The lesson we can draw from the history of physics is that as far as we are concerned, *what is real is what we regularly talk about*. For better or worse, there is little evidence that we have any idea what reality looks like from some absolute point of view. We only know what the world looks like from our point of view.

Bruce Gregory

Whenever anybody says: “I am being objective,” that means: “Shut up and do as I say.”

Umberto Maturana

He who does not imagine in stronger and better lineaments, and in stronger and better light than his perishing eye can see, does not imagine at all.

William Blake

**Let’s start with a story…**

When I was a child I loved the fairy tales written by the brothers Grimm. These stories had been circulating in German culture for hundreds of years, and had been polished to a high degree of perfection by generations of women, ‘nannies’ to children of prosperous homes. These are not trivial stories, and they have attracted considerable scholarly attention.

One of them concerns a lovely young woman who wants to marry a handsome prince. In order for the marriage to happen the woman must demonstrate her ability to make a beautiful gown: (a kind of Ph.D. exam, I guess). To this end, she is locked up in a room in the royal palace, together with a supply of flax, a spinning wheel, a loom, scissors, needle and thread. In fact, though, she is a beginner, and can’t even weave potholders! While she is sitting there, weeping tears of despair, a tiny door opens at the base of one of the walls, and three tiny, misshapen old women emerge. Very quickly, one of them spins the flax into linen thread while another beams the thread onto the loom and starts to weave the thread into cloth. Presently the third woman starts sewing the cloth into a gown. At the end of their performance they go back through the little door, and disappear from sight.

The final scene is in the Throne Room, where everybody is marveling at the young woman’s skill. For some reason that I can’t recall, her act of plagiarism is detected,
producing a very embarrassing situation. But just in the nick of time another little door opens in the wall, and the same little women enter, and march into “center stage,” as it were. One of them, acting as a spokesperson says: “It is we who made that gown! Now look at us, and see how hideously misshapen we have become. My foot has become deformed from the years I have spent operating the treadle on the spinning wheel. My sister’s lips are distended from moistening thread so that it will pass through the eye of a needle. My other sister’s back is deformed from being hunched over the loom. Do you really want a wife who looks the way we do?” Well, of course the prince married the young woman, and they lived happily ever after. Or so we are told….

Three-quarters of a century have elapsed since I read that story, but it has left a lasting impression, as you can tell. There is a lesson to be learned, one that has become part of “folk wisdom.” When we undergo training for any profession, one term for this process is: our “professional formation.” The same term exists in French: “la formation professionelle.” But the French also use the phrase: “la deformation professionelle,” to describe the distortion of our thinking produced in us by our having been trained for a specialty. That’s similar to what occurs with the domestication of animals, isn’t it? A finely trained human is a limited one.

The Sadist and the Monkey
Neurobiologist Gerald Edelman tells of an experiment in which a scientist first studied the brain scan of a monkey, noting which parts of the animal’s brain scan “lit up” as it used its fingers. He next severed one of those fingers, and went on studying what happened to the brain scan with the passage of time. What he found was that the part of the brain that had “belonged” to the now-severed finger was being “captured” by the region of the brain devoted to the other, healthy fingers. Edelman referred to this as “neural Darwinism,” implying that brain cells are objects of competition. For a given neural “route” in the brain, the rule is: “Use it or lose it.” If this is true for the monkey it must also be true for us, and subsequent research has shown this to be the case.

In the years that have intervened since that discovery, battalions of neuroscientists have scanned hundreds of brains, earning a great many doctoral degrees and a gratifying number of promotions as a result. As you might guess, in this manner a great deal has learned about the way humans use their brains. The best introduction to this field is to be found in books written by George Lakoff, Distinguished Professor of Cognitive Science and Linguistics at U.C. Berkeley.

Judging from the empirical evidence, we can conclude that the brain enjoys a high degree of plasticity. Also, whatever we normally see, think and do is represented by electrical and chemical signals that travel along neural pathways in the brain. Furthermore, these pathways are strengthened by repeated use, (think: widening a road in order to accommodate increased traffic). For example, it is possible to distinguish an experienced taxi driver from a concert pianist, simply by examining their brain scans.
Any rhetorician or marketing specialist can attest to the effectiveness of keeping messages simple and repeating them endlessly. This last applies strongly in the case of political messages. A political argument phrased to appeal only to the intellect is not nearly as effective as one appealing to the emotions, where the neural pathways are ancient, and have a richer set of neural connections. A regrettable state of affairs, but any rhetorician will tell you that, where arguments are concerned, the solar plexus is a much better target than the cerebral cortex. It is just the way we are built. Our environment places our brains in a continual state of flux, forcing the creation of this sort of neural “wiring and rewiring.” It goes on continually, mostly outside our awareness, so that constant vigilance is our best (and only) defense.

