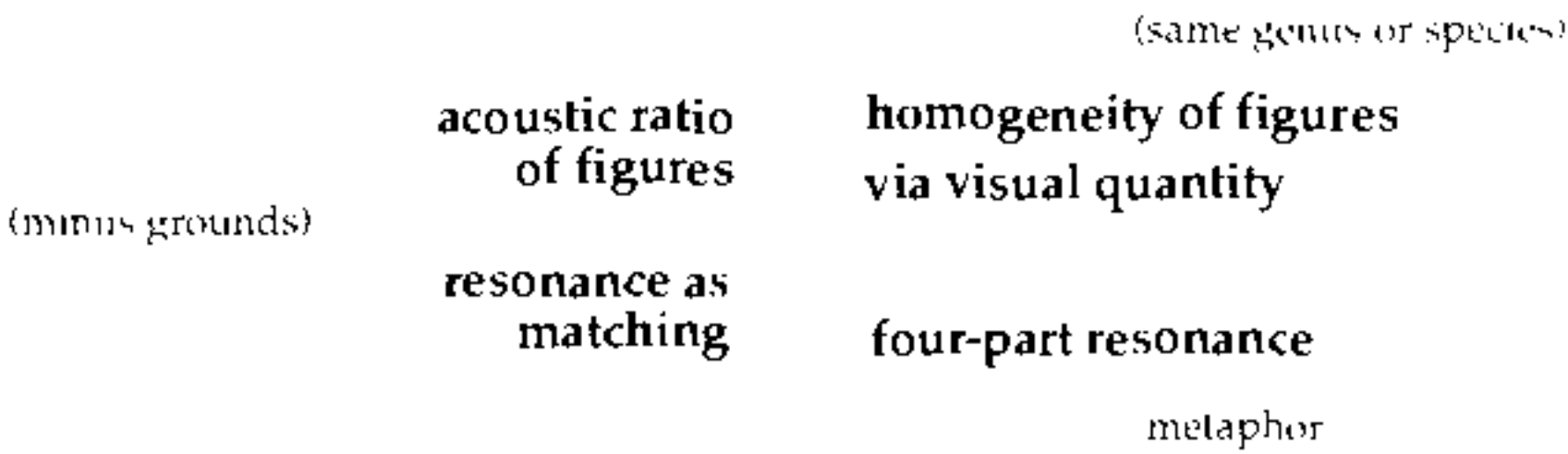
Should, instead, the analogical ratios be flipped over so that elements of **ground**, pervasive qualities, emerge into attention, metonymy is born. The stress pattern:

METONYMY



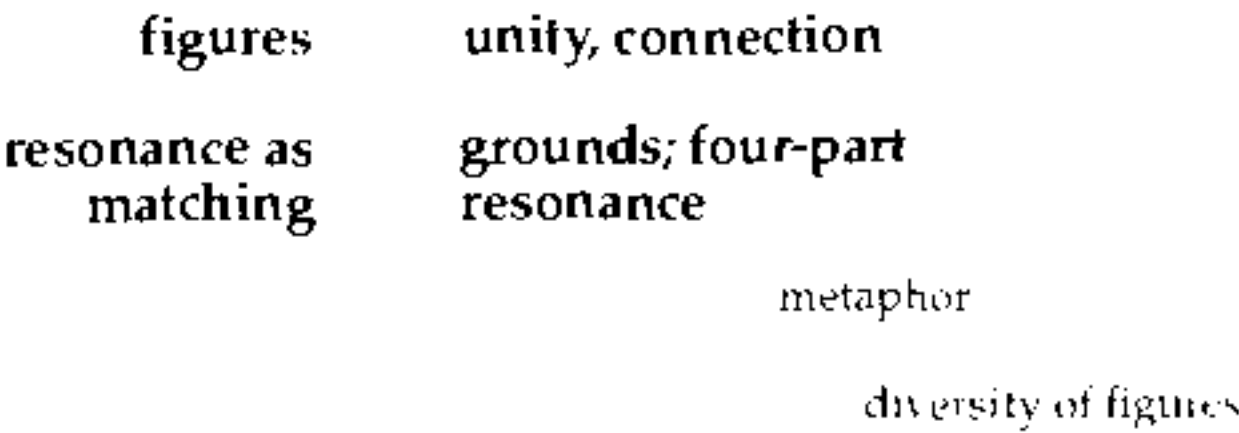
At the other extreme of formal stress, ground and quality are completely ignored and quantity reigns: synecdoche. The anatomy of this transformation:

