ART AND BEAUTY

A discussion in two parts

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WHY ART?

or

SOLVING THE BIG HEAD PROBLEM

Vita brevis est, ars longa-Seneca, De Brevitate Vitae I, I (1)

FOR THE PURPOSES OF THIS ESSAY, I shall define art as things that people do that they don't absolutely have to do in order to survive. "Work," wrote Mark Twain, "consists of whatever a body is obliged to do . . . Play consists of whatever a body is not obliged to do." (2) Art is not precisely play, though as I shall discuss below, it is indeed related to play.

We are distinguished from the beasts of the field as much by symbolic language as the restless desire to alter, decorate, personalize and fiddle with our bodies and environment. (3) Indeed, evidence for art and artifact substantially antedates evidence for symbolic language, and is thought to be an index of brain development.

Near as can be told, as long as we have been people in any true sense, we have filled our lives with things that have had no immediate or obvious survival benefit. If art in its myriad manifestations has been around so long, is universal and highly valued, it may be that there is some good reason for it. If so, what might that be?

I propose that art provides humans with an evolutionary advantage by allowing them to externalize and collectivize both the memory of the past as well as enabling us to plan for the future.

Individuals perish, and with them their memories. If, however, the individual experience is externalized and codified in art, the collective organism retains the information even though the individual expires. Language is communication in the present. Art is communication over time. When writing was invented, about 3,000 BC, symbolic language and art merged. (4)

Even more significant than retaining the past, art concerns itself with the future. I propose that art is the next step in human cerebral evolution beyond Rapid Eye Movement (REM) dreaming in that it takes advantage of language in a way that dreams do not (I will discuss this at length below). Because it is an external (i.e., it takes place outside of the brain), collective event, art is not dependent upon the processing abilities of a single individual. It "networks" a large number of brains to address alternate future realities, thereby preparing the collective as well as the individual for events that have not yet occurred. Art is practice for the real thing.

What I mean when I say that art is external is that it does not take place entirely within the brain. It starts in the brain, to be sure, but with few exceptions, art is created in a feedback environment, and ends up entirely outside the brain of its creator. It is rare for artists to conceive of a completed piece in the mind's eye, and simply copy what is in their heads into reality. (5) More commonly, the artist begins with a vague idea and hammers away until the idea begins to take some sort of finished form. The process of creation is as important as the seminal idea. The tools, techniques and materials all exert their influence. Education and training, themselves a collective action, dictate what the artist can imagine. Society dictates what the artist can successfully present.

IT IS POSSIBLE, however, that this was not always so, at least for poetry, song and dance. Art actually has two quite distinct branches, which can be categorized as right brain and left brain. The former was once considered god-inspired (unconscious) and the latter merely mortal, lacking the divine, an area in which we were basically on our own (conscious). (6) Though speech per se is a left brain activity, music, song and poetry are right brain activities, and both sides of the brain can understand speech. (7) So far as I know, all ancient performance was chanted or sung in meter and rhyme.

The Iliad begins with an invocation of the Muse, asking her to sing, through the medium of the bard, of the wrath of Achilles. The ancient idea that poetry, song and dance were dictated by a divine presence, and that the performer was only a more or less suitable vehicle for divine revelation (8) was not to my knowledge applied to the arts of drawing, painting, sculpture or architecture. (9) Indeed, the elevation of the plastic and representational arts did not enjoy equal status with the liberal arts of poetry, rhetoric and music until the Italian Renaissance was well underway. (10)

While there are Muses in overlapping profusion for the right-brain activities of dance, song, mime (11) and the many aspects of poetry, there is not so much as the shadow of a Muse for the dominant left

hemisphere activities of drawing, painting, sculpture or architecture. By itself, this provides an insight into the ancient mind. Speech seems to have been more highly valued than any other human attribute, perhaps because it was perceived as the great distinction between people and animals; perhaps also because it was the means by which the gods communicated with Man. (12)

The Roman poets identified the Muses with the Italian Camenae, prophetic nymphs of springs and goddesses of birth, who possessed a grove near the Porta Capena at Rome. The sacrifices made to the Muses were libations of water or milk, and of honey.

The Homeric Muses (the thinkers) were originally nymphs of springs, then goddesses of song and later, of different kinds of poetry. In the works of Homer (who interestingly enough was portrayed as blind, thus reinforcing the importance of hearing over other forms of perception of the divine, and speech over other means of divine communication), they are the inspiring goddesses of song who dwell among the gods and sing at their banquets under the leadership of Apollo Musagetes.

The Muses were the daughters of Zeus and Mnemosyne, the personification of memory. They were also presented as the children of Uranus (sky) and Gaea (earth). The three ancient Muses were Mneme (memory), Melete (meditation) and Aoide (the bard). Their number later expanded to nine. Hesiod first gives the usually accepted names and number, and they are portrayed this way in Herculaneum paintings. Chief of the muses is Calliope (beautiful voiced), the Muse of epic poetry-her symbols are a tablet and stylus, sometimes a scroll; Clio (to make famous), is the Muse of history-her symbols are a scroll or an open chest of books; Erato (loved one), the Muse of erotic poetry and mime (she's still in business, inspiring rap musicians and street performers)-her symbol is a lyre; Euterpe (well pleasing), lyric poetry and music, especially wind instruments-symbolized by a flute; Melpomene (the singing one), tragedy-her symbols are a tragic mask, the club of Heracles and a sword, she wears the cothurnus-a boot worn by tragic actors-and her head is wreathed with vine leaves; Polyhymnia (abounding in songs), sacred hymns, rhetoric and mime-she has no single attribute but is represented sitting in a pensive posture; Terpsichore (to delight with dance), choral dance and song-usually represented by a lyre; Thalia (the blooming one), comedy and merry or idyllic poetry-comic mask, shepherd's crook and a wreath of ivy.

Urania (the heavenly one), the Muse of astronomy, is symbolized by a staff pointing to a globe. That there should be a muse of astronomy is not so strange as it may seem: Pythagoras contributed the ancient notion that there was such a thing as the music of the spheres. He ascertained that the pitch of notes depends on the rate of vibration. Since the planets move, they must therefore make sounds. Since they move at different rates, they must make different sounds and, as all things in nature must be harmonious, these celestial sounds must also harmonize, creating music.

Bringing their number to an awkward ten, the latecomer Arethusa (a nymph who, pursued by the river god Alpheus, was changed into a spring), is addressed by Virgil as the Muse of pastoral poetry.

Basically, the Muses are creatures of sound. That there should be a Muse of mime, silent performance-

the opposite of sound-serves somewhat to reinforce the notion of the importance of speech than otherwise. Muses told the poet, musician, choral dancer or historian what to say, sing, chant, recite or perform. They did not concern themselves with "artistic vision," this despite the enormous percentage of the human brain dedicated to sight.

