THE NEW SCIENCE AND THE OLD

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The Laws of Media, as I explained in its preface, began as a project to revise *Understanding Media* (*UM*) by responding to objections it was "not scientific." My father and I expected a modest "mopping-up" operation; we discovered a vast new, uncharted territory. The real fun began with the search for "laws"—general, verifiable statements about what all media *do*. Initially we examined the individual media treated in chapters eight to thirty-three of *UM* and then added a few new developments such as video-tape, colour TV, satellites, and computers. The critics were quite right to complain that this earlier book was not scientific, at least not in the usual sense. But we all had missed the main point: there was (at that time) *no* science of media at all; not, strangely enough, even a theory of media—that is, of effects, including side-effects. Nor had we one until last year: no science, no laws, nor even any theory worthy of the name.

Instead there are mountains of observations from divers fields such as Engineering, Psychology, Architecture, Sociology, Linguistics, Cultural Anthropology, Neurology. Some of these use scientific procedures and statistical methods; some are infamous for their inability to state things clearly and simply. There are theories galore, and quite a few laws, all dealing with content or construction, none with media and culture (except in Biology, but in a sense too limited to be of much help). None of these fields suggest the arts have anything useful to contribute to a science of media and culture.

We start with one basic question: "What do all media do?" As *UM* provided a number of answers, we expected to be able to formulate a dozen or more laws in short order. All media are extensions of the user (from the subtitle, *Extensions*

of Man) that translate (Ch. 6) knowledge, experience, and energy from one mode to another. New technologies create new environments (Ch. 1) of services and disservices and alterations in human awareness and association ("medium" usually means "environment" in this sense, in *UM*). Any form pushed to an extreme will reverse (Ch. 3) its characteristics. These general observations led to the first three Laws:

- What is displaced or pushed aside?
- What is extended or amplified or enhanced?
- What is the reversal phase?

These three laws held in every single case, although from time to time one of another law took a while to answer. A few weeks later we found a fourth Law in *From Cliché to Archetype*, a book about the processes of obsolescence and retrieval:

- What (earlier displaced form) is retrieved?

And there, for the fifteen or so years since we began working on the Laws, the matter has stood. Apparently there are only four Laws of Media, just as in Physics there are only three Laws of Motion or four forces. (Can you find a fifth Law? Or a single exception to one of the four?)

This was the beginning of "UMR" (i.e., *Understanding Media Revised*, our file title), which was duly sent off to the publisher and quickly rejected. It didn't seem to have much to do with *UM*.[1]. We started not with a theory but a single question, and the resulting laws do not constitute a theory: therefore the four Laws are presented in question form—to emphasise the fact they do not rest on some underlying theory. Retrieval and obsolescence, while separate processes as *From Cliché to Archetype* demonstrated, form a single dynamic interchange between a figure and a ground. "New archetype is ye olde cliché writ large." A corresponding interchange occurs between enhancement and reversal: amplification, carried to an extreme, yields reversal.

II

At first these four Laws seem deceptively simple. Initially, our tetrads (collocations of the four Laws) simply listed the answers to the questions in this order: a (enhances), b (obsolesces), c (retrieves), d (reverses). For example,

SLANG:

(a) enhances new awareness
(b) obsolesces vagueness, inarticulacy
(c) retrieves word as gesture; unconventional feeling
(d) reverses into concept form

or, MONEY:

(a) speed of transaction, uniform pricing
(b) barter system haggling
(c) conspicuous consumption (potlatch)
(d) credit (lack of money)

Or to pursue the money theme a bit,
CREDIT CARD:

(a) image of user
(b) money
(c) corporate services
(d) debt; inflation of image

Or, more recently,
PERSONAL COMPUTER:

(a) ease of composition of prose
(b) drafts, the linear approach; the secretary
(c) the creative streak
(d) hacker (endless process); do your own work, typing

For several years such tetrads, dozens of them, circulated among colleagues in this kind of listform. How we presented the tetrads only changed after our research on the *logos*, formal causality, and metaphor forced the matter. We then realized our four Laws were appositionally related. The original form of presentation (above) suggests—falsely—that there is a sequence among the Laws; now, instead, we discovered the Enhancement is to Reversal as Retrieval is to Obsolescence, and vice-versa.

