The Evolution of Ethics

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An Introduction to Cybernetic Ethics

Erik Bromberg

Dedicated to my father Erik I. Bromberg
who taught me how to reason.

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Preface

*T*he *Evolution of Ethics* constructs a conceptual bridge between biology and human behavior. This is accomplished by examining the cultural and biological feedback systems that inspire the evolution of social rules. In theory, a cybernetic process is at the heart of developing ethical systems. This process occurs when biology and culture collide. The resulting conflict acts as a form of "informational feedback," telling people that there are serious problems that need to be resolved.

Conflict inspires human adaptation in a way that could extend the survival of the species. In this sense, the evolution of ethical systems is a response to the drive of the human species to survive. Additionally, a whole array of related, "rule systems," such as statutory laws, professional codes, customs, and even the rules of etiquette evolve to advance human adaptation. Ethical systems are reasoned rules of conduct that are based on past experience, whereas moral laws (informally known) evolve over centuries of time and are many times influenced and expressed by human emotions.

Science and Cybernetic Ethics

Evolutionary ethics is a relatively new idea in philosophy. Some say evolutionary ethics is not at all possible. But the reason traditional philosophy is unable to resolve many issues of logic and reason is because ethics is conceived to be an idea of the mind and not something that is real in the physical world. Cybernetic ethics and a new type of evolutionary ethics are used here. Reasoning is based upon experience, observation and analysis not an idea of the mind. Ethical theory is at times obscure but even so it produces a new understanding of ethics as evidenced in the last chapter on the "The Practical Application of Evolutionary Ethics". There you will see two examples which outline the solutions to two centuries old philosophical puzzles. These ideas are not trite. They represent an important milestone in the advancement of philosophical thinking. In one example there is the problem of first principles of ethics coexisting with the observable moral relativity that exists between geographical areas. How do the two moral ideas coexist in the same breath? The second philosophical puzzle that is brought to light is that of the fact that for centuries philosophers have been unable to determine whether an act of rape is morally right or wrong. One might think there is something missing in the philosopher's logic for this to be true, but the new evolutionary ethics gives us an answer.

The book is slow to define the word cybernetic. But you must read the first half of the book to fully understand

the definition. Parts of the Preface are difficult to read but throughout the book it is shown how cybernetic science merges with ethical theory.

More correctly spoken cybernetic science merges with "the evolution of moral and ethical systems." to produce a new form of evolutionary ethics.

Cybernetic ethics is a merging of science with ethics. This book presents a persuasive theory describing how ethics can (and should) be linked to science and mathematics. Here, there are objective moral standards that can be derived from the consequences of human actions. The evolution of ethical systems is shown as an "adaptation." Humans adapt to survive, and they do so by creating standards and rules of behavior to stop vicious cycles of pain, suffering, and death. The more organized and efficient human activities become, the more certain the survival of the species becomes. The science of cybernetics best describes this process. Mathematician Norbert Wiener first developed cybernetic science in 1947.

In an evolutionary context, cybernetics means "informational feedback in dynamic systems" (such as a social system) that sustains or redirects behaviors. Cybernetic ethics as a fully developed science is expressed almost totally in the language of mathematics. This form of *statistical cybernetics* would employ statistics, cybernetics, and a science of human emotion to explain the evolution of ethical systems.

When the subject of ethics arises, reasonable people often ask, "Who's to say what is right or wrong?" When ethical

development is viewed as a science, it is not so much who's to say an action is morally right or wrong, but rather, "What's to say an action is right or wrong?" The "what" is defined by inherent physical and psychological limitations within personal circumstances that make it impractical or imprudent to pursue certain behaviors, attitudes, or methods of reasoning. There are reasons why ethical systems evolve.

A major theme of this book is the integration of science and ethics. A few philosophers would think this task impossible. Evolutionary ethics is in its infancy, and at its core is evolution. Evolution is facilitated by adaptation, which is, in turn, moved by systemic feedback. Feedback is a cybernetic phenomenon usually discussed in purely mathematical terms. Evolution, adaptation, and feedback are all scientific; thus, one might assume that evolutionary ethics would bear some relation to science. Evolution is a dynamic phenomenon; the meta-ethical logic of philosophers is static. Morality is a dynamic phenomenon that evolves within societies, and static words of logic fall short of describing it adequately.

The first four chapters describe how systemic feedback arises in a culture. The focus here is on feedback. Not only does the book discuss feedback in an evolutionary ethics context but also in a cybernetic ethics context. In theory, cybernetic ethics is a math-based science that examines informational feedback in human systems.

In the first chapter, "The Evolution of Ethics," morality is seen being shaped by human pain, suffering, and death. Actions

bring consequences, and pain, suffering, and death act as systemic feedback, indicating to society that something is wrong and needs to be fixed. By contrast, human beings generally seek to maximize peace, prosperity, and productivity and to avoid pain, suffering, and death. In other words, society tends to change its behaviors and attitudes when afflicted by pain, suffering, and death; this is called adaptation. Quantification of feedback is theoretically possible in cybernetic ethics. The next chapter "Evolutionary Process" talks about social fission. The chapter on "Seminal Social Catalysts" shows how the evolutionary process is amplified. The next chapter is "The Evolution of Reason." "Mathematical Concepts Implied in the Evolution of Ethical System" and "Cybernetic Ethics" introduce the idea of cybernetics. The next three chapters have been superseded by "Charting Human Behavior," "Visceral Morality," and "The Philosophical Implications of Cybernetic Ethics." "Charting Human Emotion" is a theoretical piece that expands upon the idea of systemic feedback, introducing the concept of a societal memory. One can see this idea at work in the moral view of alcohol consumption. Memories of the effects of alcohol on human beings go back hundreds, if not thousands of years, shaping the prevailing moral view of alcohol. "The Practical Application of Evolutionary Ethics to Theoretical Problems" is the last chapter.