Art performs many tasks in society. Perhaps the most important is to enable people to see things that were formerly invisible, or which were brought into existence by the artist. Artists push at the envelope of social understanding, and those in the vanguard are often rewarded with scorn and calumny. The second wave of artists, treading where the visionaries have paved the way, are more able to be understood, and do a little better. At last, the idea becomes common currency and society as a whole lurches forward.

In the process, art creates a truthful, accurate window into the past. As much as the prow of society is art, so is art the wake of human progress, showing future generations where we have been.

IT WOULD BE USEFUL to consider where art came from in the first place. I argue here that art has roots in at least three major areas: a sense of play, tool making, and the (perhaps) uniquely human awareness of our own mortality. (13)

Play is, to some degree, a free activity zone. Play creates new situations and new solutions to old problems. In terms of a sense of play, art and humor share common origins. As animals evolve away from operating on pure instinct, they are increasingly compelled to learn to do things. Among mammals, this learning takes the form of play. Thus, the sense of play is not uniquely human.

Dogs and cats, for example, play when they're young. Furthermore, though it declines, this sense of play does not desert them as they grow older. Play is practice for the real thing; when you see a cute kitten batting a ball of string, what's really happening is that it's practicing to kill something. But the distinction between real and pretend is definitely there; play is activity that's not serious. You don't see a kitten seriously trying to kill and eat a ball of string. It understands the difference. That seems to me to be a basis for a sense of humor, if not a rough sense of humor in itself.

Like dogs, people travel and hunt in packs. People are social animals as well as independent living creatures. We like being with others of our own species, and indeed the worst thing that can happen to us is to be cast out of our preferred group, ostracized, marooned on a desert island of loneliness. One thing that's necessary if you do things in a group is that you need to know who's part of the group and who's not part of the group. So you develop a sense of "who and what doesn't fit."

Another aspect of pack or herd behavior is the establishment and maintenance of a pecking order. The mock battles engaged in by the males of such a group may also impart a sense of play.

It seems to me that an essential part of humor is an awareness of the incongruous, of the out-of-place or odd or nonsensical thing. To some extent, the out-of-place thing is the new thing, often the very thing

needed to move people forward. But people are profoundly conservative, and resist change with all their might and main. They will even go so far as to die rather than accept change. The fear of newness, strangeness or unusualness cripples and retards the growth of human communities. (14) The task of art is to overcome this resistance, and prepare people for change; the artist is the "point man," the one out in front of the rest of the community, guiding the way.

Art is always seeking new solutions, and newness is valued in art precisely because its job is to seek out and try out new things to see if they suit or not. Fear of new things is overcome with art: we are exposed to new things via art, where they are sufficiently abstract and remote that we can evaluate them before they've become corporeal. When we don't have to deal with the real thing, the situation is less threatening; we are more likely to make the effort to try something new if it doesn't cost anything. After we've had a bit of time to work it out in our minds, we can then make the big step of incorporating newness into our ordinary lives. As the philosopher Karl Popper said, such a thing "permits our hypothesis to die in our stead." (15)

Another big part of humor is the pleasure we take in seeing something bad happen to somebody else. Most jokes have a butt, a fall-guy, a pigeon. Somebody has to feel bad so that we, by contrast, feel good. It may be connected with the idea of "I'm in and you're out," that is connected with inheriting the tradition of living in a tight-knit tribal unit, or pack if you will, but most importantly, it demonstrates a clear sense that someone other than yourself can experience the same sensations as yourself. This clear sense of the "other" is essential to our human-ness. I feel pain. He is like me. Therefore, he feels pain. More profoundly: he has died. He was like me. Therefore, I too shall die. This is a big step, and one that other animals have scarcely made.

The practical joke, schadenfreude, slapstick, the crude trick, do not depend on language. Indeed, it may be that this aspect of humor is pre-linguistic. With symbolic language humans invent the pun-a play on words that engages the intellect in a way that sight gags do not. The pun is a sort of practical joke on the intellect. Cuneiform and hieroglyphic writing, in fact, is nothing but a long string of visual puns. The next step may have been riddles-tasks set for the intellect that have no immediate practical goal beyond entertainment, but which function as mental exercise. That is to say, play-preparation for a more serious task.

But I digress. If you define a sense of humor as the by-product of evolutionary developments that make us distinguish between what fits in and what's alien, combined with an ability to distinguish serious business from mere practice, animals must have a sense of humor, too. (16)

Although we do not, and likely never will, know the purpose of pre-historic painting and sculpture, we can safely say that they did have a purpose. I believe that it could reasonably be argued that they are evidence of the same sort of activity that we see, in small, in a kitten batting a ball of string. Practice, preparation; something connected in some way with something else, but with a clear understanding that the two things are different-in short, play.

A big difference between people and other animals is our use of tools; from using found tools, to modifying rocks and sticks into genuine artifacts. Even the brightest of our cousins only use tools in a restricted sense. (17) The tools of old Australopithecus are not much different from rocks that you might find at random, but they are different. (18) As people evolve bigger brains, so do they use tools that more and more look like what even a layman can identify as something different from what might occur in nature. (Of course, it might equally be argued that as people use tools, their brains develop. In these matters it's difficult to say which is the cart and which the horse.) When at last we arrive at the Neanderthal hearth, we encounter tools of such sophistication that in order to learn to make them you even need language. Monkey-see-monkey-do has turned into show-and-tell.

Tool-making leads to embellishment. Making things leads to making them well. How is the layman to tell if a thing is made well? By the maker incorporating into it gratuitous embellishment; marks of craftsmanship. (19)

A mark of craftsmanship distinguishes quality workmanship from ordinary or shoddy. A mark of craftsmanship is the apparently functionless decoration of an artifact, but what it actually does is serve to show even an ignorant person that what is hidden from unskillful eyes is nonetheless of high quality. Engine-turning on metal surfaces; engraving on the inside of a mechanical watch; the deep, mirror paint job on a luxury automobile. Each shows that what lies beneath is of high quality. The proportional cost of engine-turning, engraving or twenty coats of hand-rubbed lacquer is insignificant compared to the cost of making the object itself. Whereas with a cheap object, the cost of embellishment would exceed in some cases the cost of manufacture. Decoration is in direct proportion to the value of the artifact. You can tell at a glance what's well made and what isn't. This is nothing new, I surmise, and I imagine that our ancestors decorated valuable things in proportion to their value, exactly as we do. (20)

Of course, it's easy to see where the tail begins to wag the dog, and embellishment takes over. Painted pottery is valued as much for the utilitarian nature of the pot as for its decoration, and we even see examples of ancient pottery that were clearly meant to be more decorative than useful. But you're still not going to see labor-intensive embellishment of a slap-dash article.

Embellishment ties nicely into the sense of play, of doing what is not strictly necessary; not completely serious.

A sense of the future-really, an awareness of death- distinguishes people from most of the other animals. This knowledge of the certainty of death creates an urge to deal with and predict the future, because each one of us can see the end of time-at least for himself.

We, unlike other animals, know what we are: we know that we are mortal. Animals live in the eternal present; we, in an eternal future. Art is concerned with the prediction, indeed the creation, of the future. This obsession to confront death and predict the future is center of the Babylonian epic of Gilgamish, which is nearly the most ancient writing that we possess.

