

THE ANIMAL WITHIN

Presented at the Philosophical Club of Cleveland April 28, 1998

By

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1. INTRODUCTION.

Tonight I invite you to explore with me a subject which social critic Tom Wolfe has called the "most important news of the end of this century": the discovery that Darwinian concepts of natural selection and human evolution have left us with a kind of universal "genetic hard-wiring" that sheds light on just about everything that matters: romance, love, sex, friendship, enmity, selfishness, self-sacrifice, guilt, social status, ambition, racism, xenophobia, war, deception, self-deception, the unconscious mind, depression, sibling rivalry and parental influence.¹ And even losing weight. As William Faulkner has observed: "The past is never dead; it is not even past."

While the old argument between nature and nurture still rages, cross-disciplinary work in both the "hard" and "soft" sciences now seems to give "nature" the millennial edge. Having said that, however, it is important to recognize that the choice is much more complex than "nature" or "nurture." The assumed choice between them is a convenient but essentially false dichotomy. The two forces do not operate in isolation from each other and both strongly influence the human condition.²

Nevertheless an understanding of evolutionary pressures can illuminate the kinds of environmental or "cultural" changes that may be required to mediate our biological heritage.

The scientists who rescued Darwinian notions from the scrap heap of "Social Darwinism," eugenics and even Nazism are computer savvy intellectuals who, for the last 30 years or so have been establishing a new vision of natural selection under the banner of "Neo-Darwinism." In the process they have overhauled the social sciences and at the same time given us new insights into everyday life.

In this paper I intend to survey some of the findings of the Neo-Darwinists as they seek to explain the present state of our species in evolutionary terms and then, using those lessons, make a few personal observations looking toward the next millennium.

2. THE TIMELINE

The dominant historical fact underlying Neo-Darwinian inquiry is the incredibly short duration of our mass technological civilization and correspondingly, of course the length of time recognizably humanlike beings lived and developed in primal conditions.

Without attempting to resolve the scholarly dispute over the precise moment in pre-history when Man emerged from our anthropoid ancestors, it seems safe to pick the point at least one million years. On this basis, if we imagine a 100' basketball court as our timeline, only the last one-fifth of an inch represents the length of time that we have lived in mass technological civilization.

In generational terms, this is six of some thirty thousand generations, or as one writer observed, "a mere wink in the grand expanse of human history."³

3. METHODOLOGY

The methodology of the Neo-Darwinians is a kind of "reverse engineering": figuring out what the complex structures of our minds and bodies were engineered to do in the primal environment. This is a case of puppets trying to "decipher the logic of the puppeteer."⁴ In this fascinating process it is wise to avoid what is called the "naturalistic fallacy," the unwarranted inference of "ought" from "is." It is perhaps sufficient to understand what "is" and design our own social structures to mediate what "ought" to be. To support a re-engineering analysis it is certainly important to have as clear a view of the primal condition of the human species as the fossil and anthropological record allows.

4. PRE-HISTORY

There now seems to be a consensus from blood, DNA and fossil research that our primal forbears five million years ago were rainforest apes barely distinguishable from chimpanzees, occupying the equatorial forests of Africa. Our own "Adam and Eve." emerged when (proverbially) "two individual apes. One from a group destined to evolve into humans, the other from a group destined to become modern chimpanzees shared a moment of recognition before they ambled off in separate directions."⁵ Our ancestor ambled off; we are told, looking like a chimpanzee. Since chimpanzees are a highly conservative species "surviving happily in a stable environmental niche,"⁶ the five million year old chimpanzee did not differ in major ways from the modern chimpanzee. This has given the Neo-Darwinians an evolutionary "time machine" from which to make some interesting direct observations of our closest non-human ancestors.