"Visceral Morality," another facet of a theoretical moral science, is an interesting chapter. Here, visceral responses are seen as indicators of moral knowledge. These responses are

categorized in terms of reactivity. Reactivity relates to the intensity of a response to environmental stimuli. In theory, reactivity can be mathematically quantified. Five levels of emotional reactivity are cited.

"The Philosophical Implications of Cybernetic Ethics" is next which revisits systemic feedback. It is the first time the subjects of science and evolution are raised. Here, linguistic concepts find fault with the use of moral words, such as good, which meta-ethical logic deems indefinable. To the philosopher, good derives from logic, but experience says otherwise. The notion of good was preceded by the experience of it in the evolution of a language. Morality and ethics also have evolved from human experience. "Practical Aspects of Evolutionary Ethics" is the last chapter.

Philosophers have issues with the legitimacy of evolutionary ethics. They obstruct any meaningful progress on the subject with the is/ought dichotomy and the naturalistic fallacy. Here, one cannot logically move from "what is" to "what ought to be." However, logic is not reason; they produce different results. If "what is," is drinking alcohol and driving, and what you "ought to do" is not drive because a hundred years of traffic statistics say it's dangerous, then you have violated the principal of the is/ought dichotomy. The static logic of the philosopher says one thing, and the dynamics of driving intoxicated say something else.

There may not be much to say about cybernetic ethics at this juncture. Nevertheless, with time and some investment of

energy by cybernetic mathematicians, the concept can evolve into a science.

Morality and ethics are an extension of biology and shows itself in the evolution of ethical systems to make human existence more stable and survivable. Living systems of all descriptions have evolved both cooperatively and competitively for more than a billion years. Since biological systems have been intertwined for so long, a change in one system can cause a change in many others. In theory, these changes disperse through the environment like waves generated by an object hitting the surface of a quiet pond.

Biological interrelatedness extends to human social systems as well, thereby imposing limits upon what people can reasonably do. Human beings are not at liberty to do as they wish because personal actions often inspire consequent reactions and sometimes overreactions that need regulating by way of laws and morals. This regulation affects individuals as well as large groups. An example of this might be seen in the careless use of fluorocarbons that thin the ozone layer, allowing harmful radiation to reach the earth and threaten the survival of all humans and organisms. Such a dangerous situation forces humans to choose between doing what they freely wish to do (risking pain, suffering, and death in the process) or setting limits on their behavior. The demonstrable effects of pollutants on people appears to force the formation of laws and enlightened moral attitudes that discourage the practice of releasing dangerous chemicals into the atmosphere. These kinds of laws cannot be said to have emerged from some

abstract philosophical theory of right and wrong. Instead, they appear to have evolved from real life situations in which human beings are forced to adapt to threatening circumstances in order to maintain their health and quality of life.

Morality is sometimes viewed in a negative context because it is associated with self-serving political and religious causes. In spite of this fact, the imposition of rules in the main does not lower the quality of human life. To the contrary, carefully laid out rules have the greater potential to improve its quality. Broadly imposing guidelines through the promotion of statutory laws as well as moral, manner, and customary rule systems, redirects social priorities in an efficient way. In turn, there is an increase in societal organization and efficiency that enhances cultural peace, prosperity, and productivity. Social evolution in this light acts as an extension of the same biological processes observed in lower organisms where it appears that tight hierarchical organization and efficient survival strategies further the life of many types of organisms.

In theory, nature provides human beings with the means to motivate themselves and create great things by giving them passion and sensitivity. At the same time, it appears to endow them with an extraordinary intelligence to limit the excesses of their emotions. Unfortunately, while people strive to be rational, their actions are still governed by strong emotions. When they respond to emotions that are a derivative of physiology, behavioral excesses inspiring a host of problems manifest themselves.

When emotions run high, there needs to be some mechanism present to keep passions from getting out of hand and causing harm to people or the societies they have spent so many years building. In much the same way that circuit breakers in a house prevent an overloaded circuit from melting the wires and causing a fire, moral restraints naturally arise and intervene as reasons (or a reason) to break up the vicious circles of conflict that passions can produce. The emergence of moral laws and sentiments, shaping the course of history, is therefore an extension of human physiology that stabilizes relationships so that people grow and prosper instead of conflicting to the point of extinction.

Introduction

This book develops the idea that there is a rational basis for the existence of ethics. Such an approach is daunting because the idea of reason or rational causes at work in the formation of ethics has been seriously challenged since the eighteenth century Enlightenment. However, there have been developments in biology and cybernetics that lead to a comprehensive theory of morality in which the rational nature of ethics can more easily be explained. Not only can the rise of ethical systems be linked to biological concepts, but ethics can be tied to mathematical concepts as well by way of cybernetic science. When ethics and cybernetics are combined, the resulting theory turns on scientific principles instead of philosophical speculations.

There are several important ideas linked to the emergence of ethical systems: first, that ethical systems evolve in response to the human need to survive in an environment where they are competing with many other organisms for scarce resources; second, that humans survive and flourish by efficiently using

their resources and energies; and third, that the evolution of ethical systems is a function of an ongoing cybernetic process involving all humans, animals, and organisms.