The problem with prediction is that it never can take into account the critical, pivotal events that, in retrospect, seem so obvious. Art cuts right through this problem and predicts the future by creating it.

People emulate what they see in art. Paintings and stories provide us with models for appearance and behavior. Movies show us an imaginary, idealized world filled with models for us to copy. Art creates the ideal. (21)

ONE OF THE PROBLEMS faced by animals that bear their young alive is encountered in the birth process itself. As animals evolve big, useful brains, they correspondingly evolve big heads to store them in. If the head of the infant is too big, it will eventually either be unable to be born or will destroy its mother in the process. Each scenario engages the law of diminishing returns, and has witnessed a variety of evolutionary solutions.

The first and simplest solution is to get born before you're quite finished. This creates a new set of problems, most notably that for a while you can't take care of yourself and must have progenitors who will devote considerable effort and self-sacrifice to see that their young make it to maturity. This is the case with many animals, mammals included. So, even though mammals have big heads when they're born, their heads have room to get even bigger as they finish out their embryonic state ex utero.

It might be argued that, having been born with a little head, your head can just grow until it's big enough to hold whatever brain might be required. This would be true in a weightless environment, such as the ocean, but if the problems presented by mass and inertia are considered, we quickly see why heads must remain rather small in proportion to the mass and strength of the body. (22)

A second, even cleverer way of dealing with the big head problem is to condense the size of the brain. In mammals, this is done by using parts of the brain to do more than one job. Though it could be argued that a multiple-task tool is not as good as two or three dedicated tools, a crescent wrench takes up much less room in the tool box than a whole set of wrenches and for most purposes serves well enough. In this context, let us examine dreaming:

Why do we dream?(23) What is the purpose of watching a garbled motion picture show inside our heads every night?

A theory recently advanced by Jonathan Winson (24) discusses this puzzling question, and concludes that dreaming is

. . . the nightly record of a basic mammalian memory process: the means by which animals form strategies for survival and evaluate current experience in light of those strategies.

With the exception of the echidna (spiny anteater), a primitive, egg-laying mammal called a monotreme, and the odontocete (toothed) whales, including the dolphins, REM sleep occurs in all mammals. (25)

The absence of REM sleep in the echidna suggests that this stage of the sleep cycle evolved some 140 million years ago, when marsupials and placentals diverged from the monotreme line.

It is hypothesized that the large prefrontal cortex of these animals is needed for processing memories. Although the large brains of whales and dolphins have often been cited as evidence for high intelligence, studies have not shown that their intelligence is on a par with primates. (26)

When a cat, or a rabbit for example, is doing what is crucial to its survival-hunting, in the case of a cat and escaping from a hunter, in the case of a rabbit-its brain in REM sleep generates characteristic EEG (electroencephalographic) patterns called theta waves. In REM sleep these animals produce the same waves, leading us to the conclusion that they dream about what is most important to them, and that furthermore they spend their dreamtime evaluating how they performed so that they can do better next time.

While in REM sleep, motor neurons are inhibited, preventing the body from moving freely but allowing extremities to remain slightly active. (27) Eyes move rapidly under closed lids, breathing becomes irregular and heart rate increases. . . . By destroying neurons in the brain stem that inhibit movement during sleep, researchers found that sleeping cats rose up and attacked or were startled by invisible objects-ostensibly images from dreams.

Theta rhythm appears when animals exhibit behavior that is not genetically encoded-such as feeding or sexual behavior-but rather a response to changing environmental information.

Theta rhythms are generated in the hippocampus. Together with the neocortex, the hippocampus is believed to provide the neural basis for memory storage.

> . . . the reprocessing or strengthening of information encoded when the animal was awake occurred in sleep at the level of individual neurons. . . . theta rhythm encodes memories during REM sleep.

The spiny anteater, which generates theta rhythms while searching for food, does not enter REM sleep, and in consequence cannot process information while it sleeps.

The echidna has a large convoluted prefrontal cortex, larger in relation to the rest of the brain than that of any other mammal, even humans. . . . it needs this huge prefrontal cortex to perform a dual function: to react to incoming information in an appropriate manner based on past experience and store new information to aid in future survival.

For higher capabilities to develop, the prefrontal cortex would have to become increasingly large-beyond the capacity of the skull-unless another brain mechanism evolved. REM sleep could have provided this new mechanism, allowing memory processing to occur 'off-line.' Coincident with the apparent development of REM sleep in marsupial and placental mammals was a remarkable

neuroanatomical change: the prefrontal cortex was dramatically reduced in size. Far less prefrontal cortex was required to process information. That area of the brain could then develop to provide advanced perceptual and cognitive abilities in higher species.

This addresses the mammalian big head problem in a new way, and allows the brain's capacity to increase without a corresponding size penalty. Otherwise, the continuing increase in head size would lead inevitably to young born so premature as to be unable to survive.

Although theta rhythm has not yet been demonstrated in primates . . . the brain signal provides a clue to the origin of dreaming in humans. Dreams may reflect a memory-processing mechanism inherited from lower species, in which information important for survival is reprocessed during REM sleep. This information may constitute the core of the unconscious.

Because animals do not possess language, the information they process during REM sleep is necessarily sensory. Consistent with our early mammalian origins, dreams in humans are sensory, primarily visual. Dreams do not take the form of verbal narration. . . . Because theta rhythm has not been demonstrated in primates, it may have disappeared as vision replaced olfaction as the dominant sense.

Also in keeping with the role of REM sleep played in processing memories in animals, there is no functional necessity for this material to become conscious. Consciousness rose later in evolution in humans. But neither is there any reason for the material of dreams not to reach consciousness. Therefore, dreams can be remembered-most readily if awakening occurs during or shortly after an REM sleep period.

Consistent with evolution and evidence derived from neuroscience and reports of dreams, I suggest that dreams reflect an individual's strategy for survival. The subjects of dreams are broad-ranging and complex . . . These associations are strongly biased toward early childhood experiences.

Dreams are not disguised as a consequence of repression. Their unusual character is a result of the complex associations that are culled from memory.

A corroborative hypothesis reveals links between memory and sleep. In experiments on rats, Matthew A. Wilson of the Massachusetts Institute of Technology and Bruce L. McNaughton of the University of Arizona

> . . . inserted electrodes into the hippocampus, a region of the brain thought to be involved in spatial memory. As the rats learned to navigate a maze, their neurons fired in certain patterns corresponding to specific parts of the maze.

For several nights after the rats' maze exercises, their hippocampal neurons displayed similar firing patterns; the rats were apparently playing back their memories of running the maze. The major difference was that the firing was more rapid, as if the memories were being run on fast-forward. The

firing occurred during slow-wave sleep, a phase of deep (but not dreamless) sleep marked by low-frequency pulses of electrical activity in certain regions of the brain.

