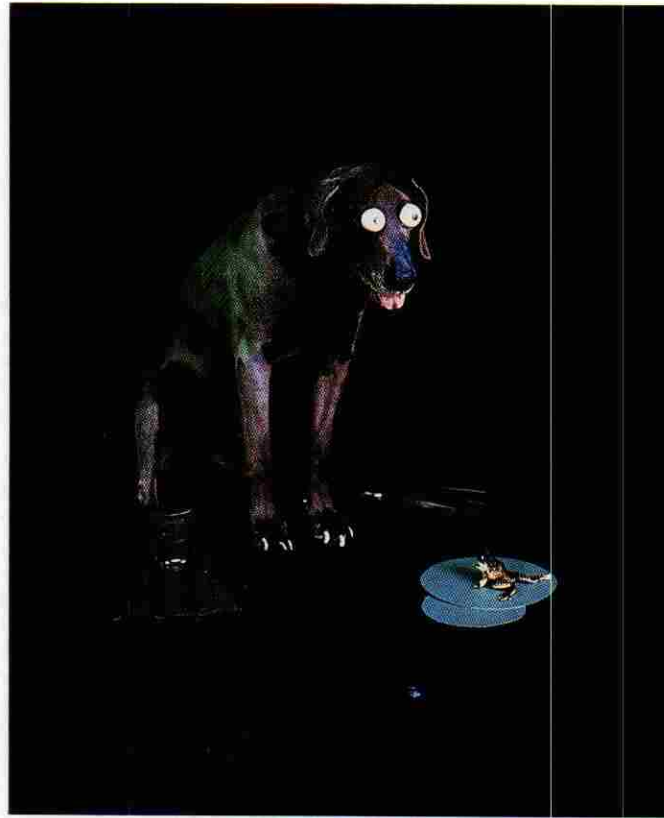


# ON HUMAN NATURE

Lee Cronk



William Wegman, Frog/Frog II, 1982

## Old Dog, Old Tricks

**H**ELP WANTED: Healthy males wanted as semen donors. Help infertile couples." The advertisement runs in the classified section of *The Battalion*, the student newspaper at Texas A&M University. "Confidentiality ensured. Ages 18 to 35, excellent compensation." But in spite of the blandishments, donors are scarce. Meanwhile, on highways in the surrounding Texas countryside, armadillos routinely kill themselves by springing into the air in front of oncoming cars, in misguided attempts to foil their perceived attackers.

What could two such disparate phenomena possibly have in common? Each of them sheds light on the environment in which a species evolved. In each case some aspect of the original environment has changed, and an old behavior that might once have been adaptive is no longer so. The problem for the armadillos is cars: for most of armadillo evolution there were none, and the armadillo's habit of springing into the air when it is threatened worked well enough to confuse snakes and other predators. Leap two feet

high in front of a Buick, though, and you're buzzard bait.

The Texas A&M undergraduates also are disadvantaged—somewhat less drastically, to be sure—by their evolutionary heritage. In a Darwinian sense, an adaptive behavior is one that increases the individual organism's chance of passing on its genes. The adaptive response to the sperm bank's advertisement (which represents a chance to reproduce, free of any cost beyond a few minutes' effort) would be to visit the bank as often as possible. But throughout most of human evolution, reproductive opportunities have involved human females, not test tubes. Focusing on females was adaptive in the past, but here, in the novel environment of a sperm bank, it is a diversion and a handicap. For the few men who do make deposits, the incentive is usually financial, not sexual; an acceptable donor can make more than \$100 a week for just a few minutes' work.

The English psychologist John Bowlby, in his treatise *Attachment and Loss*, was the first to point out the importance of understanding the environment in which an

adaptation arose—what he called the environment of evolutionary adaptedness. Behavioral and physical adaptations that seem to make no sense in an organism's current environment can be traced to the legacy of an earlier, different environment in which those traits were favored. Human beings, now the major source of environmental change on earth, have altered the environments of many other animals besides the armadillo, and the results have been incongruous and often poignant.