Chimpanzee society is characterized by male dominance and patrilineal groupings. Males are larger and stronger than females. Mating is a prerogative of the dominant male. Every male is dominant over every female. During her fertile periods, females are besieged and dominated by numbers of males. Females must bend to male whim --or risk punishment. There is little pair-bonding but brief consort-ships with favored partners are valuable because females are more likely to conceive and confusion of parenthood is eliminated. Chimpanzees have a large communal range, violently defended (and even enlarged) by aggressive males. They have no set place of settlement. They move well through the trees but walk awkwardly on all fours when grounded. Chimpanzees pat each other on the hand or kiss to show affection. They develop lifelong friendships, hold grudges, grieve for the dead, barter for sexual favors, use simple tools, hide their feelings and bring rivals together to make peace. Males aggressively, and sometimes violently, compete among themselves for status. Chimpanzees obtain their principal diet from fruit and other arboreal products of the equatorial rainforest, supplemented occasionally with small game. Recent biological research places our common ancestor-ship closer to the chimpanzee than to any other ape. Even more startling, however, is the conclusion that humans are more closely related to the chimpanzee than gorillas are to the chimpanzee.⁷ Can you feel your prehensile toes curling?

Our common ancestor came out of the rainforest into the primal woodland; it appears, at the very edge of the chimpanzee's rainforest range where, through major changes in weather and

habitat, the traditional fruit diet could not be maintained. Eventually our ancestor adapted to bipedalism possibly for hunting and traveling efficiency, since "no woodland provides year round food for a (rainforest) chimpanzee."⁸ Its large well-enameled teeth were suited for eating seeds and nuts as well as roots which were more plentiful in the savannah and woodlands than in the rainforest and which also served as a secondary water source. Natural selection favored rapid evolutionary change to accommodate to the more varied strategies and demands of food gathering in the new environment. Incidentally, the feast and famine existence of our primal ancestor may also provide a clue to the chronic inability of modern man to control weight. The body is equipped with a hormone called Leptin which makes it possible to gain or store weight during times of plenty but in times of scarcity tells the brain to conserve energy, cut back on appetite, speed up metabolism and burn fewer calories to do the same work.⁹

Over the next three million years our ancestors abandoned the climbing adaptations,¹⁰ turned more to hunting and meat eating and developed the use of tools. Our ancestors' brains continued to expand over the next million years or so to modern human dimension; fire was developed perhaps 1.5 million years ago; language emerged perhaps 150,000 years ago and agriculture some 10,000 years ago.¹¹ This history's central feature, perhaps, is the absolute necessity to adapt to new environments and changing conditions. The development of hunting skills required specialized adaptations for our ancestor to compete with the already specialized predators of the woodland and savannah. A bigger brain was required to compensate for the poor hunting body left to us by our chimpanzee ancestors. A longer childhood was required to grow the bigger brain and educate it. The larger male was suited for hunting: the smaller female for child rearing. It was necessary that both weak and strong males cooperate more and compete somewhat less. Pair-bonding solved many problems associated with the rearing of children and helped develop cooperation among men. Sex, according to at least one observer --or at least the female's greater receptivity to pair-bonded sex --provided a strong incentive to maintain a pair-bond at least until the offspring had fully developed.¹² The pair-bonded "family" provided a powerful and lasting relationship and example for developing offspring. Out of necessity our ancestors patriarchal society was more "territorial" than the ancestral chimpanzee placing a high premium on male size, strength and aggressiveness in defense of territory, as a means of rising in the hierarchy and in defense of "family".

The lesson of this evolutionary inquiry, however, is not that these traits necessarily developed "for the good of the species" but rather in order to perpetuate the genetic self-interest of the individual. This is the "selfish gene" concept of "natural selection": the adoption, over a long history, of individual traits that are more conducive to survival and reproduction than others. The Darwinian concept of "the survival of the fittest," applied directly to human evolution means an organism's overall "fitness" to the task of transmitting its genes into the next generation. Seen from this perspective, for example, the "reverse engineering" of the human mind shows it to be a system of organs of computation designed by natural selection to solve the kinds of problems our ancestors faced in their hunting and foraging way of life.¹³

5. SEX -THE ROLES OF MEN AND WOMEN

Of course, the most direct circumstance affecting genetic transfer is sex. And here the patrilineal legacy of our chimpanzee-like ancestor lives in our nature today and profoundly influences our individual and collective behavior.