The studies of humans were undertaken at the Weizmann Institute of Science in Israel. A team led by Avi Karni and Dov Sagi trained volunteers to recognize rapidly the orientation of symbols hidden in images flashed at the periphery of their vision. The workers had previously noted improvements over a 10-hour period following a training session.

To determine whether sleep played a role in this phenomenon, Karni and Sagi disrupted the sleep of volunteers after they had had their training session. Interfering with the subjects' slow-wave sleep had no significant effect. But and equivalent disruption of REM sleep, which is marked by rapid eye movements (hence its name) and vivid dreaming, kept the subjects from improving over night.

> "These results indicate that a process of human memory consolidation, active during sleep, is strongly dependent on REM sleep," the group states.

The experiments lend support to a theory advanced by Jonathan Wilson of the Rockefeller University that dreams represent, in effect, "practice sessions" in which animals hone survival skills.

Why did Karni and Sagi detect memory consolidation during REM sleep and Wilson and McNaughton only during slow-wave sleep? The answer seems to be that each group studied a different type of memory, one involving a highly repetitious task and the other the recollection of a place. (28)

The word "dream" has two meanings. The first is the stream-of-consciousness movie that goes on inside your head when you're asleep. The second is hopes, aspirations, goals.

Dreaming is a personal event in which individuals privately evaluate their own past experience. But what of the future? What of planning for things that have not yet, but might possibly come to pass? Possible futures are myriad, the branching alternatives infinite, tangled, terrifyingly complex and yet, desperately important. How do we humans deal with the future? How do we plan for things that have not, and indeed might not, happen?

Art. That's how we do it. The antiquity and universality of art indicates that it, too, is an indispensable evolutionary edge that separates people from other animals. Art is advance dreaming. The preparing for experience, the creation of uncharted territory, dipping a toe into the future.

When we move from instinct towards reason, it makes us more flexible but it slows us down! How can we get back up to speed? By figuring things out in advance, and acting quickly according to the anticipated circumstances. In art, we try out many different alternatives and are thus ready for them when they happen; we don't have to stand around figuring out what to do, because we've already thought it out. Practice for an unspecified eventuality enables us to act decisively and unthinkingly when the occasion demands, taking the place of rigid instinct, which cannot always react appropriately to novel

situations.

The creation and savoring of art is a cultural preparation for the future by enabling people both individually and collectively to test many alternate possible realities. Both art and dreams attempt to create order from disorder. In dreams, we sift through the rubble of the past and try to make sense out of what happened. Through art, we look at the unimaginably complex future, and try to find a path, so that we may create order from the bewildering disorder that confronts us.

Whereas REM dreaming is a highly individual experience, art is public. It is a collective dreaming, wherein specialized members of the human organism dream for the entire organism. The translation of ideas into graphic language is the translation of an individual dream into a collective dream. Artists are professional dreamers: they integrate collective action into collective memory and in the process prepare the human race for the future.

Art solves the big head problem in another elegant way; it doesn't even have to be your head.

BEAUTY

David Lance Goines

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"Beauty is truth, truth beauty;"
that is all Ye
know on earth, and all ye need to know.

- John Keats (1795-1821), Ode on a Grecian Urn (29)

And the true order of going, or being led by another, to the things of love, is to begin from the beauties of earth and mount upwards for the sake of that other beauty, using these steps only, and from one going on to two, and from two to all fair forms to fair practices, and from fair practices to fair notions, until from fair notions he arrives at the notion of absolute beauty, and at last knows what the essence of beauty is. - Plato (c 428-c 348 BC) Dialogues, Symposium 211 (30)

MAYBE THIS IS JUST A BAD TRANSLATION. Though the impenetrable load of double talk that Plato has here shoveled out sounds nice (especially if you don't really think about it but just let the words wash over you like warm honey, and don't actually have to go out and do something with them), it isn't good for much. When you try to figure out how you can actually use Plato's ideas to make something beautiful, or evaluate something to discover whether it is beautiful or not, you find that this sort of philosophical lumber lets you down rather badly.

So to begin with, let's just forget about totalitarian anti-art Plato and his incomprehensible ideal forms

and the other-worldly mystic Saint Thomas Aquinas, nasty lunatic John Ruskin and that sausage-gobbling Kraut Hegel and all those old frauds and their transcendent hogwash.

Beauty is real. Beauty is the expression through art of wealth and power. The vehicle by which beauty comes into the world is art; anticipating the ideals of wealth and power, art gives form to the standards by which society judges itself.

Art creates beauty. Art is the vanguard of taste, trumpeting fashion before it actually exists.

Art, like science, goes where the money is. If you follow the history of art, you also follow the history of political power. Where is the nexus of culture? Why, it is always where the most impressive military and economic society of the day holds sway. Babylonia, Egypt, Athens, Rome, Florence, London, Paris, New York, Los Angeles, Tokyo. These are, or have been, centers of beauty, taste and art. Not coincidentally, these also are or were centers of political and financial power. Artists are paid to tell everybody what beauty is, and to display that beauty for the glorification of their patrons.

Beauty is an index of leisure, which is itself an index of wealth, which is an index of power. Flower arranging, for example, takes a long time to learn and a long time to learn to appreciate. Poor people do not acquire these refined tastes. For the poor, these tastes do not exist. The subtleties of such things are totally lost on the poor. The poor do not much like the art of Rauschenberg, Oldenberg, Klee, Arp or Pollock. If they think of them at all, they think they're silly. Let's face it: only the rich can afford aesthetics. When the poor want to become like the rich they emulate the tastes of the rich.

About the only thing that is constant in beauty is that it is the opposite of ugly. (31) Ugly, too is a constant. It is whatever the rich, healthy, youthful, strong and powerful are not doing.

Beauty is constantly changing, and culture-bound. What one person at one time finds beautiful, another person from another culture will often finds ludicrous, incomprehensible and ugly. So few of our young women wear brass hoops that stretch the neck, plates in their lips and heavy facial or body tattooing. Hardly any men on the streets of New York sport a penis sheath. We do not dye ourselves blue.

> "Clothes maketh the man." - Mark Twain (attributed)

As an example of beauty in small, let us examine the infinitely fascinating arena of clothing fashions.

First, what was fashionable (beautiful) yesterday is absurdly unfashionable (ugly) today. We can tolerate outdated fashion in specific contexts, such as period costume in a play or film (though indeed it is usually heavily modified to suit the modern aesthetic), but in real life outdated fashion is not attractive. The more outdated it gets, the more ugly it becomes.

Eighteenth and nineteenth century fashion makes much of the conspicuous, even lavishly wasteful, use of fabric. Fabric, especially fancy fabric, was expensive, and since everything was made by hand,

clothing was even more so. Common people had few clothes. Rich people had many clothes of relatively sumptuous make. Rich people kept up with fashion, and poor people mostly didn't. What rich people wore was, by definition, beautiful. What poor people wore was, by definition, not. Rich people had window curtains, and the poor who emulated them, such as my "lace-curtain Irish," forebears, strove to work the sympathetic magic and get rich by copying the rich.

