

**The Curse of Literacy**

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**Featured Presentation**

**Third Annual Convention of the Media Ecology Association**

**Marymount Manhattan College**

**June 21-23, 2002**

On a tour of Mediterranean archaeological sites a few years ago, I was drawn into a compelling mystery. At nearly every Greek site we visited, our guide patiently explained that the shrines we stood before had originally been consecrated to a female deity, then later, for unknown reasons, unknown persons reconsecrated them to a male deity. While there is overwhelming archaeological and historical evidence that both men and women once worshipped goddesses in the ancient Western world, no one knows why goddesses eventually disappeared. That question was to hover over the entire trip. What event, I wondered, could have been so dramatic as to change the sex of God?

According to the most commonly accepted theory, just before recorded history began, invading horsemen from the north imposed their sky gods and virile ethics on the peaceful goddess cultures they vanquished. But this explanation seemed inadequate to explain a widespread phenomenon that took a millennium to unfold. On the trip back to the airport, it struck me that the demise of the Goddess and the advent of harsh, misogynist patriarchy occurred around the time people were first learning how to read and write. Perhaps something about the way humans acquired this new skill offered a key to the mystery.

As a vascular surgeon operating on carotid arteries that supply blood to the brain, I have observed firsthand the profoundly different functions performed by each of the brain's hemispheres. In a right handed male or female, approximately 90% of the cognitive modules concerned with generating and deciphering language reside in the left

hemisphere and approximately 90% of the modules necessary to assimilate and recognize images reside in the right hemisphere. In the developing brain of a child, different kinds of learning strengthen some neuronal pathways and neglect of certain kinds of learning causes other neuronal pathways to wither. (For example, failing to learn a second language as a small child will make it very difficult to learn that language later as a college freshman.) Combining my interest in brain lateralization and extrapolating from the individual to a culture, I arrived at a neuroanatomical hypothesis to explain an historical enigma: why did goddesses disappear. Taking Marshall McLuhan's aphorism, "the medium is the Message" as the leitmotif I examined the effects on the brain of learning literacy, particularly alphabet literacy.

The linear sequential nature of reading and writing that reinforce the left hemisphere of the masculine characteristics began to characterize a society after a critical mass of its people had learned to read and write. What triggered this profound shift was literacy's reliance on the analytic thought processes linked to the brain's left hemisphere. Meanwhile, the feminine traits associated with the right hemisphere were systematically devalued. This imbalance revealed itself in many ways, including a cultural decline in goddess worship and the status of women. Another outcome was a new disregard for the visual image, whose appreciation is closely tied to the right hemisphere as well.

In making my case against the written word, I had to use it—an irony not lost on me in the seven years I spent researching and writing my book. What's more, I am who I am because of alphabet literacy. I am humbled by the sheer volume of words in the medical textbooks I've read in order to learn my profession, and I relish the aesthetic pleasure of reading, counting Yeats, Plato, Shakespeare, and Dostoevsky among my mentors. Any society introduced to the written word experiences explosive changes, and for the most part these changes can be called progress. Indeed, of all the sacred cows in our culture, few are as revered as literacy. Its benefits have been so incontestable that in

the five millennia since the advent of the written word, poets and writers have continually extolled its virtues.

Few, however, have paused to consider its costs. Sophocles once warned, “Nothing vast enters the life of mortals without a curse.” The invention of writing was vast; so what was its downside. Only by understanding the real impact of alphabet literacy can we grasp the unique situation that exists today, as we witness a return of the image through photography, film, television, and the computer. The rise of new visual technologies has been accompanied by a resurgence of feminine values, holistic thinking, and respect for nature. I’d argue that the visual media are largely responsible for this revolution, though not simply because of the information they convey. A greater factor may be the way they actually reprogram our brains.

How could a culture’s dominant mode of communication affect the balance of power between the sexes? The key may lie in the human nervous system. The two hemispheres of the human brain, while they appear to be symmetrical are functionally different. The right hemisphere integrates feelings, recognizes images, and appreciates music. It contributes a field awareness to consciousness—that is, a way for the mind to grasp the input of our senses all at once. It’s also more often involved in generating feeling states such as love, humor, or aesthetic appreciation, which are nonlogical, defying the rules of conventional reasoning.