The dominant observable fact is asymmetry or imbalance in the reproductive roles of men and women; the competition among males for the limited reproductive resources of the reticent female. If the basic rule of the genetic game is to maximize each person's genetic legacy, the male has an overwhelming advantage, since males, of course, are capable of reproducing hundreds of times a year; women no more than once. The female "investment" in the production and nurturing of each offspring make critical her choice of mate and natural selection has equipped her with a kind of sexual reserve that "wound up being good for her ancestor's genetic legacies."¹⁴ The universality of female coyness and male eagerness in primitive as well as modern societies strongly supports its evolutionary origin in natural selection.

As we have noted, the great ape closest to our human-like ancestor is the chimpanzee. The life of a male chimpanzee is one of violent competition for rank. The techniques in use are "assault, intimidation and cunning"¹⁵ and one of the rewards is free access to the female's reproductive resources. Natural selection, as we have seen, favors big aggressive males. Though somewhat more subtle, natural selection also favors female sexual reticence -as away of screening out less genetically fit partners.

But the primal conditions affecting human development involved some more sophisticated arrangements: pair-bonding and the need for "male parental investment." In almost all cultures today women display a preference for the male who can be trusted to protect and preserve their offspring. The male, however, has inherited a mixed evolutionary strategy, one which puts at least an unconscious premium on deception --on seduction and abandonment. Natural selection, in short, has produced a kind of "arms race": developing skills at deception matched with developing skills at detecting deception. It is not surprising, perhaps, that while modern cultures all display a preference for pair-bonding, men will prefer younger, fertile women¹⁶ and women can afford to be less age selective. The evolutionary benefit of desertion for women --even in favor of a younger man --cannot possibly give her --as it can a man--25 years of reproductive opportunity. In our Darwinian framework the great male fear is investment in someone else's children and the great female fear is desertion. Thus, male and female jealousies are worlds apart: The male is worried about sexual infidelity and the female about emotional infidelity that may lead to abandonment.

The physiological facts add weight to observations of male-female genetic strategies. The secret ovulation in our species helps females devise strategies that allow multiple partners and can create confusion as to parentage. Studies of testicle size and sperm density among primates provide at least a general index of the requirements for genetic success in each species. On the psychological level, courtship for males may involve the so-called "Madonna - whore" dichotomy: the opportunity for men guiltlessly to exploit women who show less self-restraint with the logical Darwinian rationale that such women will prove unfaithful.¹⁸

Success in the hierarchy has always given the aggressive primal male greater access to reproductive resources. The evolutionary asymmetry between male and female preferences serves up a tidy evolutionary explanation for our President's supposed pattern of reckless dalliances. Steven Pinker, a professor of Neuroscience at MIT, noted the evolutionary appeal of men with status and saw the situation in stark Darwinian terms:

"In all societies known to ethnography it is the males who seduce, proposition, hire prostitutes and accumulate spouses...

"Imperial despots, who could get anything they wanted, kept harems of hundreds of women..."

"Anyone who has what it takes to rise to the top of a cutthroat profession...is likely to be a risk taker, a strategist, and a moral utilitarian who reasons that if no one finds out no harm has been done. So are leaders and celebrities more concupiscent than the average man? Fortunately for the average man, perhaps, he will never be in a position to find out."¹⁹

The predictability of such behavior among men with status is so clear that it has even been given the name of one of our presidents. This is the "Coolidge Effect" so named because of a famous anecdote:

"One day President Calvin Coolidge and his wife were visiting a government farm and were taken on separate tours. When Mrs. Coolidge was shown the chicken pens, she asked whether the rooster copulated more than once a day. 'Dozens of times,' replied the guide. 'Please tell that to the President,' Mrs. Coolidge requested. When the president was shown the pens and told about the rooster, he asked, 'Same hen every time?' 'Oh, no, Mr. President, a different one each time.' The president said, 'Tell that to Mrs. Coolidge.'²⁰

6. THE "DEMONIC MALES"

The Neo-Darwinians have traced much more of today's society to our primal heritage than we have time to discuss here, among them: the development of a kind of "ethical" behavior --so-called "reciprocal altruism" and its concomitant, the sense of justice embodied in the expression "tit for tat;" child rearing practices and even the concept of "family values" (with respect to which the Neo-Darwinians see a helpful evolutionary pressure for a more even distribution of wealth); the drive for power, status and wealth, the success of taller men,²¹ and the all-encompassing notion of "free-will" itself.