Human experiences accumulate as a reservoir of knowledge, which influences the societal perception of which behaviors benefits people and which act counterproductive to their health and welfare. When people deviate from behaviors that are known to be productive, feedback arises that affects their lives in both subtle and obvious ways. Thus, the way in which people write laws and attach moral significance to certain behaviors is linked to a cybernetic process that maximizes human survival, minimizes social conflicts, and increases the meaningfulness of the human experience.

Feedback that inspires change enhances the human ability to survive and to compete with other animals and organisms. This is important in the sense that some biologists believe that ninety-nine percent of all species that have ever existed are now extinct. In order to build a bridge between the biological world of organic struggles for survival and the moral world of right and wrong, a simplified explanation of the evolutionary process is presented. This is necessary to illustrate how survival inspires a cybernetic process leading to the rise of ethical systems. The resulting theory sounds similar to some of the ideas of Thomas Hobbes. Where the two systems differ greatly is that the evolution of ethical systems here is viewed as an extension of a biological process, grounded in cybernetic principles, whereas Hobbesian philosophy derives

from traditional ethical thinking touching on linguistic and meta-ethical aspects of reasoning.

What is important to note is how conflicts and potential conflicts act as a form of cybernetic feedback to society that alerts people to make changes in the way they behave. Feedback is an essential ingredient in evolutionary growth. Traffic laws vividly illustrate how the forces of human survival and the need for the synchronization of many parts work. While the ideas of individual philosophers are not discussed directly, their relevance is implicit in the writing. Biological perspectives likewise do not address biological theory directly on a technical level. Books such as *Living Systems*, by James Grier Miller; *The Selfish Gene,* by Richard Dawkins; and *Mankind Evolving,* by Theodosius Dobzhansky are more appropriate sources, in a field of many good books, for understanding biological phenomena. These three books illuminate the complexity of biological systems in a way that ultimately leads to ethical questions. For instance, the idea of incorporating the notion of organization and efficiency in ethical theory has its analog in Miller's living systems theory. Here it seems evident that successful organic strategies for survival have created extremely complex and efficient hierarchies of order in nature.

The principles governing the evolution and survival of lower organisms seem much the same as the forces driving the development of moral systems. Living systems theory invites the question that if organic systems are so incredibly diverse and complex, why would the nature of moral systems be any

different, suggesting that philosophical conundrums of the past regarding the nature of morality stem from underestimating the complexity of moral science.

In Richard Dawkins' writings there are illustrations of how pervasive the struggle for survival is. Such struggle involves not only humans but lower organisms, all competing with each other for scarce resources. Dawkins' ideas are important in realizing that humans, after all, still act involuntarily on a biological level. Like it or not, struggles manifest in elegant and concealed forms have endured and proliferated to this day in human societies. Both Miller's and Dawkins' writings lend visual texture to the sense of complex systems uniting in cooperative strategies to further their mutual survival. The rise of ethical systems in this sense is a cooperative effort of humanity that has the effect of optimizing its energies and resources in an ever increasing dynamic of survival guided by cybernetic principles.

Dobzhansky's work is crucial to understanding how human beings adapt to a hostile environment by changing the way their cultures are structured. The idea that human culture is an instrument of biological adaptation is central to perceiving how Dobzhansky, and those who followed him, were perhaps unknowingly the first to establish credible bridge points linking ethics with biology.

The Evolution of Ethics

A goal implicit in human evolution is survival; thus, humanity directs some of its energy toward creating a state of peace to achieve the necessary efficiency and conservation of energy to survive in a hostile and sometimes unpredictable world.

*T*he foundation of the emergence of rule systems is built upon centuries of reasoned insight and personal experiences that reveal which actions are better than others, which are productive, and which are disruptive and should be avoided. As efficient actions reveal themselves to an evolving society, its people develop the means to make productive choices between one type of action and another. Some choices are decidedly better than others. This prioritizing of human actions into efficient hierarchies establishes the foundations of rule systems which later refine themselves into more sophisticated systems of morals, manners and statutory laws. All these systems have a tendency to address the fundamental need of the human species to survive and avoid the common fate of extinction by conserving energy and directing social attention towards more productive kinds of behavior. It could be said that as

civilization approaches the ideal of efficiency, the harmony that follows from efficient and thoughtful actions inspires a state of peace that exponentially increases the chances of human civilization surviving over long periods of time.

Social change has more or less followed the more reasoned logic and experiences of people. Change is not always perfect. However, as people experience more and learn more about their world through formal education, they have more resources by which they can make judgments about the behavior of their fellow humans. Knowledge of the past lends to enlightened minds a knowledge of the future. Common education and experiences inspire the emergence of informal belief systems, clarifying what appears to be acceptable behavior and what is not. Observations that endure centuries of reasoned scrutiny integrate ultimately into the cultural ethic.

As a rule of thumb, an action that contributes to the disorganization of society is often considered "wrong" and that which contributes to the organization of society "right." Behaviors that corrupt the peace, prosperity, and productivity of a society are generally discouraged as "wrong," in favor of behaviors which contribute to the well-being of the society and are generally considered "right." In any event, the evolution of rules in complex societies addresses the fundamental impulse of the human species to survive in a world of competing biological systems.