SYNECDOCHE

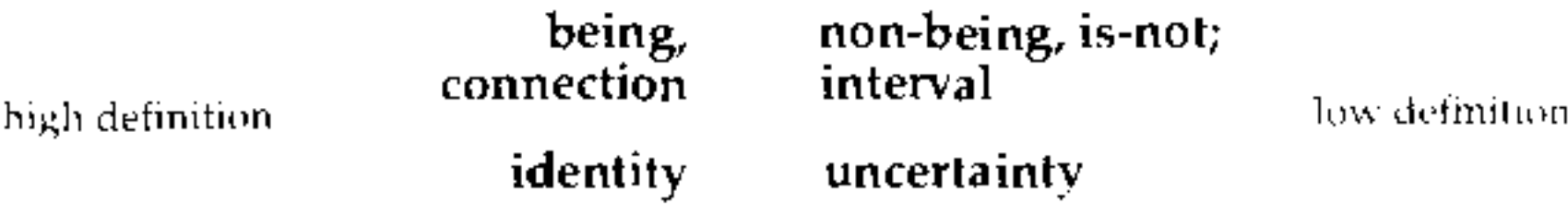


This might be regarded as the basic pattern of all visual stress, via the alphabet, on language. By pursuing the identical pattern one step farther, we discover how Aristotle came to regard the abstract, connected form, the copular 'is,' as metaphor. Again, the stress pattern (the process of generation):⁴

COPULAR 'IS'