But as a "bridge" to the evolutionary view ahead we take up the issue of the "Demonic Male." Of the 4.000 mammals and 10.000.000 or more other animal species on earth --only two -- man and chimpanzees --engage in murderous violence against their own kind. And until 1977 it was believed that man was the only animal species to do so. By 1977, however, observation of chimpanzees in Tanzania had positively determined that aggressive lethal male raiding takes place

among related groups of chimpanzees. This was in marked contrast to the equally accurate and well documented observations of friendly inter-group relationships in chimpanzee society.

Subsequent research has confirmed male lethal raiding as a species-wide pattern and "made credible the idea that our warring tendencies go back to our pre-human past."²²

Of course, Human society, too, is characterized by a system of patrilineal communities defended by related, aggressive coalitions of men. The Hatfields and McCoys. The Palestinians and Israelis, the Tutsis and Hutus, the Serbs and Croats, to mention just a few. And the similarities do not end there. Modern crime is unquestionably gender-based and male criminals dominate in violent crimes. A man is nine times more likely than a woman to commit murder, seventy-eight times as likely to commit forcible rape and ten times as likely to commit armed robbery. "Overall men are almost eight times as likely as women to commit violent crime."²³ The patriarchy that underlies these statistics is world-wide and history-wide. Its origin is in man's "evolutionarily derived efforts to control women and enjoy solidarity with fellow men in competition with outsiders."²⁴ Perversely, it has probably served the evolutionary interests of female genes as well, even as it has made their female hosts vulnerable to male domination, rape and battering. These were strong forces in our pre-history, the genetic influence of which is universally present today. As the late Tammy Wynette sang in her signature song you should "stand by your man" because, after all, "he's just a man." And Hillary Clinton after reading the book on which this section of my paper is based found it surprising that men ever behaved well at all.²⁵

Our pre-history also leaves us with the questions: Need this have been? and: What does evolution say might be done, if anything, to mediate universal aggressive male impulses?

7. THE GENTLE APE

An intriguing suggestion is provided by our ancestral apes and especially a smaller ape species only recently accorded the status of a separate species: the Bonobo, or pygmy chimpanzee. It separated from its chimpanzee-like ancestor "only" 1.5 -3.0 million years ago but it has in extraordinary ways changed rapidly away from its chimpanzee ancestor. The story of its development --based on extensive field observation --has been characterized as a "tale of vanquished (male) demonism." bonobos have "reduced the level of violence in relations between the sexes. in relations among males and in relations among communities."²⁶

Among the Bonobos, the sexes are co-dominant from top to bottom and form cross-sex alliances which help determine relative status. Mothers and sons, particularly, form close protective relationships which advance the son's male status. Female Bonobos cooperate with and defend each other. Males on the other hand are disorganized and "never cooperate with each other" and even the highest ranking male can be defeated when females gang up on him. Food sharing is done on a sex equal basis. While the society is still patrilineal. females form strong alliances --"friendships" in our terms. Males have social relations similar to chimpanzees but behave somewhat more peacefully, inclining toward threats and displays rather than violence to achieve dominance and showing less of the signs of status recognition. While chimpanzees form strategic alliances through sharing and grooming, male bonobos show a capacity for such behavior with less emphasis on its strategic aspect. There is less competition for access to females apparently in part due to the ability of the

female to conceal ovulation. And a prodigious appetite for sex --homosexual and heterosexual --is used to make friends and to reconcile after aggression. There is less inter-community violence and even some evidence of friendly interchange.

These differences are all the more remarkable in view of the fact that chimpanzees and bonobos occupy the same equatorial region of Africa; the chimpanzees on the north and the bonobos on the south of the Zaire River. The primatologist's solution to this puzzle? Snack Food. There is evidence that the bonobo evolved in the south in absence of competition with the gorilla for foods the gorilla once monopolized: young leaves and herbs. Gorilla foods enabled the bonobo to form and maintain larger foraging groupings. This enabled females to form alliances with each other and raise a collective defense against male aggression. The evolving human-like species on the other hand had no such bonanza and maintained hunting and gathering activities in small unstable groups.