In the latter part of our own dangerous century, we see little in the way of obvious contrast between the clothing of rich and poor. We have adopted as our models the class of performing artists (rock stars, movie stars) whose clothing is more a product of the imagination (Flashdance, Saturday Night Fever) than a concession to either the elements or outward signs of wealth. We have put most of our effort into the body itself, neglecting the outer integument. The poor have as little ability to be "body fashionable" now as they did to be "clothing fashionable" in the 19th century. Rich people jog and have a membership in a gym; they watch their diets and are concerned with cholesterol; they do not smoke; they do not drink to excess ("Just Perrier, please"); they do not take drugs; they practice safe sex; they wear their seatbelts. Poor people don't do any of this stuff.

Throughout most of the world's history, fatness was admired as a sign of wealth, health and fertility; thinness was a sign of poverty, disease and barrenness. In the case of fatness in a time of general food shortage, the wealthy person is beautiful because he doesn't look poor. In the case of thinness in a time of plenty, the wealthy person is slender and athletic by way of contrast to those who have little leisure for sport and health maintenance.

Fashion, created by art and adopted by the wealthiest strata of society, began in the late 19th and early 20th centuries to model itself not after the old gougers of wealth but after the leisured, athletic, youthful figure.

Gather ye rosebuds while ye may,
Old Time is still a-flying,
And this same flower that smiles today
Tomorrow will be dying.

- Robert Herrick (1591-1674), To the Virgins to Make Much of Time (32)

Beauty is evanescent, and reminds us of our own mortality. A beautiful young person will be neither beautiful nor young for very long. That youth is fleeting makes youthful beauty all the more valuable.

Coarsely put, youth is beautiful because it is healthy, fecund, strong and rare. Age is ugly because it is moribund, infertile, weak and common. Much of fashion is an attempt to look powerful (rich), youthful (fertile or virile), and healthy (leisured). Though the outward expressions of these attributes may change dramatically, beauty in fashion is always aimed at these things, and flees from their opposites. Fashion is always as much the product of fleeing from ugliness, or those things that indicate ugliness (poverty, age, weakness) as striving toward beauty. Its Protean nature keeps everybody on the hop, inevitably leaving

behind those who are unable to keep up-the old, the poor, the weak.

In the old age black was not counted fair,
Or if it were, it bore not beauty's name.

- Wm. Shakespeare, Sonnet 127

My mother bore me in the southern wild,
And I am black, but O! my soul is white;
White as an angel is the English child,
But I am black, as if bereav'd of light.

That we may learn to bear the beams of love;
And these black bodies and this sunburnt face
is but a cloud, and like a shady grove.

I'll shade him from the heat, till he can bear
To lean in joy upon our father's knee;
And then I'll stand and stroke his silver hair,
And be like him, and he will then love me.

- William Blake (1757-1827), Songs of Innocence, The Little Black Boy (33)

The pallid complexion that indicated that one was not a "horny handed son of toil," (34) suffering Apollo's furnace in rude agrarian pursuit, gave way to the healthy tan that indicated that one was not a member of the laboring industrial and mercantile class shut away from the light, unable to winter in sunny climes. The tan becomes popular shortly after WWI along with the rise of the twin sports of the leisure class, tennis and golf. Pale is back now, just as the rest of the world has figured out how to tan. Tough to keep up with the ruling class!

The much admired ivory complexion of the 19th century bespoke the most powerful stratum of society, as well as being a direct, intentional contrast to the "lesser breeds without the law," (35) whose skins were dark. Even freckles were de classy= as a sign of exposure to the sun, Irish ancestry or mixed blood.

After the battle of Waterloo, The conquering English Duke of Wellington, coming upon a troop of his Irish footsoldiers bathing in a creek, is reputed to have expressed amazement that they were white. This betrays not only a wealth of class prejudice, but an indication that their sunburnt faces and hands were in some contrast to those of their superior officers.

One of the first great Negro fortunes was made by a Louisiana washerwoman who developed an effective hair straightener. (36) A glance at ads (especially those of the pre-civil rights era) aimed at Americans of Black African ancestry will show that they think themselves ugly, and want to look like white people. (37) Why? Because white people are beautiful in their power, and Blacks ugly in their

weakness.

Americans of Black African ancestry have in more recent times been depicted as beautiful in direct proportion to the power they have wrested from the white establishment.

> Cheek-bones protruding, lips thick, eyes triangular,
> Face like a netsuké carved by the great Shuzan,
> Expression vacant as though the soul were removed,
> Ignorant of himself, jumpyon
> Cheap-lived,
> Show-off,
> Small-minded, self-satisfied,
> Monkey-like, fox-like, squirrel-like, gudgeon-like, minnow-like, gargoyle-faced
> Japanese!

-Takamura Kotaro (1883-1956), The Land of Netsuké (38)

Now there's a nice little paean to self-hate!

Commodore Perry's black ships sailed into the Bay of Yedo on July 14, 1853 and he and his officers walked ashore to negotiate a treaty with the shogun. The Japanese were completely unable to prevent them from sailing where and as they pleased, and were immediately forced to accept a treaty opening Japan to Western trade. There was nothing the Japanese could do about it except try and catch up, which they rapidly did to our envy and their own perfect satisfaction. In the process, they were transformed in Western eyes from ugly to beautiful.

If a race of technologically and politically superior aliens, to us as we are to the naked savage, were to land on the Earth, our first, xenophobic reaction would be fear and loathing. They would initially appear to us to be ugly. But, as we grew convinced of their superiority, they would become the model of beauty, and we would become ugly. After a short while, we would be attempting to make ourselves look like them, and would despise our Iowa corn-fed blondes as much as the Japanese author of this poem despised himself.

Just as the Apostle James tells us that Faith without Works is dead, so is power without beauty. (39) Beauty is the outward evidence of power. The pyramids are beautiful. They indicate immense power. They always have and they always will. Unless we reject power and wealth as desirable attributes, we will forever admire Stonehenge, the pyramids, the Parthenon, the Coliseum, Notre Dame Cathedral. All are symbols of power. Beauty is enduring, to show that even though the individual dies the works of his hands will serve to remind generations yet unborn that he was powerful; that he may be dead but his power lives on. Power is of course relative. We despise and ridicule the potlatch of the Northwest Indians because we can kick their butt. Their symbol of power is absurd to us, and as a conquered people, it soon becomes absurd to them.

The fashions of the powerful displace those of inferior, subject or provincial peoples. Note how the pissant dictator gauds his glittering, overstuffed military uniform with spurious medals and decorations, plumes his hat, surrounds himself with the outward trappings of power. We despise his two-bit effort, his sedulous overstatement, because compared to those he apes, he is not actually powerful.

Even the formerly revered gods of the weak become ugly and foolish when they come up against the gods of the strong, and lose their worshipers to the gods of power. Hepheastus limps into oblivion faced down by the conquering resurrected Christ. Who worships Baal? Who Mithra, Isis, Zoroaster, Ra?