Ethical systems and formal laws together serve to bring order to a world that tends to become disorganized and

sometimes violent if ethical views and rules of conduct are not established. Ethical systems that emerge for any given period of historical development may not represent the finest of rules ever conceived, but they are sufficient to hold the growth of humanity in the balance.

Along with the emergence of good rules have evolved many others that were bad. These bad rules evolved from errors, delusions, and self-interest. But over time the good rules that incorporated a keen insight into human relationships have likely endured and have slowly grown into a reasonably consistent set of rules. These rules today are expressed formally and informally in systems of laws, morals, manners, and customs.

Rules spontaneously evolve in every social system, whether it is a group of small-time criminals or highly educated people in a multinational corporation. Rule systems evolve along the lines of an efficiency algorithm that effectively organizes the prevailing state of affairs in small increments of change over long periods of social time. In the beginning of the formation of social systems, rules may not have been as refined as they are today. But rules necessarily existed from the beginning simply to keep volatile passions, immaturity, ignorance, and misunderstanding from inspiring endless fighting and slaughtering of human beings.

Written laws, morals, manners, and customs help synchronize the various parts of an increasingly complex society. Developments in higher education, technology, national politics, or even from natural phenomena, such as extremes in the

weather, all affect the destiny of humankind. Some people are slow to see changes in the world, while others are quick. As a result, people's lives operate at different speeds. Moral and legal systems help sustain order in a society where people operate at different levels of sensitivity, understanding, and speed of thinking. Rule systems, on the whole, concern the evolution of sensibility rather than insensibility and self-interest.

Rule systems are not always the result of one person or party imposing dogmatic prescriptions of behavior on another. They evolve because they are inherently sensible reflections of the natural order. The capacity of a tiger to kill and maim other animals, for example, is part of the natural order. Wishing tigers away will not make the danger disappear. Natural order bestows a power upon tigers, which like other powerful things or people in the world should be dealt with prudently. The ability of a tiger to inflict harm is not subject to opinion or political perspective; it is a "reasonably" known fact. Not all facts are deduced by time-consuming laboratory experimentation. Some are learned over centuries of time through the experiences of people who, in this instance, have tangled with tigers and learned their power to inflict pain, suffering, and death.

Systems of morals and manners are inherently sensible perspectives of what constitutes prudent behavior in a dangerous and sometimes unpredictable world. Prudence is an aspect of sensibility. The history of the evolution of ethics is essentially the history of sensibility and intelligence coming to life. To move toward the ethical and legal is to move away from the

primitive. There is a dynamic relationship between the evolution of rules, concern for human survival, and the need for increasing systemic efficiency. The evolution of ethical systems is a natural result of this relationship. Efficient biological systems are likely to survive where inefficient ones do not. Organization follows efficient action.

If the theory of natural selection holds true, it is likely that one of the mechanisms that determines extinction or survival is an organism's ability to use its energies efficiently. The ways in which human beings or organisms struggle to survive profoundly affect the way they behave. If order and efficiency in a biological system truly enhances its chances of survival, then the system will encourage the evolution of rules to make existence more orderly. By this thesis it could be said that, as the construction of human society approaches the ideal of efficiency by the promotion of societal peace through thoughtful lawmaking, the chances of human civilization surviving extremely long periods of time, increase exponentially in biological terms.

It would be difficult to separate the biological evolution of humans from the evolution of the rule systems they create to define order. Human beings are a part of nature. They are subject to the influences of genetic development that have been in the works for perhaps billions of years. At certain points, evolutionary ethics moves from talking about concerns of survival at the human level to concerns of survival at the genetic level. This is a gray area, and one that evolutionary

biologists perhaps need to sort out. What is important, however, is that many behaviors arising from human struggles find their analogs in genetic and cellular activity. Clues explaining human behavior may run deep in the species.

Over centuries the construction of social rule systems (formal laws, customs, manners) may result from credible and accurate observation rather than self-serving beliefs defining what is real and true about human nature. For instance, if people observe the destructive effects of alcoholism, the accuracy of such observation over centuries will eventually overcome the most hardened of self-serving beliefs to the contrary. From such observations, attitudes and laws will likely follow. There is chemistry evident in social life that allows certain things to occur and other things to be prevented, if there is a way of preventing them. For example, there has been a natural progression of laws that prohibit an intoxicated person from driving an automobile. After decades of experience, people can fairly accurately guess what will happen when people drink and drive. That intoxicants are destructive is no longer considered to be merely a belief. Some moral values, therefore, derive from physiological facts. Over centuries of time, facts concerning generative or degenerative behaviors invariably lead to the creation of values. To a degree, values evolve as a consistent response to persistent social problems. In this respect, biological principles lie at the root of ethics. The accumulation of facts and observations leads to the construction of values to enhance systemic efficiency and the ability of individuals,

as well as the entire species, to survive. While values may vary from culture to culture, the principles of biology affecting human behavior that contribute to the evolution of value systems remain the same.

Sound empirical knowledge implied in portions of ethical systems is sometimes difficult to distinguish from self-serving beliefs, delusions, and unexamined opinions. Since ethical systems are complex, few want to take the time to examine their logic. It is easier to believe that rules are merely opinions; thus, people never have to accept the discipline of any rule set. They are morally free by their own ignorance to do whatever they want. Since laws are believed to be opinions, or an extension of an authoritarian state, the prohibition against drinking and driving restricts their actions only as far as the legal sanctions intimidate people into conforming to the proper use of alcohol and automobiles. Because the idea that excessive alcohol consumption is wrong (for good reasons) is not understood, laws and values must force a spirit of compliance on those who seek the protection of ignorance to maximize their moral freedom.