The message of all this seems to be that a society organized more on feminine impulses --or female reproductive strategies --would be more peaceful and collaborative. And while the demonic male once functioned in a monopolistic power framework based on personalized power, modern institutional democracies offer the prospect for women to accumulate power and to use it collaboratively. But at the millennium, we are clearly not there yet.

8. SHAPING THE FUTURE

In the previous sections of this paper we have seen that the primal past of our species universally influences our behavior today --and not always in ways that comport with collective and individual tranquility. In fact, if the past is a guide, man's warring instincts will continue unabated and. With increasingly sophisticated weaponry, will constantly threaten the very existence of human civilization.²⁷

We have also seen that a very different evolutionary past --even within our own primate ancestral group --could have produced a gentler, kinder species.

The question is: What are the prospects for using the vast resources of our modern society in ways that will mediate the undesirable impulses of our evolutionary history? And can this mediation be done in away that preserves diversity and individual rights and liberties?

The visions of our future at the near millennium show a perhaps unsurprising, and deep divergence of opinion. On the one hand Bill McKibben in his book The End Of Nature posits that the self-healing abilities of our planet have been thoroughly exhausted by development and pollution and have been replaced by the necessity for humans to "manage" all of our dwindling resources - a task for which we are inadequately prepared and equipped. On the other hand, we have the Ayn Rand Institute of California which sees "environmentalism" as the great danger to mankind and accords to Man the "moral right to live his own life for his own sake [with] no duty to sacrifice to the needs of others and certainly not to the needs of non-humans."²⁸

The emerging elite of our information economy, represented by Kevin Kelly, editor of Wired magazine, believe that they have created a way of extending life itself "beyond its traditional

carbon-based boundaries." Theirs is a vision of life in "specialized online communities," focused -- Ayn Rand like --on the individual. The new cyber-elite --the "digerati" --also believe in the "creative destruction" of the industrial society and its replacement by a Network Economy of "spontaneous order."²⁹

Science weighs in to the calculus offering us the prospects of cloning and alteration of our basic genes. Science has even come face to face at the cellular level with what could be the secret of longevity in humans.³⁰

A less scary --but still troubling --view of the future is provided by Marvin Minsky, formerly of the Artificial Intelligence Lab at MIT, now an official at Disney:

"Look, the world is a dumb place. There's nothing special about it. It's accidental. The world was terrible before people came along and changed it. So we don't have much to lose by technology. ..Eventually robots will make everything. ..[T]he money and the energy in this country will eventually be devoted to doing things with your mind and your time."³¹

Perhaps the best way for us to think about the future in evolutionary terms is to ask: Over the next million years what aspects of our evolutionary past might be preserved --and what rejected --as part of the future inheritance of the planet?

According to some observers the movement by our forbears from a nature-based to an agricultural society (some 300 generations or 10,000 years ago) was the "Pandora's Box" that unleashed an "original trauma" from which we have been trying to "recover" ever since. This view of our evolutionary development sees primal humans as having been until then, tuned to the world around them with "a visible sense of inner peace, un-self-conscious humility, an urge to communal cooperation, and heartfelt appreciation for the world around them."³²

While this romantic view³³ tends to obscure the more "demonic" aspects of primal society, it does point to the kind of psychological inner harmony that is possible "[where] desires are simple [and] choices clear."³⁴ In our society, for example, children act spontaneously and are "seldom unhappy without good reason." Inner harmony is much more difficult for adults. :

"No longer is every man a hunter, sharing skills and interests with every other man. The farmer and the miller, the priest and the soldier now see the world differently from one another. There is no one right way to behave, and each role requires different skills. Within the individual life span as well, each person becomes exposed with age to increasingly contradictory goals, to incompatible opportunities for action."³⁵

After noting the above, the distinguished psychologist, Mihaly Csikszentmihalyi, observed that no program for producing inner harmony in our complex world --religion especially included -- has yet been successful. We have prospered out of differentiation, he says, and differentiation has produced science, technology, and the unprecedented power of mankind to build up and destroy its environment.³⁶ In his view, what is now needed is "integration," the "realization that the entire

universe is a system related by common laws and that it makes no sense to impose our dreams and desires on nature without taking them into account."³⁷

This gives us the first possible foundation stone for our re-engineering of the future: the adoption of a nature-based ethic using the natural world ("the commons") to define choices. Since resources are finite, the nature based ethic would encourage a "cooperative rather than ruling role in the universe" and restore some universal sense of common purpose.