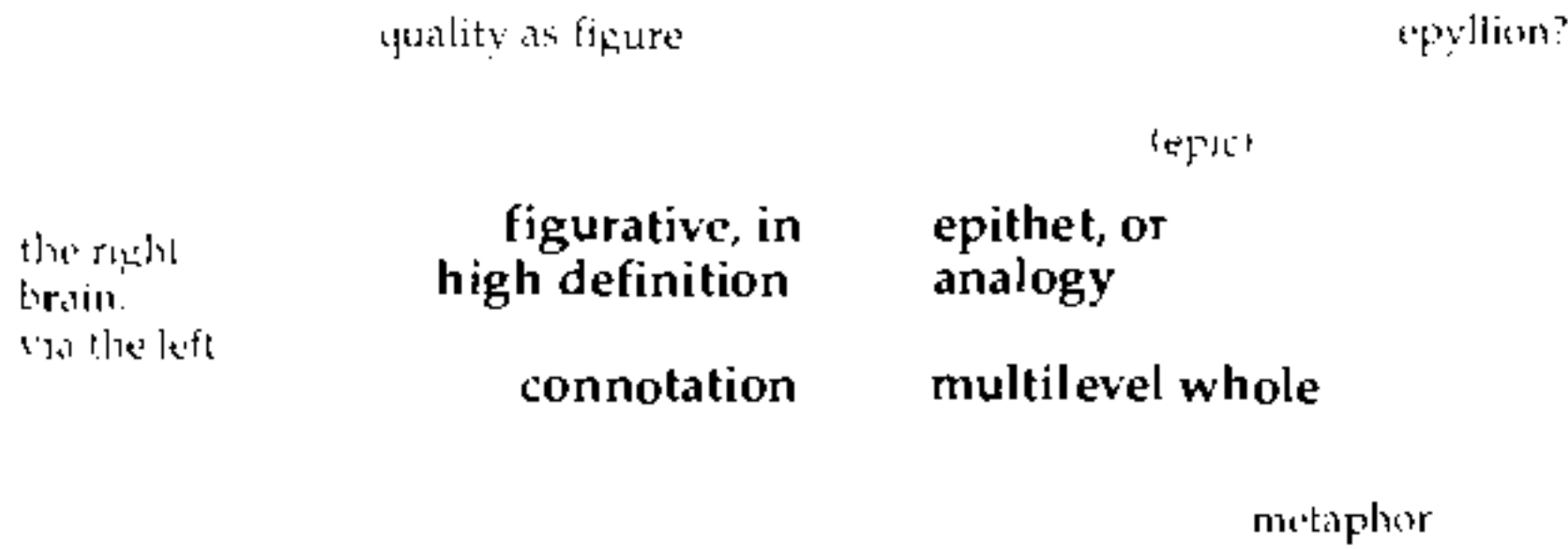


4 This shows only the process of generation: the actual tetrad for 'is' itself differs somewhat

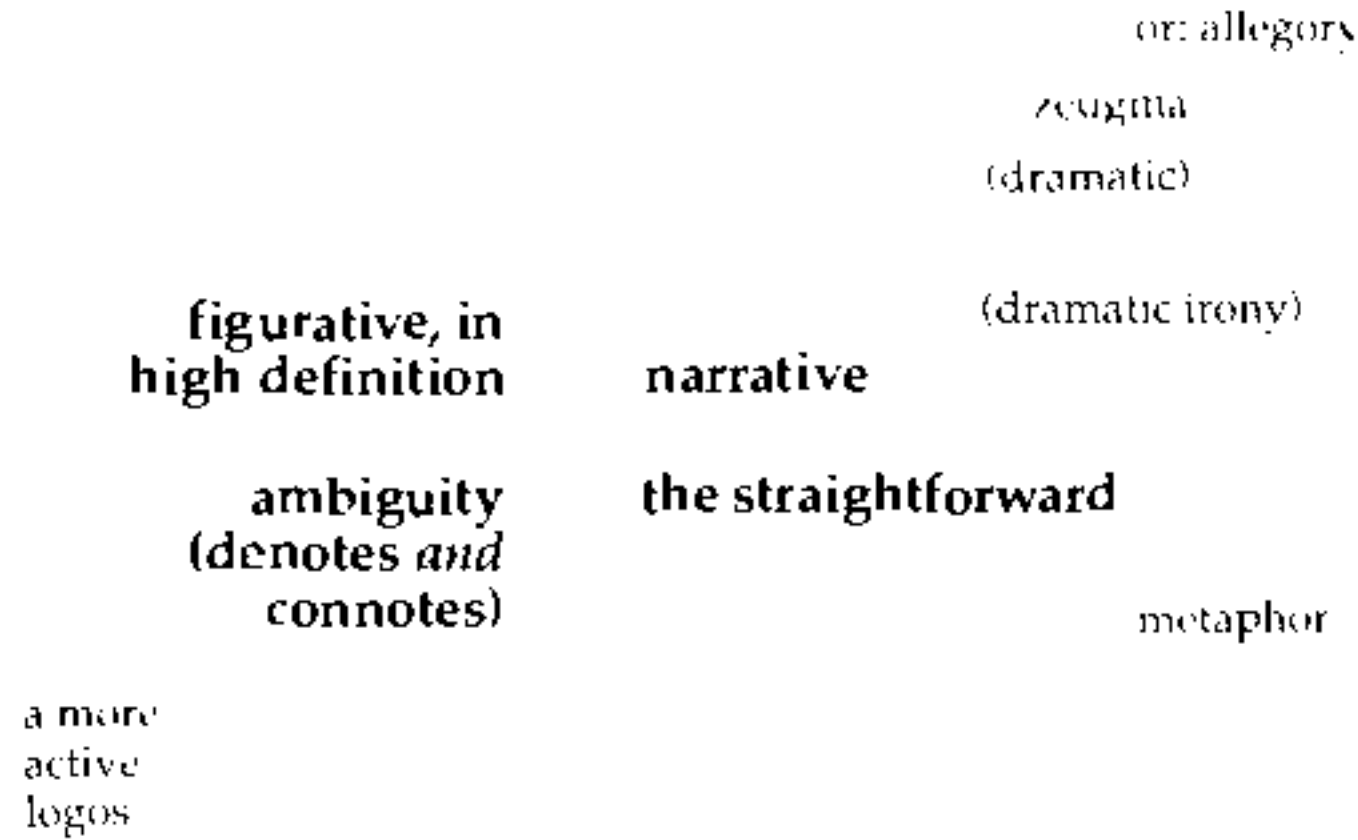


Use the tetrad for vivisection of each of these fundamental figures of speech to see how the next generation is derived.