Ethical prescriptions many times represent a statistical accumulation of facts and observations that have been gathered over centuries and appear to point to some inherent truth (e.g., that excessive consumption of alcohol injures the health of a person and disrupts the lives of those around them). A much different form of moralism might be the view that "patience is a virtue." This view is not simply some off-the-wall belief of

personal propriety; rather it derives from mature observations concerning behaviors that help people navigate the stresses of life without an overreaction to their circumstances that would be counterproductive to their attempts to realize their ambitions. Clear, concise, and reproducible observations about human conduct are generally expressions of wisdom rather than of opinion. While there are elements of belief present in almost all ethical systems, it is their fundamental wisdom that shines through the generations. As a civilization grows, it archives its wisdom in many ways. In more ancient times, myth and religion served to archive the essential nature and wisdom of humankind. Literature has carried some of this essential knowledge. In more refined form, philosophy has dealt with the essentials of wisdom, but few can understand the complexity and rigor of its language. The larger portion of proven and practical knowledge to guide our behavior is known through our legal system, morals, manners, and customs.

When a civilization blossoms, a wide spectrum of ethical views, customs, and laws evolves. Ethical systems can vary greatly. Some are better than others at fostering the growth of a culture. Some become so corrupted with self-serving intentions that they must be rebuilt. There is a natural tendency of biological units to become compartmentalized. In a similar way, different ethical systems may evolve and become compartments in a larger system. Ships are built so that the many areas in them are divided into watertight compartments. In this way if one area of the ship is damaged and water begins to pour in, then the damaged area

can be isolated and sealed off so the entire ship does not sink. The evolution of the human species appears to operate along similar lines. Compartmentalization of societies makes sense. If one legal or ethical system leads to the destruction of a nation, the entire world does not suffer. The inherent efficiency in natural design lends itself to a multipurpose design in systems. Not only does compartmentalization keep a world that is operated by only one standard ethic from being destroyed by some opportunistic manipulation of the system, it also allows for the natural diversity of local customs and genetic differences to be accommodated in "culturally friendly" ethical systems. People have choices in how they will decorate their lives by adopting a variety of value, ethical, and social systems.

The evolutionary process operates on a grand scale. It is somewhat analogous to a laboratory experiment, operating on an enormous scale, in which new ideas and methods are constantly applied. Sometimes the experiments lead to counterproductive results. However, the mishaps do not spread, because their effects are limited by compartmentalization. Compartmentalizing civilization is essential to its ultimate survival, as is the creative exploration of new systems. In time, an uncreative system, whether it is a cell in a plant or a human society, will be overcome by more vital systems that more creatively adapt to the ever-changing demands of the environment.

The evolution of efficient rule systems may be crucial in maximizing the possibility of survival and minimizing

the possibility of extinction. By this thesis, the development of rules could further assist natural selection at all levels of human development: it could be an isolating mechanism that keeps people who can follow rules from genetically mingling with people who are unable to follow them. Organisms, and the environment that produces them, necessarily must be symbionts if either is to maximize its chances of survival. At the human level, an ability to follow rules satisfies the debt of giving to the environment (the social environment). In response the environment bestows greater opportunities on cooperative people than on uncooperative rule violators. A natural separation occurs between the two (cooperative and uncooperative people), further enhanced by the isolating effects of value and moral systems warning a society's members of the problems of dealing with uncooperative people. Natural selection likely favors cooperative elements in nature rather than uncooperative elements. Nature does not provide a single system of rules, but rather a wide spectrum of rule systems that the human species can follow and thus benefit from the natural system's efficiencies. Which ethical system is best is less important than which system isolates cooperative from uncooperative elements to maximize systemic efficiency.

Rules represent the minimum standards of conduct necessary for a person to act cooperatively with a society that is a heterogeneity of widely different people. The presence of rule sets helps clarify in a society who is cooperative and who is acting in counterproductive ways toward the goals, intents,

and energies of the society. The evolution of ethical systems is an integral part of social growth. Formal and informal rule systems promote systemic efficiency by maximizing the system's social power; they minimize conflicts by developing laws to the point that peace and prosperity grow incrementally. Social problems that have been repeatedly met and overcome become "behavioral information" recorded in the sentiments of the various moral systems that spontaneously emerge. If an individual, society, or civilization must repeatedly relearn the lessons of the past, that ignorance becomes parasitic on the energies of the person, society, or civilization. A biological system whether it comprises genes, bacteria, animals or humans that acts in inefficient ways places itself at a strategic disadvantage. Social problems lead to conflicts that distract from the orderly growth of civilization and are a waste of vital social energies. A society that invests more in creatively building a future instead of sustaining conflicts of the past will probably outperform its competitors.

If a society is to conserve energy, it must develop some method of distinguishing wasteful activities from productive ones. It must remember which elements in its past are associated with conditions that gave rise to conflicts. Remembering what works, and what does not, is recorded in a society's formal laws, customs, manners, ethical systems, and literature.