Secondly, we might borrow from the "Gentle Ape:" the establishment of more symmetrical patterns of behavior between men and women. Surely our democratic institutions are capable of providing greater impetus to this worldwide movement. Maureen Dowd has said that already "the most remarkable post-feminist trend is not about women. It's about men. The idea that women should mimic men is now dead. ..Now men mimic women...turning traditional female modes of behavior into macho strategies to get ahead."³⁸ With widely available contraception, and something approaching co-equal status, perhaps we can even see the evolutionary end of gene-centered competition for unlimited pro-creation and correspondingly, the future diminishment of violence and inter-group aggression. The possibility of truly friendly and cooperative relations between the sexes is certainly appealing.

And if our developing consciousness can establish a natural selection for traits that support our collective survival in these respects, perhaps we can also provide a natural selection for the appreciation of art, music, literature, wit and humor --things which seem to have little meaning in a struggle for survival and reproduction. Perhaps also we may develop natural selection for learning for its own sake --a curiosity about origins, about how things work, about meaning, in short, selection for education beyond mere information.³⁹

Modern man, of course, is blessed with the capacity to know what could be: To understand whether our dependence on technology is a kind of "Faustian Bargain;" to move from hostility and mistrust to affection and trust without a direct, self-serving motive, to develop a concept of status freed from genetic self-assertion, status which offers rewards for knowledge and altruistic behavior as well as height and strength.

Any such quantum of change, of course, presumes that global institutions and alliances can be formed which re-integrate man with nature without sacrificing diversity and freedom. This is not a prescription for global free-market capitalism and surely not for collectivism but perhaps for something new --born out of self-interest but sustained by cooperation and shared values. Can this happen? As Steven Pinker reminds us:

"[H]istory has seen terrible blights disappear permanently, sometimes only after years of bloodshed, sometimes as if in a puff of smoke. Slavery, harem-holding despots, colonial conquest, blood feuds, women as property, institutionalized racism and anti-Semitism, child labor, apartheid, fascism, Stalinism, Leninism and war have vanished from expanses of the world that had them for decades, centuries or millennia."⁴⁰

Fortunately, our genetic legacy has left us not only with demonic promptings from the distant past but with burning intelligence as well. In away the

"great human brain is nature's most frightening product. But it is simultaneously nature's best, most hopeful gift. If we are cursed with a demonic male temperament and a Machiavellian capacity to express it, we are also blessed with an intelligence that can, through the acquisition of wisdom, draw us away from the 5-million year stain of our ape past...wisdom represents the capacity to leave the island of our own selves and to move out across the sea. ..to consider outcomes distantly, for ourselves and our children and the children of our children..."⁴¹

References

1. Paraphrased from Robert Wright, The Moral Animal, Random House, 1995 at p.5. This paper is based primarily on readings from Wright's book and the following: Richard Wrangham and Dale Peterson, Demonic Males, Mariner Books, 1996; Steven Pinker, How the Mind Works, W.W. Norton & Company, Inc. 1997; Desmond Morris, The Naked Ape, Dell Publishing, Inc. , 1967; Chellis Glendinning, My Name is Chellis & I'm in Recovery from Western Civilization, Shambala Publications, Inc. 1994; Czikszentmihalyi, Flow The Psychology of Optimal Experience, Harper & Row Publishers, Inc. ,1990; Kirkpatrick E. Sale, Rebels Against the Future, Addison-Wesley Publishing Company, 1996. The new Darwinian View has not been wholly accepted. British theorist, Richard Dawkins is perhaps the foremost proponent. Harvard zoologist, Stephen Jay Gould takes a strong opposing view. The Selfish Gene, Oxford University Press, 1976 is Dawkins' principal work. For reference, each work will be referred to by author and page number.
2. This has become known as "Galton's Error" after Charles Darwin's cousin, the biological determinist, Francis Galton.
3. Glendinning, at p. 14.
4. Wright, at p. 37.
5. Wrangham & Peterson, at p. 42. The separation from our common ancestor at 5 million years turned over conventional theory that set that point at 10-15 million years, a period shrouded in mystery without a good fossil record. The theory became accepted in 1984.
6. Wrangham & Peterson, at pp. 46-47.
7. Wrangham & Peterson, at pp. 39-43, referring particularly to the work of Charles Sibley and Jon Ahlquist. The gorilla separated from the line some fifteen million years ago and man only five million years ago.
8. Wrangham & Peterson, at p. 52.
9. "The Pima Paradox," The New Yorker, February 2, 1998 at p. 44.