The powerful, the socially and culturally advantaged, can of course afford to admire the works of the past and of other cultures. They have nothing to lose by it. Not too long ago, the idea of archaeology and indeed, of cultural history was unheard of. The dead were weak, the past was dross. Rich people, such as 19th century Europeans, became interested in the past, and treasured the works of the ancients for more than they would fetch melted down into ingots of gold and silver. That's more than the ancient grave robbers ever did. Or the Spaniards, looting the conquered peoples of the New World. Except for their value in metal, they had no use at all for the artifacts of the Americas. Conquered = Ugly. Weak = Ugly. Old = Ugly. Dead = Ugly. Beauty is power; power is beauty.

We admire the works of our ancestors, of primitive peoples, of the weak and powerless, in direct proportion to our own strength. We can afford to find them beautiful. Nobody else has ever been as rich as we are, and in consequence as benevolent, leisured, tolerant. It is only in the last few decades that the dream paintings of the Australian Bushman have found favor in the eyes of their Western conquerors. We are no longer arm-wrestling them for their land; we've got it-they are no threat. We are so rich that we can even afford to give some of it back. Having nearly exterminated these people and their culture, we can now afford to look at what they might, in their quaint and backward way, have to offer us. In the 1930s American Indian women sold their silver jewelry, blankets and basketry by the side of the road to get money for ammunition and food. Not many people wanted the stuff. We were all too broke to value the works of a down-and-out conquered people.

You will find, among other historical peoples, neither an interest in foreign culture nor an interest in the past that is in any way comparable to our fanatical pursuit of the antique, strange or primitive. The city of Cairo is built of the facings of the Great Pyramid, which was generally perceived as a convenient quarry. Napoleon's artillerymen used the Sphinx to sight their guns, blowing off its nose. The Parthenon was exploded by accident when it was used as a powder magazine. Peasants farmed in the Coliseum. The Ukiyo-e woodcut prints of Utamaro and Hiroshige came to the attention of the West as wrapping paper for commercially valuable ceramics.

Rich people have big houses. They have more rooms than they absolutely need to do things in that they do not absolutely need to do. They don't so much have big houses because they like them as to show that they are not poor. Poor people live in single room hovels with the pigs. Powerful corporations and governments erect big buildings made of expensive materials as outward indications of power.

Seventh-day Adventists grovel before their uninteresting god in little square crackerboxes. Roman Catholics erect cathedrals that consume five centuries and the entire GNP of a nation. Who's the schmuck?

An ugly building is one that is occupied by the poor and built to indicate powerlessness. A beautiful building, ipso facto, is one that indicates power and wealth. Fashions change, and we do not much now admire the architecture of Nazi Germany (what's left of it), but then again, they did lose the war.

To be sure, "there is no excellent beauty that hath not some strangeness in the proportion." (40) Beauty needs to be balanced, to contain a hint of imperfection. As demonstrated by the hubristic intentional error woven into the Persian carpet, we mistrust anything too perfect as a temptation to the Fates to squash us for our presumption.

Beauty is rare and scarce. A diamond is beautiful, because it is costly. We bought Manhattan Island with the equivalent of diamonds. A chest of glass beads, paste and copper wire. Tawdry baubles to us, the conquerors, they were precious jewels beyond imagining to the dumbo Indians. Gold is beautiful because it is enduring, incorruptible, and rare. If you really could transmute lead into gold, gold would be used for wires in high-fidelity sound equipment and to line pots and pans. Beauty belongs to wealth and power. That's what makes it beautiful. Likewise, the artifacts of the past are valued in direct proportion to their rarity.

> "Power is the ultimate aphrodisiac." - Henry Kissinger (attributed)

Beauty attracts beauty. A Rolls Royce has a magnificent paint job because the car is so valuable that anything less would be silly. What's a 5,000 paint job on a 150,000 automobile? Gold, so valuable in itself, demands fine workmanship. Diamonds are agonized over to discover the best cut to bring out their hidden fires. Rich, famous and powerful men are often seen in the company of beautiful women. The women are beautiful because they are with the rich men as much as the rich men select them for their beauty. In the 19th century, they would have been well-upholstered, with small, regular features, deep dimples, good teeth, small hands and feet, smooth white shoulders and dark, flashing eyes, i.e. a cultural paradigm of wealth. Now, they are tall and leggy, full-bosomed and slender waisted, with blond hair, blue eyes and aerobically-toned muscles. It goes without saying that they have dazzling smiles. Each is an exemplar, a rub-your-nose-in-it of the ruling class. Each is an expensive ornamental object. Each is, in the main, what most of the people in the world aren't.

Things can become beautiful that didn't start out that way. Things can acquire a wealth of symbolism and association, can start out in Nowheresville and end up in the nexus of power. Marie Antoinette's facial mole becomes a beauty mark, copied in court plaster even unto this day.

When our ancestors beheld the forests and prairies of the Americas, the limitless steppes of Central Asia, the vasty, briny deep, you may be sure that they did not see beauty. What they saw was a hostile wilderness to be conquered. (41) It is only in the 19th century, when we got a handle on the workaday

business of subduing Nature, that proto-ecological types like Henry David Thoreau (1817-1862) start talking about the unpleasantness of human society and the beauty of wilderness &c. Now that we have won the war, and Nature bows her trembling head beneath our iron heel, now we think that she's beautiful. Now that we have despoiled her, we too late discover that we want her virgin again. The only 19th century people interested in saving the whale were those who worried that next year's catch would be diminished if too efficient means of converting them into "oil for the lamps of China" depleted the pods below replacement levels. Gee, I sure miss the passenger pigeon, don't you? Talk to the folks in Brazil about the beauties of the rainforest-you'll be lucky to escape with your life. They don't think it's beautiful, because they haven't gotten their money out of it yet. As soon as they have done so, they will revere the source of it, just as do we. If there's any of it left. (42)

In conclusion, beauty is what we, as people on the long end of the lever of social decision making, say is beautiful. We cast our eyes over past and present and pick and choose what is to be called beautiful, usually selecting things that are the product of dominant civilizations, cultures and individuals. What they evaluate as beautiful remains cross-culturally and -temporally beautiful because both they and we are looking at things from the same perspectives of wealth and power.

(1) Though life is short, art endures. Also, Hippocrates (c. 460 - 377 BC) Aphorisms, section I, 1, "Life is short, the art long. opportunity fleeting, experiment treacherous, judgment difficult."

(2) The Adventures of Tom Sawyer, chapter 2.