The simple idea of good and bad would naturally arise in the consciousness of even the most primitive society. A "good choice" would be avoiding behaviors that demonstrably lead to

conflict and a "bad choice" would be a decision that ignores the dangers inherent in certain behaviors. The idea of refraining from kicking a tiger has an Aristotelian quality to it: first, it is a practical idea; second, it is definitely a productive idea because it leads to a longer life; and third, it is theoretically the best way for everyone to live the longest life in the presence of tigers. The tiger is a metaphor for human nature. A human analog might be that if you are a one hundred and thirty pound professor, it is probably a bad idea to make romantic overtures toward the girlfriend of a two hundred and thirty pound drug dealer on a dark street. Certain conditions invite certain dangers. There are various formal and informal ways a civilization teaches people such things.

What people value profoundly affects the way they define their world and make laws. Every person values something. People value their health, their families, their possessions and their careers. The things that people value most are their lives and the lives of their friends and their families. Survival is a cardinal value in an extensive hierarchy of values. If people value their careers more than their lives, they are thought to have misplaced their priorities. If one's hedonistic pursuit of sexual pleasures carries with it the high possibility of disease and death, again society might think such a person had misplaced his or her priorities. To comment on this possibility is to express a sense of morality that comes from prudent thinking. Drugs, alcohol, gambling, are activities that have repeatedly caused people to temporarily misplace their priorities. Rule systems

help keep people in their "right mind" instead of going "out of their minds" through excess. People who are repeatedly "out of their minds" have less chance of surviving and surviving well than people who remain true to their original personality. Some behaviors corrupt the efficiency and social compatibility of people more than other behaviors. Some part of the evolution of ethical systems monitors the growth of potentially harmful behaviors and looks for methods to suppress them.

Rules help to reign in human passion as progress demands finer and finer delineations of labor, resources, and authority. The visceral compulsions of humans to survive rather than perish commands intelligent people to try to hold their society together and to keep people and their passions from tearing it apart. Survival places an imperative to be sensible enough to stay above the threshold of extinction as a species. This evolutionary process inspires finer and finer details of order, and is first evident in the moral senses of reasonable people who push for better rules to keep society orderly. To do this they must look from past experience into the future.

As a civilization grows larger its complexity increases to the point that a small disruption in a crucial aspect of society can have enormous consequences on the stability of the entire system. As a social system becomes more dynamic, it takes on more energy. But to stay energized it must be a coordinated system wherein each of its parts synchronize well. While emergent ethical systems may not hold legal sway, they do help coordinate people and institutions. They can work at

higher and higher speeds and produce more in a shorter time. As the coordination and speed of a society increases, the resultant efficiency begets an increase in its production and the reliability of its products.

When a system becomes reliable it is less apt to break down under the stress of aggression from another system or a natural disaster. Coordination reduces conflicts and increases the general sense of prosperity. But as coordination increases along with production, communications, and societal energy, so does the risk that interpersonal conflicts will inspire a breakdown of a civilization. The emergence of ethical systems is a naturally occurring, rapid response to social upheaval. Civilization is humankind's most sophisticated device. It works best when it is well regulated and finely tuned to all aspects of interpersonal relationships.

The Evolutionary Process

As education and intellect become more refined, greater order emerges. Evolution is not always planned; sometimes it seeps in where self-interest is asleep.

Social Fission

*S*peculating on how early tribes and societies produced rule systems could probably be better described by historians, but for the purposes of establishing a first approximation of how ethics has evolved from the dawn of civilization until the present, a very general overview will suffice.

Human beings express a wide range of timeless emotions: passion, rage, grief, love, and compassion, to name a few. To this day, people are born immature, uneducated, and inexperienced. Some are intelligent, others slow to learn, some emotionally stable, and some prone to rage. Some individuals mature faster than others, some can understand complex relationships, and others have great difficulty understanding the simplest of things. Given the wide diversity of individual talent and emotional sensitivities, conflicts are inevitable. If conflicts dominate

societal attention, vital energies are drained from the creative growth of a society. Constant conflict impoverishes any society.

At some point, incessant conflict within a species will threaten its survival. Thus, some regulating systems will arise. Actions inspire reactions that in a primitive environment may be overreactions. Thus, certain delaying mechanisms must buffer emotions and the effects of their excesses. Manners, customs, protocol, and decorum help regulate relationships among people and curb impulsive behavior.

The anarchy that would arise from the chemistry of a group of primitive intellects and emotions in the first moments of building a society would produce certain results. The emotional excesses and predatory habits of people who were not fully reasoning individuals would predictably start conflicts. After repeated conflicts of a similar kind, the nature of conflict might suddenly shift. In some instances, more organization might emerge.

As more people began to move into closer proximity to one another, their untempered emotions would create excesses and overreactions. As the number of overreactions increased, and tempers began to elevate, stress would begin to affect everyone. Given enough stress, some individuals would imagine hostilities where none existed. Mistakes of judgment would proliferate and afflict the society with an exponentially increasing number of reasons to engage in conflict. With an increase in conflict people would begin to yearn for a resolution and for a return to a state of equilibrium. There would be no way to stop the

conflicts from intensifying until some benchmark catalysis occurred, since in earliest times no prehistory would have been known that could guide society's actions. Conflict in society would heat up like a nuclear chain reaction. A catalysis would illuminate the source of the conflict and would produce a new rule or attitude to prevent a similar conflict from recurring. Social fission, like nuclear fission, can be initiated under certain conditions. Honest misunderstandings are one condition that can lead to tragic conflict. Systems of etiquette are an example of how rules help minimize misunderstandings by regulating social intercourse through prescriptions of decorum and protocol.