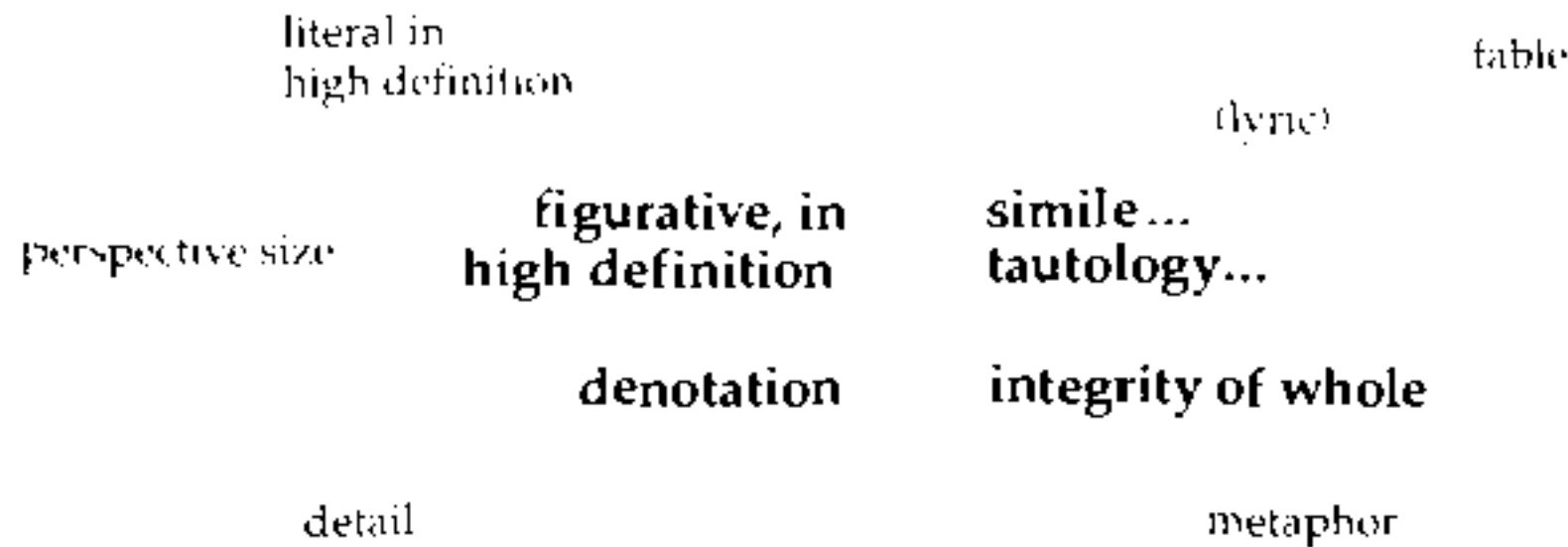
METONYMY



IRONY



SYNECDOCHE



In each case, the reversal phase discloses a spectrum of new figures, ranging in scale from individual word to genre. And thus are generated each and all of the figures of eloquence in every human language.

Tetrads vivisect these transformations in exact detail: New Science provides a common foundation for rhetoric, linguistics, semantics, hermeneutics, and semiotics.

In the process, four kinds of relations between tetrads – between their subjects – will be discovered, as has already occurred with the tetrads on other artefacts.

First, closed circles or rings of tetrads will appear, as, for example, litotes (understatement) is the reversal of hyperbole (overstatement) and vice versa (see page 209).

Second, chains or sequences of tetrads appear. These can be generated by any of the four processes. A will obsolesce B; B will obsolesce C; C will obsolesce D; and so on. Or, A will retrieve B; B will retrieve C; and so on. Or reversal, as with Newton's Three Laws (see pages 213–14).

Third, clusters of tetrads appear, revealing significant intersections in the processes of their subjects. Thus, a group will be found, all of whose members enhance, or obsolesce, and so on, the same thing. Metaphor, paradox, erotema (rhetorical question), and many other figures set aside direct narrative statement. All electric technologies extend the central nervous system. Books and files reify memory (retrieval). Cubism and atonality enhance multilocationalism and set aside a fixed, homogeneous point of view.

Fourth, the subjects will give rise to several apparently quite different tetrads. Metaphor, for example, can be stressed to flip into simile, or metonymy, and so on, each with differences in other areas of the tetrad. The same observation can be made with respect to tetrads in chapter four: every one of them can give rise to two, or three, or more tetrads. The question as to which is the right one is meaningless. Each tetrad is a vivisection of its subject, and reveals its essential verbal nature and form. Viewed in differing ways, as against different grounds, the artefact may present different features as salient but their pattern from one 'fix' to another will persist. Each of a group of tetrads on the same subject, then, is a hologram that displays the same structure and configuration of physical and psychic energies as the others: all should be considered simultaneously.

Another traditional understanding of the figures of speech holds that each is a unique posture of the mind and the imagination. Each is a vortex of energy and experience and a pattern of sensibility. The goal of science and the arts and of education for the next generation must be to decipher not the genetic but the perceptual code. In a global information environment, the old pattern of education in answer-finding is of no avail: one is surrounded by answers, millions of them, moving and mutating at electric speed. Survival and control will depend on the ability to probe and to question in the proper way and place. As the information that constitutes the environment is perpetually in flux, so the need is not for fixed concepts but rather for the ancient skill of reading that book, for navigating through an ever uncharted and unchartable milieu. Else we will have no more control of this technology and environment than we have of the wind and the tides.

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