Thus:

Enhancement	:	Reversal
Retrieval	:	Obsolescence

Chief among several advantages of this form is that it does not imply some order of occurrence. All four processes are present in each innovation from the first moment of its existence. Another, and perhaps greater advantage: this mode of presentation allows us to see not one but *four* complementary proportions, and allows for considerable cross-checking. You can read left-to-right or right-to-left,

top-to-bottom or bottom-to-top. As you do so, the ratios enable you to fine-tune the tetrad, to get the "rhymes" aright. So, for example, the STIRRUP, which enabled the armoured knight to stay in the saddle (in the list form):

Amplifies:	weight and power of knight
Obsolesces:	infantry
Retrieves:	the centaur
Reversal:	man becomes tank

or, in the appositional form used in *LM*:

knight's weight and power	tank
centaur	infantry

Of course, any given innovation will obsolesce (or retrieve, etc.) a whole group or spectrum of earlier forms and practices rather than a single one. There may even be several candidates for each of the Laws. When this happens all the possibilities should be put into play at once. The resonances among the Laws will quickly clarify the selection. In fact, the technique that works best in constructing a tetrad is to begin by treating all of the possibilities as glosses, that is, to use the questions to probe the topic, to sharpen awareness. Gradually, ratios among the groups of glosses will appear, with some groups evidently being incomplete, indicating where further digging is needed. As the groups develop and the lines of force get clearer one central, incontrovertible tetrad statement emerges that crystallizes the topic. The residue should be kept as glosses, if apt. Among them a second or third tetrad may be found; each serves as a gloss on the other much as the stanzas in a poem serve as glosses on each other. For example, for symbolist poetry there is, either:

SYMBOLIST POETRY

Finnegans Wake

	image-less
the image	pure sound
multisensory awareness	logic

else:

SYMBOLIST POETRY

	reader as tyrant
role of reader as	solipsism
co-creator	robotism
discontinuity	classical/Augustan
objectivity	

or this:

SYMBOLIST POETRY

poet or seer;	
inwit,	Hermeticism
percept	the occult
Homer: poet	editorial poet
as teacher	concept

It stands to reason that any medium or technology will yield several tetrads, as viewed in various lights or historical periods or against the backdrop of different cultures. Wine, or radio, or rifles mean one thing to us, another to a Bedouin. Yet all tetrads on a given topic show a characteristic pattern or resonance; the more tetrads there are for a single topic the more the lines of force stand out and the sooner that central or focal tetrad will reveal itself.

III

A tetrad is a word. There in a single sentence is the biggest discovery we made about them. As words, tetrads bespeak a language and new mysteries. What manner of word?

First, bear in mind that the four parts of the word, the four Laws, like the ancient four causes, are simultaneous. All four are latent in the medium at once and from the outset.

Second, there are evidently fixed ratios among them, as there are among the four parts of a metaphor. To use a metaphor is to use one situation as a way of discerning another. "The ship ploughed through the ocean" places the ship in relation to the waves as a plough to the land: a ratio among ratios. A is to B as C is to D. One kind of experience is brought to bear on another, one thing seen *through* another, processed through another. So among the Laws: Enhancement and Retrieval are in ratio as Reversal and Obsolescence are in ratio; equally, Enhancement and Reversal as Retrieval and Obsolescence.

Third, every word in every language ever uttered is metaphor. Literally, the word is not the thing: the word presents, translates the thing. It gives one kind of experience as another kind of experience, direct awareness as speech. The "New Science"—ours, Bacon's, Vico's—is a science of words: every word is a medium, every medium a word. The word is not an arbitrary sign abstract from things and experience: such a contention flies from the humblest common sense. Nominalism has led to an enormous residue of wasted effort, to bad Semeiotics and worse Linguistics. Words, as translators, store experience: knowledge common to all poets. Through the common ground of experience the word and the thing are in ratio. Any science of language that ignores etymology, as Nominalism *must*, is in the same fix as a science of horticulture that ignores whatever goes on below ground. Roots nourish and give form to words. Since words translate experience they have a mimetic dimension largely unexplored outside of poetics: an obvious, and extreme, example is onomatopoeia. Etymology discovers the form of words, words rooted in sensibility, sensibility and things (and the urge to discuss them) the formal cause of words. Our media, our extensions (outerings/utterings) compose a veritable garden of eloquence: we are their roots; we speak ourselves. They burrow and barrow profoundly in our beings. Our artefacts are words: tetrads are their ideograms.