Rabbits dart back and forth in the paths of oncoming cars, attempting to confuse what they perceive as predators intensely bearing down on them at great speed. Toads are undone by their feeding behavior. They snap reflexively at almost any small, moving object—behavior that serves them well in their normal surroundings, where such an object is likely to be a tasty insect. But when cane toads were introduced on the Hawaiian islands in 1932, their environment included a novel element: trees that produce strychnine and deposit the poison in their flowers for protection against insects. As the

blossoms fall from the trees and blow along the ground, toads searching for food sometimes snatch them up, with predictable results. In Korea toads faced another novel environment when they were captured by bored American GIs, who amused themselves by rolling shotgun pellets past the toads. The animals would fill up with lead like little amphibious beanbags until they were unable even to hop.

In addition to changing the environments of other species, we humans are building a strange and in many ways novel environment for ourselves. The ability to do so sets us apart from other species. Fortunately, so does the ability to respond flexibly to new conditions of our own making. Any animal is likely to be confused between a new stimulus and a familiar one. Rabbits and armadillos react to moving cars as if they were predators; toads react to blossoms and shotgun pellets as if they were insects. Most people react to sperm banks as if they had nothing to do with reproduction; after all, sperm donation certainly lay outside the behavioral repertoire of our ancestors. But people also have fewer simple behavioral programs, and our intelligence makes it possible for us to shape our behavior to new circumstances. The sperm bank near Texas A&M may not be as popular as the local ice-cream parlor, but the bank still attracts enough donors to stay in business.

Yet there are limits to our flexibility. In some features of our physiology or psychology we seem to be rather like the armadillo and the toad: we carry on in ways that were once adaptive but have become a handicap in our new, artificial environment. Many of those legacies remain obscure. But by conceptually reconstructing the environment of our own evolutionary upbringing and comparing it with our present surroundings, we may be able to locate the roots of certain contemporary medical, behavioral and social problems. We may even find clues about how best to deal with them.

To begin we need a picture of our ancestors' world. That phrase usually conjures images of the African savanna or the caves of Ice Age Europe—in other words, the physical environments in which the human species evolved. Changes in the physical environment surely lie at the root of some of the current difficulties. Certain diseases of advanced age, for example—high blood pressure, heart disease, some cancers—seem to emerge from the clash between a Stone Age physiology and one aspect of the new physical environment: diet. Salt was once scarce, and early humans evolved both a taste for it and some mechanisms for conserving it. Those adaptations no longer serve now that salt is plentiful. By the same token, the human body became

adapted, over tens of thousands of years, to a diet low in fat and high in fiber, and the recent departure from that pattern is blamed for many health problems.

But emphasizing the physical aspects of our species' past may be a mistake. Investigators are beginning to explore the possibility that the social environment may have been a source of selective pressure at least as strong as the physical environment during the evolution of humans and other primates. The psychologist Nicholas Humphrey of Kings College at the University of Cambridge draws an analogy between human evolution and the story of Robinson Crusoe. Crusoe certainly faced physical challenges when he was alone on the island—getting enough to eat and drink, avoiding danger and so on—but, as Humphrey puts it, "it was the arrival of man Friday [that] really made things difficult for Crusoe. If Monday, Tuesday, Wednesday and Thursday had turned up as well then Crusoe would have had every need to keep his wits about him."

Indeed, the anthropologist Sue Taylor Parker of Sonoma State University in Rohnert Park, California, has argued that one defining human characteristic, the capacity for abstract reasoning, evolved in response to the demands of the social world, as well as to the demands of tool-making and tool use. The traditional human societies in our time all impose on their members an exceedingly complicated social environment, no matter how simple their technology. The Australian aborigines, for example, never developed the bow and arrow, but their social systems are well known among anthropologists for their intricacy. The Tiwi of northern Australia maintain an elaborate system of political bargaining, favors and intrigue, all centered on the rights of men to bestow women on one another. Other aboriginal groups regulate marriage and kinship according to systems of Byzantine complexity. Such social systems, assuming they existed earlier in human evolution, would have strongly favored an ability to generalize rules from experience and apply the rules in new situations.