(3) In this essay I have no desire to become embroiled in what seem to me to be essentially meaningless, chauvinistic debates: people are different from animals, not in nature, but in degree. I see no good reason to perpetuate the notion that there is some hard-and-fast barrier between people and other animals. The boundary between humans and the other primates is highly permeable, and it is not so very long ago that we had no more control over our environment than they. Although many will find the notion horrific, there is less difference between human and chimpanzee chromosomes than between that of various kinds of fruit flies, and a great possibility exists that we are still cross-fertile. Lurking beneath the allegation that there stands a great chasm between people and animals (and indeed, between people and their own creations, computers), is a note of hysteria that I find unbecoming. Birds are not diminished because we can learn to make nests; we are not less human because a chimpanzee or gorilla can make tools or learn a few hundred words in American Sign Language. Animals have language, use tools, feel pain, evidence logic and reason, display emotions and construct social systems. This working definition of art does not exclude the apparently gratuitous activities of animals other than ourselves. The distinction between people and other animals was simpler when it was generally accepted that we had immortal souls and they did not, but I prefer to believe that either we all have souls or none of us.

Furthermore, the arguments that seek to deny intelligence or the potential for intelligence and self-awareness to Man's creations in the field of Artificial Intelligence, are equally without merit. As these devices become increasingly complex, subtle, dense and capacious, they will not so much rival their makers as extend our horizons. Much as we have engineered animals and plants to suit our needs, so are

we engineering machines and devices toward the same ends. Indeed, we may go so far as to integrate these works of our hands into our bodies and brains, to such a degree that any distinction between "them" and "us" becomes foolish. Is a man in a wheelchair not a man? Is a man with an artificial heart, eyeglasses, a prosthetic limb, not a man? Let's not be silly about this.

(4) Although it has been hypothesized that writing developed as an analog of speech, proceeding from lists of things, inventories and contracts to true writing in which words were written down the way people spoke, it may also be that both writing and true speech developed simultaneously. Human speech began as visual and vocal signals, then developed syntax and became symbolic language. Though it is perhaps the case that writing recapitulates the development of speech, it is also possible that narrative speech and narrative writing developed simultaneously and for the same reasons. Writing appears when people begin living in cities, and the same pressures may have been at work to force people to develop more complex forms of speech. For a discussion of the origins of writing see my paper The Origin of Writing, The Development of the Alphabet and the Devolution of the Minuscules (1985).

(5) Although this is apparently exactly what Mozart did; when he composed, he wrote all the parts at once, vertically on the score sheet, as though he were taking dictation. Michaelangelo seems also to have started with a block of marble and simply cut away everything that did not look like the finished piece, at every point leaving behind perfect work. The "Slaves" testify to this astonishing technique. Concerning music, poetry and dance see below.

(6) Consciousness is defined by Michael S. Gazzaniga in The Mind's Past (University of California Press, 1998) as "the awareness of we have of our capacities as a species, not the capacities themselves." It is the product of a few circuits whose function is to interpret our behavior and our emotional responses to environmental challenges. The interpreter represents itself as the source of these responses, but it is not. It is as if the president's press spokesman confounded himself with the entire executive branch.
(Review by C. R. Gallistel in American Scientist, September-October 1998, page 485)

(7) For example, stutterers can sing and rhyme aloud without impediment. A popular remedy for stuttering involves teaching the stutterer to speak to the rhythm of a metronome, thus inserting into their speech meter or poetry.

(8) Indeed, this is not extinct. Barry Gifford, the author of Sailor's Holiday: The Wild Life of Sailor & Lula ". . . has given hundreds of interviews since Wild at Heart was released and has been quite candid in confessing that the voices of Sailor, Lula, et al have inhabited him since 1988, and that he virtually transcribed their conversations verbatim. He intended their story to be a 600-page quintet, but the five novellas are written now and he claims that the voices have still not run out of steam." - Review by Jill Koenigsdorf in the April 1991 monthly literary supplement to the East Bay Express of Sailor's Holiday: The Wild Life of Sailor and Lula by Barry Gifford, Random House, 1991

(9) The seven liberal arts, so-called because their pursuit was the privilege of liberi, or freemen, were in the middle ages the seven branches of learning: grammar, logic, rhetoric, arithmetic, geometry, music

and astronomy. Things considered purely practical, such as medicine and law, were excluded.

(10) "Contributing to the emancipation of Quattrocento artists from their traditional craft milieu and mentality was the emergence of the idea that painting, sculpture and architecture should be classified among the liberal arts, and were thus equal in status to poetry, rhetoric, and mathematics. This argument was first advanced in 1435 by Leon Battista Alberti in his treatise on painting." - Gene A. Brucker, Renaissance Florence, University of California Press, Berkeley, 1969, page 249.

(11) Mime was an early form of comedy in which players combined dialogue, dancing and lewd gestures. Sophron of Syracuse (fl 5th century BC) wrote ribald mime plays about daily life. Herodas (fl 3rd century BC) wrote mime plays in verse that influenced Theocritus, Plautus and Terence. (Source, Bent's Reader's Encyclopedia, Third Edition)

(12) For an exhaustive treatment of consciousness vis-a-vis right-brain communication with gods, in which the role of ancient poetry, song and dance is discussed at length, see The Origin of Consciousness in the Breakdown of the Bicameral Mind by Julian Jaynes, Houghton Mifflin, 1976.

(13) Although Jane Goodall insists that she has observed this trait among chimpanzees. Elephants also seem to exhibit an awareness of the concept of death, touching and fondling the skulls of dead relatives as though recognizing and mourning them.

(14) Records of human and proto-human habitation over exceedingly long periods of time indicate that change came only slowly. Caves, occupied for tens of thousands of years, indicate in some cases absolutely no innovations, changes or departures from what had been done ten thousand years before.

The introduction of the barbed spear attached by a line to an inflated bladder marks a watershed between the pre-historic Innuit communities that survived and those that eventually died out. The barb kept the spear in the flesh of the prey, and the bladder acted both as a drag, which tired the seal more quickly, and eventually as a marker showing where it had died and incidentally the identity of its hunter. Despite the obvious advantage to this innovation, as well as its simplicity, it seems that the earlier, established communities refused to adopt the modification of traditional hunting technology and as a consequence disappeared.

(15) Scientific American, October, 1994, page 105.

(16) For a discussion of laughter, both in humans and chimpanzees, see Robert R. Provine, "Laughter," American Scientist, January-February, 1996, pages 38 - 45. The article discusses how "the study of laughter provides a novel approach to the mechanisms and evolution of vocal production, perception and social behavior."

(17) The instance of a chimp using a grass stem stripped of its leaves as a fishing pole for termites is an important illustration. (See Jane Goodall's Through a Window: My Thirty Years with the Chimpanzees

of Gombe, Houghton Mifflin, 1990). For a compelling discussion of human social evolution, compared and contrasted with the activities of other primates, see On Becoming Human, by Nancy Makepeace Tanner, Cambridge University Press, 1981. Discussion of chimpanzee tool use is found on pp. 32, 33, 69-76, 190, 268.

(18) It is important to remember that most artifacts were made of materials that have perished with time, and that all we are left with are stones and other likewise enduring materials. Every now and then we luck out, however, and come upon some poor fellow who fell into the ice, or into a peat bog, or whose precious tools were lost to him but found by us.

(19) Here see David Pye, The Nature of Design (Studio Vista, 1964); The Nature and Art of Workmanship (Cambridge University Press, 1968); and The Nature and Aesthetics of Design (Van Nostrand Reinhold, 1978).