Fourth, we found that tetrads apply only to *human* artefacts. They break down when applied to natural or animal products. What, for example, does a mountain enhance, or retrieve, or reverse into? Or a tree? Or a spider's web or bird's nest? A lightning bolt? It makes perfect sense however to talk about technologies as extending or enhancing human powers, as obsolescing incapacity or less potent forms, and so on.

Fifth, and most surprising, we found that tetrads apply to *all* human artefacts, to physical objects (cars, planes, radios, forks, spoons, water pumps, satellites) as well as intangibles. The latter include theories and laws of science (which are not natural artefacts like rocks and trees but human creations), philosophical systems, styles in art and poetry and music, medicines, customs, clothing, figures of speech, even tetrads themselves. We provide a representative sampling in *LM*.

"Why" asks the poet, "why are natural objects so much harder to describe than man-made objects? (Near-impossible, in fact, as noted by Cultural Anthropologists.) Why, except that man-made things are of themselves human utterances—extensions of man. Description is paraphrase or circumlocution. The Book of Nature is writ in another language with another syntax. Its words are tacit, implicit, all part of ground, whereas man-made things are explicit. "Technology is explicitness". So, too, all our artefacts: all are processed through those parts of the brain that govern speech.

Minesis, in the preliterate sense demonstrated by Eric Havelock, belongs to the other and more integral part of the brain. Mimes report that natural things are easier to mime than man-made things: you can not mime a chair or broom, only someone using one, a person *in relation to* an artefact. From tetrads we learn that *all* human artefacts are verbal, that all have the nature of metaphor. Also, all have the power to transform sensibility or culture. They constitute a language.

Does that language have a structure? a grammar? (There is utterance and utterer.) Are there different "parts of speech"? How might they be distinguished? Can they transform, one into the other, as do our verbs, nouns, adjectives, etc.? Or are they ur-speech, verbnouns, undifferentiable? Does the language have a syntax? Perhaps it does, and we call it "history".

IV

When people talk of "the media" they usually refer either to TV, radio, the press, etc., or (figuratively, by synecdoche) to TVs, etc. and all those who work in, on, or around them. Or they use personification: "The media report..." Basically there are two approaches to media: either from inside or outside, empirical or theoretical. The first requires looking at the item and studying it; the second, proving or disproving a theory. The first emphasizes sharp wits and trained perception; the second relies on a more mechanical clarity, the conceptual faculties of right judgement. For several hundred years now only this second approach has bee regarded as respectable science. The former approach is more ancient, the way of the arts. Francis Bacon pointed this out in his *Novum Organum* ("New Science", as contrasted to the *Organon* of Aristotle):

> There are and can be only two ways of searching into the 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 judgement ... 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. (Aphorism xix)

Barely a century later, in 1725, Giambattista Vico explained in his *Scienza Nuova* (P 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.

Two matters need to be clarified: media can't be studied "from the outside" and media study necessarily embraces sensory study. Conventional science

proceeds by theory and description of the thing, one thing, one event, one effect at a time. The effect of any medium or technology is a new human environment both physical and perceptual. A new scale is introduced into our affairs by each innovation since it alters sense ratios or patterns of perception. Each functions as a new ground, not a passive wrapper but an active process. Environments or grounds, which are imperceptible, take all previous environments as their content.

When critics attacked *Understanding Media* as "unscientific" they were right in part: this work wasn't theoretical or systematic (Old Science). It was empirical, packed with observation by a sensibility trained in poetics: the raw stuff of New Science, but it did not provide Laws. Some principles emerged, however tentatively. One paradox, "the medium is the message," drew attention to environments as the locus of real action and effect. (The form of causality remained problematic for it is not sequential but circumstantial, not efficient cause—the scientific—but formal cause.) Another such principle is the numbing process, :Narcissus as Narcosis". Another: "Reversal of the Overheated..." A first report on the unknown ground rules of everyday life, this book felt chaotic, quirky to anyone looking for system or theory because it was based on pattern and percept. As Bacon noted, foreign because "as yet untried."