If the social environment of our ancestors played a major role in shaping human physiology and behavior, current social, economic and political arrangements might be a good hunting ground for conditions that strain our evolutionary heritage. One main difference between the present environment and that of our ancestors is in the nature of work. Traditional societies have simple divisions of labor, based only on age and sex, and consequently their members are generalists. In foraging societies men usually do most of the hunting for meat and women do most of the gathering of plant foods. All grown men take part in such activities as toolmaking, stalk-

ing and butchering, and the women likewise share a broad range of activities. Many herding societies go even further in sharing tasks: all members—men, women and children—tend the livestock.

Modern societies, in contrast, subdivide labor in infinite and subtle ways. Some people specialize in deboning chickens or soldering circuit boards; others spend their days taking telephone orders or running office copiers. An office, a hospital or a construction site is a hive of finely divided responsibilities. Although such division of labor has brought enormous increases in productivity and wealth, it has led also to specific physical problems.

Through most of evolution everyone performed a wide range of physical activities. Today specialization has gone so far that some jobs have been reduced to a single pattern of motion, repeated over and over again, day after day. The result, for some workers, is a cumulative trauma disorder. Carpal tunnel syndrome is one of the most common of those ailments: the tissues of the wrist and hand become inflamed and press on the nerves that run through the carpal tunnel, causing pain, numbness and weakness. Butchers, meat packers and assembly line workers have long been subject to carpal tunnel syndrome, but as computer keyboards have proliferated, the ailment has spread to white-collar workers as well. Indeed, carpal tunnel syndrome has now become so common among the new groups that it is sometimes called computeritis or journalist's disease. According to Linda H. Morse, medical director of the Repetitive Motion Institute in San Jose, California, the growth of cumulative trauma disorders is a sign that "the electronic revolution has outstripped our human muscular and skeletal evolution."

Economic changes have not only led to physical activities unanticipated by evolution; they have also disrupted traditional patterns of childbearing and child rearing. Again specialization is to blame, at least in part. Many jobs now require long periods of schooling and apprenticeship. Women are finding increased opportunities in such specialized fields, and as a result they are delaying childbearing, often into their thirties. In response to career pressures, many limit the size of their families and return to work quickly after giving birth. Breast-feeding is also curtailed, since it is rarely accommodated in the workplace. In all, fewer than 10 percent of married American women between the ages of eighteen and thirty-four expect to have more than three babies, and fewer than 20 percent of American women nurse their babies for six months or more.

A strikingly different pattern prevailed for most of human evolution, and it is still evident in traditional societies. There,

women usually become pregnant not long after they begin to ovulate, between the ages of fifteen and nineteen. They continue to bear children until menopause, nursing each one for as long as three years. Although both the rights of women and population control make such a pattern unacceptable in modern industrial societies, it may be what human physiology is best equipped for. Consider that tens of thousands of years has settled the body into the strategy of early and abundant childbirth. Only in the past few decades has that pattern changed.

There is increasing evidence that the change may not sit well with our Stone Age reproductive physiology. For example, the change in reproductive behavior may be contributing to the high incidence of breast cancer in industrial society. An epidemiological study by Peter M. Layde and others at the Centers for Disease Control in Atlanta found that getting pregnant early in life, having several children and breast-feeding them for long periods—in other words, following the reproductive regimen of early humans—all reduced the risk of breast cancer. In some cases the reductions were dramatic. Women who had breast-fed for a total of more than twenty-five months were 33 percent less likely to develop breast cancer than were women who had children but had never breast-fed. And women who had had only one child had more than twice the cancer risk of women with seven or more children.

People have carried a Stone Age physiology into an age of fast food and commuter marriages, but they may also be carrying some aspects of Stone Age psychology—traits evolved over tens of thousands of years of foraging. Are there any signs of an emotional legacy from the past? No one knows how much human behavior comes from the genes and how much is learned; any argument that people are hobbled by a Stone Age psychology is necessarily speculative. But it may prove useful to look at certain modern social problems from the perspective of the early human environment, where aspects of the psyche may have been forged.