How These Ideas Apply to the Invention of the Phonetic Alphabet
Paleontologists tell us that “modern humans” came on the scene about 60,000 years ago. If this is the case, reading and writing constitute a relatively recent invention, since the earliest alphabets are only about 3400 years old. So, it isn’t reasonable to expect that our ancestors made a grand entrance into prehistory, hard-wired for the alphabet. There is no reason to suppose that evolution even had the alphabet in mind. It does seem more probable that this kind of intellectual revolution required a substantial change in the neural “wiring diagram” of humankind. That is the way that psychologist Julian Jaynes saw the matter. Jaynes consulted ancient texts, and found that they abounded in references to hearing—even when the source of the words was not physically present. This is surprising, but eerie things could conceivably happen when visual information was mostly limited to pictograms until the advent of the alphabet.

Today some of us still inhabit “the Gutenberg Galaxy”; and in males, at least, strings of abstract symbols on the printed page are “displayed” on the occipital cortex of the brain, and then referred to “cataloging librarians” usually “sitting at desks in a region located on the underside of the brain’s left hemisphere. These functions are related to those sites where time sequences are analyzed, and where numerical operations are performed. Here, then, is the site of the kind of thinking that we designate as “left-brained.”

A More Severe Specialization…
Experience seems to be a trackless land; and strings of words, (the noises we make), are like a network of roads that we have superimposed upon that trackless terrain. If this sounds peculiar, we can make an analogy between Experience and Number. We can start exploring the land of Number by filling in the integers, but then the fractions have to be included in the gaps between them, the fractions falling between successive integers. But what about the square root of, say, two, or five? They are neither integers nor fractions. Where do they go? And how about pi, and others like it? Well, a mathematician will tell you that most numbers are completely indescribable. No matter how fine the net we use, almost all of the numbers will squeeze their way to freedom. Good! Now we understand how, in a similar way, language is a kind of road building across our Experience. (If you disagree, just sit down to a computer and try to describe one of your own experiences; it is a matter of very hard work, isn’t it?). Language is simply a form of socialization of
Experience, and also a form of domestication. Further, a phonetic alphabet carries the limitation one step further: It maps the ‘language noises’ we make onto abstract visual symbols. And it is all done in the interest of civilization. But there are still ways that the brain uses in order to get around this limitation, and that is what I want talk about next.

About Metaphors: How We Really Think.

What do we mean by a metaphor?

The essence of metaphor is: understanding and experiencing one kind of thing in terms of another.

Like most people, I had once let myself think of the metaphor as a kind of frivolous ornament, the antithesis to “straight talking and writing.” Hence the phrase: “There’s more truth than poetry in that statement.” But one day I was fortunate enough to purchase a copy of “Metaphors We Live By,” by George Lakoff. His book has made a valuable contribution to linguistics, and Lakoff has also made it possible for us to obtain indispensable insights to make sense of the present disastrous political situation in the United States. Here is a list of just a few of the provocative ideas found in his books.

• The Embodied Mind: This means that our normal way of thinking is determined by the way our brains actually work. There exists a very respectable body of data supporting the idea that our way of thinking and talking is heavily mortgaged to our way of sensing and moving. Since Lakoff’s book appeared, it has been discovered that primate brains contain what are called: “mirror neurons.” Among other things, when one monkey sees the fingers of another monkey at work on a computer keyboard, on a brain scan the first monkey’s sensory-motor cortex “lights up.” “Monkey see, monkey do!” (Somebody should try this experiment with hedge-fund CEO’s and other psychopaths). Metaphorically speaking, the beautiful bird of intellect does not sing its own private cage; instead, it must join with other, more ordinary birds of the sensory-motor variety.

• Thought is mostly unconscious. Metaphorically, it usually goes on behind our backs. The Germans have a word for our unconscious thoughts: die Hintergedanken: (the thoughts behind the ones of which we are aware). Thus, we are mostly not aware of why we think the way we do.

• Abstract concepts need to be expressed metaphorically, in order to be understandable.

• Speaking metaphorically, of course, The Word, spoken or written, by someone who knows how to use it, is pure dynamite.