The left brain’s primary functions are opposite and complementary to the right’s. The left brain largely knows the world through its unique form of symbolization—speech. It uses words to discriminate, analyze, and dissect the world into pieces, objects, and categories. Analysis—reducing the components of sentences into their separate parts—is essential to understanding speech. This key left brain task depends upon linear progression, in contrast to the holistic thinking of the right brain.

A bridge of neuronal fibers called the corpus callosum connects and integrates the two hemispheres, so that each knows what the other is doing. Researchers have

discovered that women have between 10 and 33 percent more neuronal fibers in the forward part of their corpus callosum than men. A greater integration between the hemispheres may contribute to women's better perception of feelings, their strong communication skills, and their enhanced global awareness. In human evolution, a woman's ability to understand the moods of her offspring must have increased their chances of survival. Although the evolving male paid a price for relative isolation from his right-brain emotions, he gained the ability to shut out feelings that might otherwise have distracted him while he was engaged in that most dangerous activity, the hunt.

We remain strongly influenced by the original neurodesign that bred successful nomadic gatherer-hunters. The feminine outlook is holistic, simultaneous, synthetic, and concrete, whereas the masculine view is linear, sequential, reductionist, and abstract. Every newborn is endowed with a brain that embodies both modes of thought. One without the other is incomplete; together, they form a unified whole that is stronger than either half.

But human brain development is not complete at birth. We enter the world as works in progress, waiting for family and culture to add the finishing touches. A third shaping force, almost as important, is the principal medium with which the child learns to perceive and integrate his or her culture's information. This medium plays a role in determining which neuronal pathways of the child's developing brain will be reinforced: those that process images or those that process words.

The media theorist Marshall McLuhan proposed in the 1960s that a civilization's principal means of communication molds it more than the content of that communication. McLuhan classified speech, pictographs, ideographs, alphabets, print, radio, film, and television as distinctive information-conveying media, each with its own technology of transmission. He declared that these technologies insinuate themselves into the collective psyche of any society that uses them, exerting a powerful influence on cultural perceptions.

McLuhan's famous aphorism, "the medium is the message," explains what happened when ancient people first became alphabet literate. The precursors of writing were pictographs, humankind's first attempt to preserve communication. Because images drawn from life require that the brain first establish key elements like shape, size, and the relationship of parts to the whole, pictographs and every other visual art form fall primarily under the right brain's purview. The Sumerian Mesopotamians invented the first written language: cuneiform figures made by gouging tiny wedge-shaped marks with sharp sticks into wet clay tablets. The progression toward literacy eventually led to the invention of the alphabet—a set of otherwise meaningless symbols assigned to represent the basic sounds of speech.

Literacy, especially alphabet literacy, caused a biological effect that led to a fundamental change in the way cultures understood their reality. Some neuropathways in the brain were reinforced while others withered. Goddess worship, feminine values, and women's power had depended on the ubiquity of the image. God worship, masculine values, and the paradigm of patriarchy rose with the written word. This was—and is—literacy's hidden cost.

The masculinizing impact of the alphabet can be traced back thousands of years. The Hebrews, for instance, founded the first religion based on literacy and established the first sacred alphabetic book. Rising Israelite literacy influenced many of the most striking cultural shifts associated with the Old Testament, from the rise of monotheism and the Rule by Law to the repudiation of iconic imagery and the Goddess. While many benefited, others suffered, including wives, prophetesses, queens, artists, daughters, female slaves, rape victims, the sexually adventurous, and priestesses. A case can be made that the alphabet also subliminally coaxed users to be extremely intolerant of iconic systems and other beliefs in general. For the first time in history, religion emerged as a rationale for violence and war.

The rival Greek city-states of Athens and Sparta provide a unique opportunity to test the alphabet hypothesis. Both worshipped the same deities. Both were bellicose. Both spoke and wrote a common language. But Sparta was a militaristic society that had little use for literacy; it produced not a single playwright, philosopher, or historian whose words or ideas are meaningful to us today. Athens, in contrast, produced history's greatest concentration of thinkers, along with the first extended experiment in democracy and a rich tradition in the visual arts. The literacy-loving Athenians were the first to debate the merits of aesthetics, and they espoused many values that we associate with the feminine.