Just as the division of labor has fragmented the economy, so it has atomized social life. We move from city to city; we work with colleagues and bosses rather than with kinfolk; we often gain recognition and rewards for our own efforts rather than through family influence. The clans, lineages and extended-family networks that structured life for our ancestors (and for the members of traditional societies today) have disintegrated, and in the West most people now live in nuclear families. The loss of such kin networks may be another factor that has led parents to have fewer children, later in life: many people

can no longer call on relatives to share the work of child rearing.

It may also have had disturbing psychological effects. The feelings of alienation so often ascribed to modern urban life may reflect the evolutionary novelty of that environment, in which families and small, often short-lived webs of friendship take the place of widespread kin networks. David P. Barash, a professor of psychology and zoology at the University of Washington in Seattle, has argued that social pathologies such as drug use and crimes against strangers may reflect this uneasy fit between aspects of our psyche, evolved long ago, and the strange social world we now inhabit.

Although traditional societies have drugs, the drugs rarely become the center of a person's life. And crime is less of a problem, because it is difficult to accomplish anonymously. Crimes of passion and impulse concerning adultery, unpaid debts and unreturned favors predominate, whereas premeditated robberies and burglaries barely exist. "A small-town resident doesn't rob the corner grocer; everyone knows nice old Mr. McPherson," Barash writes in his 1986 book *The Hare and the Tortoise*. "But if McPherson is a nameless, familyless, disembodied, and anonymous spirit in a big city, he can be attacked with relative ease."

Even if the novel human environment is perilous to creatures that evolved to meet the demands of the Pleistocene, what can be done about it? After all, the adaptive advantages of the artificial environment far outweigh its drawbacks, as the health and prosperity of many people in the industrial world make clear. Quite apart from its benefits in a Darwinian sense, the modern world created by human effort offers freedoms and pleasures unknown in traditional societies. Alienating as they may be, cities are also exciting and fun. Kinship networks offer psychological support during child rearing, but the obligation to support is reciprocal, and many people prefer their family ties loosely knotted. Delayed reproduction may have medical risks, but careers can bring rewards that breast-feeding cannot.

What is more, it may be possible to relieve some of the problems of the novel contemporary environment without returning to the Stone Age, by mimicking some of its key features. Cumulative trauma disorders such as carpal tunnel syndrome are currently treated with drugs and surgery. But they also improve when the sufferer's job is redesigned to allow a greater range of motion—making it perhaps more like the ancestral activities of root grubbing and spear throwing. The risk of breast cancer may one day be reduced by hormone treatments that mimic the cancer-reducing effects of the tradi-

tional reproductive pattern, without its career-reducing effects as well.

Alienation is a more subtle problem, calling for a more imaginative solution. The novelist Kurt Vonnegut offered one in *Slapstick, or Lonesome No More!* The second part of the title is the campaign slogan of Wilbur Daffodil-11 Swain, the last president of the U.S. His sole issue is the loneliness of his compatriots, and his solution is to engage the computers of the federal government in recreating kinship networks like the ones of prehistory.

In Vonnegut's fantasy everyone gets a new middle name, corresponding to something in nature—Chipmunk, Hollyhock, Raspberry, Uranium—and a number. By name and number everyone is instantly linked to 10,000 brothers and sisters and 190,000 cousins, all obligated to help out fellow clan members. That's a lot of kinfolk, but individually the obligations are mild. And, as Swain explains, "We need all the help we can get in a country as big and clumsy as ours."

People may never shed the need for kinship networks, but perhaps some day in the distant future adaptations to the modern environment will begin to appear. As sperm banks account for more and more babies, for instance, men may eventually evolve a propensity to find test tubes downright arousing. By the same token, it is not inconceivable that the division of labor could lead to the development or the atrophy of certain physical characteristics in human beings. But, surely, it will be a long time before laboratory supply catalogs are sold at convenience stores and armadillos stop littering the Texas highways. ●

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