• Finally we need to revisit the ancient question: What is truth? In ‘Philosophy 101’ we are given what is called: The Correspondence Theory, which states that a statement is true if it corresponds to the correct state of affairs in the world. This definition has a built-in problem: There is no Bureau of Standards “out there,” to which we can compare a
statement, in order to verify its truth. Thus, truth depends upon our understanding of statements. Hence, the definition proffered by Lakoff and Johnson, (which is harmonious with that used by astrophysicist Bruce Gregory in the first epigram at the head of this chapter):

A statement is true in a given situation when our understanding of the statement fits our understanding of the situation closely enough for our purposes.

The Effect of the Invention of Movable Type, Combined With a Phonetic alphabet Upon the History of the World.
That technology could have the power to disintegrate a society should not be surprising. Think of the Industrial Revolution and the disappearance of the cottage industries in England, for example. And think of the effect of the automobile and television on the structure of the city and the family during the 20th century. It would be surprising, therefore, if Gutenberg’s printing press, not only by making new ideas readily available, but by disseminating craft secrets formerly accessible only to members of guilds, didn’t act to dissolve further the ambient social structure. In addition, printing served to undermine the position of the Catholic Church, which had been the supreme authority, for a thousand years, in matters pertaining to faith and morals. Although this was, from one point of view, a very good thing, it cannot be said that it contributed very much to social cohesion. Its effect was a radically centrifugal one, as we shall see. So, it would be astonishing if the printing press didn’t contribute mightily to the eclipse of a society that had already become economically non-viable, thereby hastening the demise of the medieval world.

But a Price had to be Paid For All This: A Loss of Participating Consciousness.

Definition of Participating Consciousness: “The union of the subject and the object in the act of perception.” (Later in this book I shall try to convince you that the universe is not a box of things, but rather a set of observed events.)

Initially this might seem shocking. After all, we have all studied grammar, and have learned that the subject of a sentence is only allowed to be the same as its object in “reflexive sentences,” such as: “I am fooling myself.” In all other cases ‘who’ is supposed to be distinct from ‘whom.’ When the dog bites the man, there is no grammatical possibility of confusing the two. But when we are forced by circumstance to resort to the use of a metaphor, so that our hearer may “grasp us squarely,” we then find ourselves “moving into new territory.” We are talking in a manner removed from a brute statement of fact, while using words that still unite that fact to us. It is seeing one thing in terms of another that dissolves multiplicity, restoring unity. As James Joyce once said: “Any object, intensely regarded, may be a gate of access to the incorruptible eon of the gods.”
Here is just one example of the use of a metaphor, but I assure you that there exist hundreds of them.

*Argument is war.*

Your claims are indefensible.

He attacked every weak point in my argument.

His criticisms were right on target.

I demolished his argument.

I’ve never won an argument from him.

If you use that strategy, he’ll wipe you out.

He shot down all my arguments.

In England, by the latter part of the seventeenth century, the metaphor had come under fire from the ruling classes, who associated it with “enthusiasm” (read: altered states of consciousness). There had been a recent civil war, together with a thriving counterculture, but the propertied classes and royalty were once more in the saddle. For them: “The poet is always in the devil’s camp.” Thomas Sprat, Secretary of the Royal Society, was one of the leaders in an effort to re-structure the English language so as to eliminate the “dreaded metaphor.” Another member of this faction was a certain Samuel Parker, who wrote in the following fashion:

> All those theories in philosophy which are expressed only in metaphysical Terms are not real Truths, but the meer products of imagination, dress’d up (like Childrens babies) in a few spangled empty words…. Thus their wanton and luxuriant fancies climbing up into the Bed of Reason, do not only defile it by unchaste and illegitimate Embraces, but instead of real conceptions and notices of things, impregnate the mind with nothing but Ayerie and Subventaneous Phantasms.

Like the rest of us, Parker couldn’t avoid using metaphors to save his soul.

In her treatise: “*The Rise of Magic in Early Medieval Europe,*” Valerie Flint describes the efforts of the Roman Catholic Church to stamp out magical beliefs in the minds of the inhabitants of Western Europe during the period between the fall of Rome in 476AD, to the end of the tenth century, the period commonly called “the dark ages.” At the outset the “natives” were thoroughgoing animists; everything in their environment was alive, and filled with spirits, benevolent or otherwise. Sorcery was an uncomfortably common practice. But against all this, the Church found itself helpless; the “natives,” the country folk, remained obdurately animists—that is, they believed that everything is in some sense, alive, and pregnant with meaning.