Social fission could be defined in the following way: as the number of people increases in a given area, there is a tendency for those people to establish strong and meaningful relationships that draw individuals residing on the periphery into the midst of a society formulating itself. As the depth and richness of life's experience unfolds in the socializing process, a fascinating tapestry of civilization begins to weave itself. This tapestry becomes the nectar of civilization subtly moving men and women to become dynamically involved. However, a countervailing force, slowing the socializing process, simultaneously evolves from the clashes of human emotions, immaturity, and misunderstanding of a society that does not yet know how to be social. On one hand, people would begin to savor the benefits of being together; on the other hand, they would not know exactly how to be together without getting into conflicts.

Social fission spontaneously follows from the nature of emotions. When resources are scarce, and the closer that primitive emotions come to other primitive emotions, the greater the number of conflicts there will be. Each conflict will inspire more conflicts. Overreactions would create an atmosphere of chaos. For instance, suppose a person's dog bites another person. The second person kicks the dog. The owner of the dog has noticed the kicking but not the biting. The owner hits the bitten person, whose kin happen to be watching. Consequently, tensions rise to the point that several people are killed. It is doubtful that a sensible person observing this would believe that kicking a dog in defense of one's life warrants the tit-for-tat killing of several people. Senseless killing such as this sometimes inspires a grief that raises the consciousness of people, making them aware of the harmful actions they propose to undertake. It could be said, then, that a catalysis of events in a major conflict gives rise to new quanta of social organization.

Conflict catalyses repeatedly occur as the society defines finer and finer details of organization. Social, legal, and moral contracts evolve out of these catalyses. There is something threatening to the whole society, and its ultimate survival, if it finds itself being killed off for little or no reason at all. Grief intensifies the perception of insensibility loose in the world. It is a primitive emotion, yet it can move people toward a better way of organizing their world.

Seminal Social Catalysts

Divisions of Authority and Property

The first catalysts, likely some of the most intense, established formal and informal rules regarding property rights and sanctioned killing. From these seminal catalysts of an evolving ethical system, society likely grew with the speed of a newly inseminated egg. Because formal and informal rules and social contracts of behavior have evolved over so many thousands of years, it is difficult to comprehend the dynamics of ethical evolution in the classic sense of deontological and teleological ethics. The dynamics are difficult to understand, in part, simply because divisions of labor, property rights, authority, and duty create an intricate web of relationships, all of which a person must consciously acknowledge in order to navigate through society properly. With every passing year, these relationships become more numerous and refined. After thousands of years the web is so complex, in terms of the number of obligations that an ordinary person must satisfy, that it is nearly impossible for the average person to

understand why many obligations and ethical rules have come to be in the first place.

When divisions of labor are defined in finer and finer detail, and matters of property become more clearly demarcated, intricate systems of custom, protocol, and decorum emerge, which define a system of methods for transferring property, achieving rank, or satisfying obligations. The idea of property begins to extend itself to more and more abstract applications once the rudimentary idea of it is understood. The organization of the earliest ethical systems thus begins to accelerate, because "property" in the abstract means that when time and energy are given to another person, that time and energy must someday be repaid in some form. Obligations arise from the increasing complexity of society. People somehow learn to benefit from each other, and the ingenious bartering of their time and energies makes the creative process more efficient. When certain people default on their obligations because they believe it is profitable for them to do so those who meet their obligations eventually become aware of the cheating and force changes in the customs and laws. As centuries pass, various methods of cheating the social good for personal gain become known, and they are described, recorded, and stigmatized in emergent moral systems. Cooperative people develop strong attitudes called morals about those who are uncooperative and counterproductive to the efforts of the moral group (rule followers). Ethical rules evolve from persistent moral attitudes, which eventually influence the construction of

legal mandates that censure certain behaviors such as lying, stealing, fighting, and murder.

A harmonious and peaceful society does not emerge overnight, because people have emotions and intellectual deficiencies that interfere with their best intentions to build a peaceful world. The more people work on resolving these deficiencies, the more coordinated social actions become. History in a sense chronicles the process of learning and synchronizing.

The Evolution of Reason

The natural world gives human beings many reasons to undertake certain activities and avoid others. Some plants might be nourishing to eat, others quite deadly. Some large animals have the capacity to harm humans and are prudently avoided. Bones break under certain stresses, people bleed when cut and can die. Pain becomes a conscious "reason" to undertake certain activities or abstain from others altogether. Nature constantly reveals her many dangers to alert and conscious minds. A prudent person can easily observe the ability of plants and animals to inflict harm under certain conditions and from those observations make wise choices.

Not only do individual people want to avoid pain and suffering, they want their friends and family to avoid it as well. A primitive ethical system naturally evolves from the simple avoidance of pain, which has the added benefit of also promoting the longest life. When a rule system informally evolves in a society to assist choice-making, it is the beginning of an ethical system. People survive best when they

share information about the hazards of the natural world. If generations of people observe that kicking tigers is not a healthy undertaking, this fact becomes known in the behavioral wisdom that people share with each other.

Nature provides information about the capacity of its creatures to inflict pain, the capacity of plants and animals to poison as well as to nourish the body, and about the dangers of natural phenomena such as lightning, windstorms, high seas, and hurricanes. Human beings have evolved with eyes, ears, and an analytic mind. They have been given the tools to survive, if they choose to do so. A person has a choice to stand up in a hurricane or seek cover. Choosing between alternative actions is a part of the ethical building process. In the natural world individual actions inspire consequent reactions from the environment and from other people, sometimes in significant ways, and sometimes not. Societies remember important things through the construction of their value systems, moral systems, and laws.