Given these contrasts, one would assume that women fared better in Athenian society. The opposite was true. Athenian women were excluded from education, government, and public affairs. For all its state-sanctioned hardships and brutality, Sparta was more egalitarian. Girls and boys were educated in nearly the same manner in Sparta, and women competed in athletics. The Spartans honored women's life-giving role and considered it equal to that of their warriors. Virginity, chastity, and fidelity were virtues demanded of Athenian women, but these strictures did not apply to the same degree to Spartan women, who were free to bear children with more than one man, providing the father belonged to the proper social class.

A similar paradox surrounds the Dark Ages, which historians consider dark for only one reason: After the fall of Rome, in an era wracked by ceaseless invasion and chaos, literacy withered. One might expect that feminine values would have disappeared in these barbarous times, but when the written record finally resumes in the 10th century, one finds instead that a rare equilibrium between the sexes prevailed. As historian Doris Stenton noted, "The evidence which has survived . . . indicates that women were more nearly equal companions of their husbands and brothers than at any other period before the modern age."

The invention of the printing press by Johannes Gutenberg in 1454—and the rapid rise in literacy that followed—was a boon to European science, literature, and philosophy. And yet it seemed that no country could escape the terrible religious upheaval that inevitably followed the march of the metal letters. Following the Protestant Reformation, violent religious persecution erupted all over Europe and reached as far as the colonies in the New World, a reign of terror that lasted 150 years. A crucial factor was surely the wrenching sociological shift wrought by a new information technology dependent on users being alphabet literate. Books, including the New Testament, the West's second significant sacred alphabetic book, were now available to growing numbers. The Gospels that contain the words of Jesus Christ *overwhelmingly* accentuate right-brain values, and yet somehow violence prevailed. Once again, McLuhan's maxim holds: The *content* of what was read by growing numbers had less impact than the *process* of reading itself

Even in the modern era, there's good evidence that a culture's first contact with the alphabet drives it mad. Hunter-killer values thrust to the fore, followed by nationalism, imperialism, and bloody religious revolution. In 1954 Mao attempted to make over the Chinese character by declaring that the people should begin learning and using a Romanized alphabet. Although he was no academician, Mao intuited that the Roman alphabet somehow conferred a more aggressive mind-set on those who used it. By the late 1950s, problems that had bedeviled 16th-century Europe now afflicted the Chinese. China's written language, customs, and religions had long resisted sudden change, but with Mao's "Great Leap Forward" the once venerated religions of Confucianism, Taoism, and Buddhism were violently swept away. Mobs of chanting young people embraced a new deity—Mao himself—whose written sayings were transcribed into yet another sacred testament, his *Little Red Book*. China soon became an imperialist power intent on expanding its territory and conquering its neighbors, as suggested by its incursion into India, its conquest of Tibet, its deployment in Korea, its menacing of Taiwan, and its abrupt repudiation of Russia, its ideological twin.

Russia, of course, was in the grip of its own malignant delirium. Thanks in part to its own sacred text, Marx's *Communist Manifesto*, the now-familiar litany of left-hemispheric assaults against right-sided values had swept that land as well. The communists purged art, color, gaiety, and laughter from society. Clothing became drab, buildings gray, and smiles disappeared as people pored over their new black-and-white text. Dogma replaced rational discussion. Though communism often oppressed women, it was Mother Nature that suffered the most grievous wounds as the anti-feminine assault in the name of "industrialization" despoiled much of Russia's pristine landscape.

While alphabet madness still exists, the world has been changing. A series of media revolutions began in the 19th century with the rise of photography and the discovery of electromagnetism leading to film and television. Meanwhile, a number of dramatic intellectual developments in physics, psychology, linguistics, and other disciplines began to weaken the left-brain assumptions that formed the substrate of Western thought.

All these developments served to elevate the importance of the image at the expense of written words. The return of the image also coincided with the birth of the women's rights movement. Women received the right to vote in America in 1920, in England in 1928. In most of Europe and America, the fanaticism that had characterized patriarchal religions was imperceptibly fading. Protestantism softened, became more egalitarian, and even inspired mystics. Protestant women wore lipstick without fear of retribution. Large numbers of Jews abandoned Orthodoxy and turned to the Reform movement while many Catholics, in defiance of reigning dogma, practiced birth control.

Print technology unbalanced one society after another; the irrational right hemisphere has its dark side too. Using radio, Adolph Hitler burrowed into the dark depths of the right hemisphere, resurrecting tribal myths and rituals. World War II was a firestorm for modern civilization, but the conflict also marked the beginning of yet another massive shift in global consciousness tied to television.