What were the priests to do? The Inquisition, with its methods, had not yet been invented—and these would have been impractical in any case, for at the time the bishops were heavily outnumbered. The problem was solved, after a fashion, by “priest-craft” — acts of resourceful bishops, who would build Christian churches upon sites of former pagan shrines. The medieval Church did not permit priests to perform cures, but simple
monks (those who had merely taken vows) in monasteries were free to cure by acts of “white magic” according to their talents—and that is just what they did. It was necessary in order to compete with the native shamans. In this manner was born “Christendom,” in which one form of magic was superimposed upon another: producing a “state of mind” that lasted throughout Europe for a thousand years. And the embers of that fire are still warm—in some places.

Now that we live in “the digital age,” in which our hallucinations are only “electronic ones,” we might ask: What ever happened to Magic--to sorcery? My answer is that from the scattered bits of evidence available, it is still “there.” In England, until after World War Two there was a law in force against the crime of “witchcraft.” Furthermore, I once read a doctoral dissertation in ethnology by a certain Dominique Camus who, for his graduate project, had spent six years studying healers in Brittany. His research project took a fateful turn when it became clear that many of the healings were being done in order to counteract the effects of spells that had previously been placed upon people by sorcerers. Shunned by his colleagues and, ultimately by his own family, he persisted in reporting his discoveries in an empirical way, avoiding “rationalistic” value judgments. So, what brings about this unwillingness to face the fact that sorcery exists? The answer to this question may also be one of the answers to why witchcraft was so energetically persecuted from the 14th to the 18th century. For whether or not these practices are truly efficacious, they manage to produce an atmosphere of hatred, fear and demoralization, corroding the social bonds that link people with each other. It is best to avoid sorcery!

To make my case that Participating Consciousness is alive and well, even in the sacred precincts of NASA, you might want to know that, as the scientists and engineers awaited a critical moment for their recent 2012 Mars Rover mission, they performed a curious ritual: They shared cans of peanuts. According to one scientist: “Missions always seemed to work out better when we had the peanuts there.”

What do I conclude from all of this? The reader is of course, free to think as she/he likes. But, as in the movie The Wizard of Oz: “We are not in Kansas any more.” As a matter of fact, we were never really in Kansas in the first place; we just refused to admit it. It was a Kansas of our own devising. More about this in a later chapter.

Notes to Chapter Three:

(1) See: ‘The Flight of the Wild Gander’ by Joseph Campbell, for a wonderful discussion about the Grimm brothers, how they accumulated the Tales, and about the surprising origins of some of the famous sagas. The Grimm stories, more than 200 in all, are listed by title, beginning on page 187.
(3) See endnote (7).
(4) See: *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, by Julian Jaynes. There is room for criticism here; Jaynes used the word Consciousness as though it is readily definable. It tends to get confused with “awareness.” And then there is the question of “how we are aware of being aware.” It is like a hall of mirrors. It is also self-referent. See Douglas Hofstadter’s book: *Goedel, Escher and Bach*, for more fascinating stuff.

(5) Brain-lateralization tends to get over-emphasized. It’s more complicated than being left-or-right-handed. See Wikipedia. One of the problems with this is that researchers like Broca, Wernicke and Sperry seemed to work with people who required surgical intervention.


(7) See: *Metaphors We Live By*, and *Philosophy in the Flesh*, by George Lakoff and Mark Johnson. You can Google George, and in doing so, you will hit an intellectual gold mine. The empirical bases for his work are the recent discoveries that have been made in the field of cognitive neuroscience. His analysis of “framing” has contributed a great deal to our understanding of why we make such irrational political choices. He has written many books, and all of them are good. Advance token to Bookstore and BUY!

(8) This could be a long endnote! The City of Detroit owed its vitality to the automobile industry; until the latter brought about the freeway system. This in turn carved up entire neighborhoods with freeways, finally leading to the exodus of a large fraction of the population. The driving force behind this was, of course, racism. As far as television goes, I believe that few inventions have contributed as much to alienating people from each other. I recommend the book: *Amusing Ourselves to Death*, by Neil Postman.

(9) *The Rise of Magic in Early Medieval Europe*, by Valerie J. Flint, Princeton University Press,

(10) The famed cathedral: Notre Dame de Chartres was superposed on a Druid temple, whose remains are still detectable in the crypt of that building. I’ve been there.