Both modes of science, Old and new, have their weak spots. Old Science rests on theory and knowledge and systematic reasoning. Its main weaknesses therefore are imperfections in theory, gaps in knowledge, flaws in reasoning. "Once we have an explanation—correct or incorrect—for otherwise discrepant or puzzling events, there is no more puzzle, no more discrepancy. As a result, we are complacent, at least for a while."[2] Sir Karl Popper observed (*Objective Knowledge*) that Science proceeds by progressive falsification of theory—by means of new knowledge (and new ignorance). Another aspect, exact reasoning, has for ages been the special province of logicians, who have long recognized its pitfalls and fallacies. Discoveries of irrationalities in Science and Method, whether by Heisenberg, psychologists or neuroscientists, have on the whole made no difference to the orderly progress of scientists.

Although empirical science also relies somewhat on knowledge and an updating process, it is by contract quite different. Systems theories have little or no use and tend to impose unwanted rigidity. For deftness with theory, concept or logic, New Science substitutes training of perception. It finds maximal flexibility, through critical awareness, to link the configurations of ground as process to know the form from within. In place of logical fallacies, then, the "fallacies: of an empirical science are all deficiencies of perception. So, just as the study of logic and efficient cause are necessary adjuncts to Old Science, those of sensibility and of formal cause are adjuncts to New Science.

New Science is conservative of knowledge and tradition—rather a different attitude from the evolutionary approach which simply discards obsolete knowledge like worn-out socks. Knowledge and ignorance both are human artefacts, valuable too in their own right as pertaining to *ways* of knowing, forms of perception. No way of knowing is ever obsolete:

> Knowledge is an artifact; it is created by us; but one created it exists outside ourselves; it possesses a certain autonomy; it affects us (it has unintended consequences), and we can affect it, for example by criticizing it, by examining its logical structure; it is *real*... It is, in a word, *objective*. The sociology of science looks at the behaviour of scientists producing knowledge, at the production process; it is concerned with how scientists get their knowledge, with its social causes.[3]

From the sciences we learn about things; from the arts we learn about ways of knowing: both are artefacts. Wyndham Lewis pointed out in *The Demon of Progress in the Arts* that the very notion of progress is without meaning in the arts (whereas it is crucial in science). No artist competes with any other where art is concerned. Artists may compete for markets or adulation, but neither of these is related to art (a desire to be slobbered over is human but not artistic). Artists constantly struggle to remain current, keep the environment tuned in, and stay awake. In place of studying fallacies in reasoning, they study the bias of perception.

Old Science has this distinct advantage over New: that whereas reason can be studied in the abstract and a flaw (such as Post Hoc...) once identified can thereafter be dealt with, perception changes its contours with each age and situation. Concepts are static: percepts processes. Therefore pollution of perception—if I may call them that—are also processes. Francis Bacon called them Idols and identified only four; Vico made those four his first four axioms. A science, then, that includes perception necessarily concerns itself with transformations of experience: media are translators. All of the arts belong to New Science.

Awareness and experience are unscientific because they are not passive or objective. Edmund Blair Bolles, a follower of Bartlett, provides a recent example when he notes awareness was once a forbidden topic in both psychology and neuroscience: "The taboo arose partly because no one can observe it directly and partly because experimental psychology began in reaction against the introspective psychology that studied only awareness.[4] Although the study of the brain, in recent years, has returned awareness to respectability somewhat, Old Science's reluctance, even outright opposition, remains strong:

> The dispute comes down to the passive or active question. If memory is entirely passive, manipulated only by objective factors, the brain is a machine. It is not a computer or a tape recorder, but it is a biochemical device and its activity comes from outside itself. Many people insist that it is unscientific to deny that the brain is a machine. The repeated use of

> the title "Mechanisms of Memory" is an aggressive assertion that memory is part of the dead mechanical universe. These thinkers will not lightly embrace a view of an active memory whose adaptations depend on subjective factors known only to the individual actor.[5]

The same bias has long prevented science from tackling media and diverted its attention instead exclusively to content study and to the transportation of messages. All media extend limbs and faculties and profoundly transform the user, intensify and reshape his or her experience in some areas and blunt it in others. Self-defence begins with "tuning of the world" and the training of sensibility.