After the war, as people watched more and more television, the supremacy of the left hemisphere dimmed as use of the right increased. Television was so startlingly original that many other adjustments in perception were necessary for the brain to make sense of it. The electroencephalogram (EEG) brain wave patterns of someone reading a book are very different from those of the same person watching television. Watching television and meditating generate the identical slow alpha and theta waves associated with a passive, receptive, and contemplative state of mind. A show about adorable koala bears elicits essentially the same brain wave pattern as one containing violence or sexuality. In contrast, reading generates beta waves, which appear when a person is concentrating on a task. Task-oriented beta waves activate the masculine/aggressive side of the brain of both men and women; alpha and theta waves emanate more from the feminine/nurturer side of both men and women.

The spread of television is redirecting the course of human evolution. While most social commentators wring their hands over the dismal nature of much of television's content, they fail to acknowledge that the way we actually *perceive* television is reconfiguring society in a positive way. While content surely is significant, the more important story, as McLuhan noted, is how the medium affects people's perception of reality.

Fiercely loyal to the literate mode of the previous medium, many critics of television have missed the Fresno of the present age. As the influence of the written word declines, images are increasingly important. In the countries that have embraced television, museums have enjoyed an unprecedented surge in membership applications. On Times Square in New York, word-text billboards have given way to neon displays of eye-catching, rapidly changing images. Business presentations, legal cases, medical conferences, scientific meetings, and military briefings increasingly rely on colorful charts and graphics. Advertising icons have become ubiquitous, while written copy has receded into the background to become clever word play.

In the heyday of America's print literacy, baseball—a sport characterized by one event following another, from the batting order to the way in which a player rounds the bases—became the country's national pastime. It was the perfect sport to complement alphabet literacy. After television, baseball began to lose ground to sports that are more involving for the eye, such as football, basketball, and hockey—in which fans track multiple, simultaneous interactions between players, grasping the gestalt of the overall field or court with their right brains.

Meanwhile, the personal computer has greatly increased the impact of the iconic revolution and continues to do so, shifting the collective cultural consciousness even more into the right hemisphere. Consider, for example, the keyboard. Since the 1970s, males have rushed in droves to learn what their fathers and grandfathers contemptuously dismissed as a skill for women and sissies—typing. Unlike all the scribes of past cultures, men now routinely write using both hands instead of only the dominant one. The entry into the communication equation of millions of male right brains tapping out computer-generated written messages, is, I believe, an unrecognized factor in the diminution of patriarchy.

Another revolutionary feature is the computer cursor. The mouse that controls the cursor liberated the right hand's need to stay within the confines of the lane markers on lined paper while writing. Computer literates use a hand-eye coordination more spatial than linear: the mouse scurries across the corpus callosum and invites right brain pattern skills to participate in the maneuvers necessary to generate the written word. Even though these aspects of computer operation have nothing to do with the computer's purpose, the computer's processes have unwittingly advanced the role of images and the status of women

I began my inquiry by asking, Who killed the Great Goddess? My conclusion—the alphabet—may seem repugnant to some and counterintuitive to others. I cannot prove that I am right, but I think a discernible pattern shows the shaping influence

on culture of writing and particularly the alphabet. The rise and fall of images, women's rights, and the sacred feminine have moved contrapuntally to the rise and fall of alphabet literacy.

I am convinced that we are entering a new golden age in which tolerance, caring, and respect for nature will begin to ameliorate the conditions that have prevailed for too long. Images, of any kind, are the balm bringing about this worldwide healing. Though it will take more time, the new visual technologies will no doubt transform the world both physically and psychically.

As I've already noted, the right-hemispheric attributes are not purely positive; unchecked, they lead to a different kind of disarray, one linked to mindless anarchy and sensuous excess. Emphasis on one mode at the expense of the other is noxious. The human community should strive for a state of complementarity and harmony. Balance is the ideal.

Reading and writing are such valuable tools in world culture that virtually all governments want their citizens to acquire them. The benefits of alphabet literacy are magnificent and life changing. Even when we become aware that literacy has a downside, no reasonable person would recommend that people should not become literate. Instead, we must cultivate a renewed respect for iconic information to accompany the power of the written word. Only then can we hope to bring our two hemispheres, along with the world's cultures, into equilibrium.

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