10. But retained certain residual features such as the mobile shoulder joint, Wrangham & Peterson, at p. 228.
11. On our timeline this is one foot or about three hundred generations.
12. Morris, at pp. 55-56.
13. Pinker, at p. 21.
14. Wright, at p. 37
15. Wright, at p. 50.
16. Lord Beaverbrook is reputed to have said "Buy old masters. They fetch a much better price than old mistresses."
17. Wright, at p. 67.
18. Wright, at p. 29.
19. Steven Pinker, The New Yorker, February 9, 1998, at p. 30. Maureen Dowd in The New York Times (reprinted in The Plain Dealer, April 27, 1998, at p.7B) quoted a guest on MSNBC as proposing a Viagra jingle: "Take the pill and be like Bill."
20. Pinker, at pp. 470-471.
21. Pinker tells us that big men are preferred in a variety of ways in modern society. "In the United States, taller men are hired more, are promoted more, earn more (\$600. per inch in annual salary), and are elected president more: the taller candidate won 20 of the 24 elections between 1904 and 1996." Pinker, at pp. 475-476. This recalls Spencer Neth's paper on therapies for increasing height in children.
22. Wrangham & Peterson, at p. 22.
23. Wrangham & Peterson, at p. 113.
24. Wrangham & Peterson, at p. 125.
25. Quoted in Maureen Dowd's column, The Plain Dealer, April 2, 1998.
26. Wrangham & Peterson, at pp. 204-205.

27. Steven Pinker tells us that, in a 1993 New York Times interview, the Dalai Lama, the 1989 winner of the Nobel Peace Prize:--said that" as a boy he loved war toys, especially his air rifle. As an adult, he relaxes by looking at battlefield photographs...Like guys everywhere; he enjoys pictures of military hardware." Pinker, at pp. 519-520.
28. Michael S. 8erlinger "Environmentalists Pose the Greatest Danger", The Plain Dealer , April 22, 1998, at p. 118.
29. Jedediah S. Purdy, from the March-April 1998 issue of American Prospect Magazine.
30. Nicholas Wade, The New York Times, referring to the "Hayflick Limitation" on the number of times a cell can divide before it dies. (Date unknown; clip attached to the original of this paper).
31. The New Yorker, October 20- October 27, 1997, at p. 222. (I note in this regard the implicit acceptance of the view that work in the future will not occupy humanity nearly as much as it has in the past, a thesis supported by Nat Cooke's paper "Poverty Sucks.")
32. Glendinning, at p. 18-19.
33. The romantic notion of the "noble savage" has been very much under attack. With reference to Margaret Mead, see Pinker at pp. 426-427; Wright, at pp.75-77.
34. Czikszentmihalyi, p. 229.
35. Czikszentmihalyi, at pp. 229-230.
36. Czikszentmihalyi, at p. 240.
37. Ibid.
38. The New York Times April 15, 1998, at p. 27.
39. Mike Barnicle, The Plain Dealer, April 22, 1998, at p. 11B, quoting David McCulloch. People still prefer the "hard copy," the look and feel of the book itself. The New York Times on the Web for April 1 8, 1998 describes the "Last Book" --one that includes all others now being developed by the Media Lab.
40. Pinker, at p. 518.
41. Wrangham & Peterson, at p. 258.