V

Of what real use is the tetrad and the "New Science" founded upon it? The four laws of media show the innovation of artefacts to be one with poetics: both concerned words. The tradition of poetics, therefore, has much to offer the student of media. Since we have already mentioned our main predecessors in laying a foundation for "New Science", Francis Bacon and Giambattista Vico, it should be noted that in this century, Ezra Pound, T.S. Eliot, and James Joyce pursued the same goal. Pound's professional poetic concern with words and sensibility (which are parallel to media and sensibility) led him to explore the wisdom of various cultures with regard to language and utterance. Having the usual concern of serious writers with exactness of expression, Pound made that pivotal in his approach to poetry, which is "precise verbal definition". There is a text, which bridges poetics and politics, that he was fond of citing to illustrate this:

> Tseu-Lou asked: If the Prince of Mei appointed you head of the government, to what wd. you first set your mind?
> KUNG: To call people and things by their names, that is by the correct denominations, to see that the terminology was exact.
>
> "You mean that is the first?" Said Tseu-leu. "Aren't you dodging the question? What's the use of that?"
> KUNG: You are a blank. As intelligent man hesitates to talk of what he don't understand, he feels embarrassment.
> If the terminology be not exact, if it fit not the thing, the governmental instructions will not be explicit, if the instructions aren't clear and the names don't fit, you can not conduct business properly.
> If business is not properly run the rites and music will not be honoured, if the rites and music be not honoured, penalties and punishments will not achieve their intended effects, if penalties and punishments do not produce equity and justice, the people won't know where to put their feet or what to lay hold of or to whom they shd. stretch out their hands.
> That is why an intelligent man cares for his terminology and gives instructions that fit. When his orders are clear and explicit they can be put into effect. An intelligent man is neither inconsiderate of others nor futile in his commanding.[6]

Tetrads not only let us view things as words, they provide a (four-part) verbal structure and provide exegesis of the parts (i.e., definition). As the parts are (simultaneous) processes, tetrads display both being and becoming, essence and causality. No such definition has hitherto been offered in the West: may it not have practical uses? These four Laws also provide insight into the relation between inner and outer states, between the subjective and objective. Media mediate between the inner and outer the more obviously when we realize media are utterances (extensions, outerings), words that embody and translate modes of being and experience. Pound had discovered in the *Ta Haio* of Confucius (Kung) observations with specific respect to language on this matter, which formed the core of Kung's (and Pound's) philosophy—"The Great Learning". Pound, the foremost poet of his time and culture, considered this "Great Learning" with its absolute insistence on precise verbal definition, to lie at the heart of all Western poetics. Tetrads afford, for the first time, active (not static) definition of our media and innovations; they vivisect poesis, "making" processes.

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The Ideogrammic Method. Etym and Telos.

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What further use are tetrads?

We in the West have *never* controlled our media and only rarely censored their contents. Media, technologies, artefacts have been left to entrepreneurs to build and exploit markets: the idea of control contradicts that of a free market. Only, the courts have been gulled into accepting that advertising is "education of the public so it can make responsible choices". Cui bono? We are accustomed to regard our media and artefacts as passive and neutral, a natural consequence of left-brain bias. Dozens of studies have demonstrated they are not, e.g., Lynn White, Jr., *Medieval Technology and Social Change*, on the horse collar and the stirrup producing the feudal system; Havelock, McLuhan, Logan on the alphabet; E. Carpenter's *Oh! What a Blow that Phantom Gave Me*, Media penetrate and spread like viruses through society, viruses that affect the genetic and perceptual code of a culture and remake it in their own image.

The New Science proposes that media and artefacts exert their influence along four axes (four Laws). For the first time, this permits systematic prediction; prediction permits control. Tetrads and the Laws hold out the possibility for control of the influences that shape and define the course and nature of our culture. The arts are our DEW-line—for diagnosis. Here now are the beginnings of a science for prescription and regulation of dosages, for the "tuning of the world". Tetrads and New Science enable us to do more than talk about "media ecology". Almost incidentally, another use (a side-effect) of the tetrad is to reunite the arts and sciences: since all activities in both, arts and sciences without exception, manifest

the same four dimensions, obey the same Laws and rest on a common verbal foundation.

ENDNOTES

1. The further evolution and peregrinations of the *UMR* MSS are a separate story. Another large publisher has been sitting on a copy without even acknowledging receipt of it for over ten years now.

2. Donald A. Norman, *The Psychology of Everyday Things* (New York: Basic Books, 1988), p.45.

3. J.W. Grove, *In Defense of Science* (Toronto: University of Toronto Press, 1989), pp. 22-23.

4. Emund Blair Bolles, *Remembering and Forgetting* (New York: Walker and company, 1988), p. 144.

5. Bolles: 174.

6. Ezra Pound, *Guild to Kulchur* (New York: New Directions, 1970), pp.16-17.