(20) This is substantiated in an article, "The Last Stone Ax Makers," Nicholas Toth, Desmond Clark and Giancarlo Ligabue, July, 1992, Scientific American, pages 88-93.

"Aesthetic considerations also motivate the Kim-Yal grinders, otherwise they might not bother to polish more than a few millimeters from the leading edge. In fact, they polish nearly to the point where the axhead disappears into the binding of the haft. Prehistoric craftsmen in New Guinea and other parts of the world often went further, polishing the entire surface of the tool. Additional evidence of aesthetic intent appears in the Kim-Yal's use of red ochre and other locally occurring pigments to fill in the unground depression spots on their axes. Such use of pigments for aesthetic or symbolic purposes has been widely documented in modern nonindustrial societies, as well as in prehistoric cultures over the past 35,000 years. (page 92)

(21) For a thorough discussion of the role of art in forming and creating taste and fashion see Anne Hollander's, Seeing Through Clothes, Avon, 1975.

(22) This may, indeed, have something to do with the evolutionary backwardness of the toothed whales. The essentially weightless environment in which they live means that they were not called upon to deal with the problem, so they didn't.

(23) An equally interesting question is, "Why do we sleep?" A discussion of this question by Dr. Harvey Moldofsky, director of the University of Toronto Center for Sleep and Chronobiology, as presented in the August 3, 1993 "Science Times" section of the New York Times, argues that sleep is related to restorative functions of the body and the immune system. Rats deprived of sleep lose weight, lose the ability to regulate body temperature, and eventually die. Autopsy reveals bacterial infections of the blood, uncontested by the body's immune system. Sleep-deprived subjects demonstrate elevated counts of immune cells in a non-specific host response, as though the body were being attacked by a new disease-causing agent. Further evidence indicates a connection between the process of digestion and sleep. "REM sleep, when dreams occur, may be necessary for a healthy brain. . . . but for all we know,

non-REM sleep may be necessary for a healthy bowel." (page B8)

(24) Winson, Jonathan. "The Meaning of Dreams," Scientific American, November 1990, pp. 86-96.22110

(25) It is important to keep in mind that there is often more than one purpose served by any evolutionary adaptation. Sleeping eye motion may originate in the straightforward need for keeping the tear layer refreshed during sleep so that the surface of the eye receives sufficient oxygen.

(26) Letters to the editor, Scientific American May, 1991. Morgan S. Lynn

(27) This mechanism is called "postural atonia.

(28) John Horgan, "Daydreaming," Scientific American, October 1994, pagen 32-33.

(29) Modern Library, published by Random House, New York.

(30) Translated by Benjamin Jowett.

(31) For a discussion of the role of physical symmetry in the selection of mates see Natalie Angier, "Why Birds and Bees, Too, Like Good Looks," New York Times, February 8, 1994. The premise offered is "... a beautiful face and figure may be alluring not for whimsical esthetic reasons, but because outward beauty is a reasonably reliable indicator of underlying quality."

In corroboration of the concept that the outside tells a good deal about the inside, the researcher Devendra Singh (reported by Robert Trivers of Rutgers University, Scientific American, February 1996, page 10) has "... isolated a major variable in the attribution of human attractiveness, the waist-hip ratio. Throughout the range of female human shapes, increasing waist-to-hip ratios are associated with increasing mortality, decreasing fertility, increasing free testosterone levels and decreasing attractiveness."

In the same issue, a letter to the editor from V. S. Ramachandran (University of California at San Diego) is worth repeating in full:

"I would like to propose an evolutionary explanation for 'why gentlemen prefer blondes' over brunettes in Western culture. Several authors have suggested that florid displays of secondary sexual characteristics 'inform' the female that the suitor is healthy and free of dermal parasites. I suggest that being blonde serves a similar purpose. Anemia (a common symptom of intestinal parasites), cyanosis, jaundice and skin infection are much easier to detect in fair-skinned individuals than in brunettes. Also, the skin of blondes 'ages' faster and more visibly than that of brunettes. Fertility in women declines with age and with disease, so men may gravitate toward blondes, in whom such signs are easier to observe. I originally intended the above as a parody of ad hoc sociobiological theorize of human mate selection but

came to realize that this idea is at least as viable as many others currently in vogue, including those mentioned by Horgan (See the article by John Horgan, "The New Social Darwinists," Scientific American, October 1995).

(32) English Lyric Poems, published by C. Day Lewis, Goldentree Books, Appleton-Century-Crofts, Inc., 1961

(33) William Blake, The Penguin Poets, Penguin Books, Inc., 1978. (7110 Ambassador Road, Baltimore, Maryland 21207)

(34) Denis Kearney (1847-1907) From a speech given in San Francisco c. 1878 (Source, The Oxford Dictionary of Quotations, Oxford University Press, 1955, page 284)

(35) Rudyard Kipling (1865-1936), Recessional.

(36) Orphaned at the age of 6, married at 14 and widowed at 20, Sarah Breedlove Walker (1867-1919) invented and marketed the "Walker method" hair-straightening process for Negro women. She employed over 3,000 women, known as "Walker agents," who made house calls throughout the United States and Caribbean selling and delivering Walker products. The founder, president and sole owner of her business, she became America's first Black millionaire businesswoman.

(37) Negro hair was characterized as "good hair," which was straight or smoothly curled, or "bad hair," which was kinky.

(38) From Modern Japanese Literature, edited by Donald Keene [1960] Published by Grove-Atlantic Press. Quoted by permission.

(39) James 2:26 - For as the body without the spirit is dead, so faith without works is dead also.

(40) Francis Bacon (1561-1626) Essays, 36, Of Beauty

(41) "As quaestor Caesar was appointed to Further Spain, where the governor sent him off on an assize-circuit. At Gades he saw a statue of Alexander the Great in the Temple of Hercules, and was overheard to sigh impatiently: vexed, it seems, that at an age when Alexander had already conquered the whole world, he had done nothing in the least epoch-making. Moreover, when on the following night, much to his dismay, he had a dream of raping his own mother, the soothsayers greatly encouraged him by their interpretation of it: namely, that he was destined to conquer the earth, our Universal Mother." - Seutonius, The Twelve Caesars, translated by Robert Graves, Penguin, 1957

The Noble Red Man, of course, despite the long-standing and somewhat offensive and condescending fashion of portraying him as living in childlike harmony with Nature, enslaved his fellow man, polluted the environment as much as he was able, carelessly destroyed natural resources, wiped out 23 species of

American megafauna (mostly by eating them) and generally pissed in the soup well before the White Man came to help him out.

(42) For that matter, talk to the folks in Plumas County, California, who in the late 1980s and early 1990s believed themselves put out of work by ecological concerns. A group less sympathetic to the welfare of the spotted owl would be hard to find. As it stands, Plumas County contains what are called "sacrifice forests," which means that its forests are being sacrificed so that forests elsewhere may be spared.

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