Human existence can be very dangerous under certain circumstances. Take for example driving a car. Driving is dangerous under certain circumstances. If people run through red lights and stop signs, their lives will be at risk. Many people use the same roadways. Rules are established to allow multiple use of the highways. In the same way that we share highways, we sometimes share environmental space. In a primitive setting, where tigers and humans shared the same space, one of the rules of tolerable coexistence would have been to refrain from

provoking tigers. A better strategy would be to get out of the way altogether, in the same way a prudent person today would get out of the way of a truck barreling down a highway. Teaching successive generations such hazards is delegated to systems of knowledge taught through laws, customs, ethics, and manners. People are the products of biological growth in a natural setting. People do not emerge from a factory all identical. Organic systems tend to diversify in order to evolve. There is a diversity of laws and ethical systems, and this protects the larger portion of the systems from failure if there is a serious defect in any one system.

The danger of tigers is obvious, but as life becomes more complex, life-threatening dangers reveal themselves in subtler shades. Danger becomes more difficult to explain as it becomes more abstract. As a civilization develops, the growth of reasoning moves from the tangible toward the intangible, or abstract. The desire for peace is a more abstract reason to modify behavior than the desire to run away from a hungry tiger. In both instances, however, the goal is essentially the same, the avoidance of pain and the promotion of personal survival in a hostile world. If pain is known to be an immediate consequence of an action, there arises a "reason" in the conscious mind to avoid it most of the time.

People can live about a hundred years. In a hundred years of life it is impossible to experience everything and learn the subtleties of all the dangers in the natural and social world. If people perceive that cooperation diminishes pain and suffering,

"reasons" emerge to modify social behaviors to encourage cooperation instead of conflict. Early ethical systems were likely built on such perceptions. Since "reasons" were remembered in the cultural ethic, myth, and the like, people did not have to live a hundred years to learn many of the dangers of life.

In the beginning, formal or written laws prohibiting murder may not have existed, but certain environmental factors would have inhibited the practice. If there were no prohibitions against killing, the common perception might be that any person could kill any other person without any need to justify that action. In an environment where any person could kill another, then all individuals in that environment would be at risk. Since primitive man was most likely a creature of emotions and raw genetic expressions of behavior, considerable killing would have been evident in that early society. With no rules in place to restrict killing, life would have been experienced one tenuous moment at a time.

Kin would have close and meaningful bonds that would inhibit them from killing each other. But as civilization grew, many different families would be coming into closer proximity to one another. Intense relationships would not yet have been established so there would be no personal loss in killing a person of another family. If the killing could be done discreetly, without raising the suspicions of others, there would be no consequences. Everyone in the society would be party to the same rule of the jungle. In such an environment, stress would be high. Peace would be fragile and easily broken by the

untempered nature of human emotions to provoke conflict and start a vicious circle of killing and retribution. As strangers became more dependent on each other for survival, in the same way that close kin were, the killing of even strangers would begin to diminish the quality of life. There would be a natural tendency for a rule to emerge inhibiting the killing of strangers. More and more people would begin to realize the many mutually beneficial relationships that could be created through tolerance that would enhance the survival of all people. The world has perhaps evolved from kin consciousness, from there to tribal consciousness, and on to national and global consciousness.

There seem to be mechanisms in the design of human beings that prevent them from turning the full force of their predatory nature upon each other. In the beginning, people would have quickly torn each other apart if rules had not developed. Humans can sense meaning in higher forms of experience. That sense subtly influences how they behave over long periods of time. An increase in a spirit of give-and-take can demonstrably produce higher forms of cultural experience. Perhaps violence and killing gets boring and unexciting compared to other potentially enjoyable and safer undertakings. Like the first taste of some exotic food, higher forms of experience inspire a yearning in the hearts of men and women. People desire a knowledge of themselves to fill a void. There is a yearning to know where they have come from. Orderly socialization brings out that meaning

in greater detail. Thus there may be a tendency for higher forms of socialization to begin to subordinate more primitive ways in that epic search for meaning.

People do not ordinarily act totally without reason, and they have a natural tendency to seek reason to explain their world. Sense is many times evident in the feelings of people but is difficult to explain logically. If the restraint of primitive urges to kill and create mayhem make the environment a safer and more meaningful place to live, people will naturally encourage the evolution of more sophisticated behaviors. Yet the higher influences upon human actions are not strong forces; they are weak. However, a weak force persistently working on the thoughts and feelings of people over thousands of years can have a profound influence. Ethical rule systems evolved very slowly. They are corrupted, then refined and enhanced as each generation takes the controls of society while trying to bend their logic toward selfish interests. But, like a spring, the essential wisdom of rule systems returns distorted logic to sensibility.

At the dawn of civilization people were probably much more violent than they are today. Even then, there must have been behavioral inhibitors that prevented human beings' predatory nature from turning on itself instead of some other food source such as plants and animals. For instance, with no government to enforce rules, a contemporary person might imagine that primitive people could do anything they pleased, such as kill other people for the slightest advantage. However, behavioral inhibitors would make such behavior more difficult

than it might appear. Two things would immediately affect decision-making. First, primitive people had to concentrate intently on gathering enough food simply to survive. Second, any activity that had the potential to produce pain was likely avoided. A person might not be killed outright, but might be injured and suffer a slow death. This would act to prevent a person from simply walking up to another person and starting a fight. Again, the consequence of pain would informally formulate a rationale for appropriate behavior.

An early rule of the jungle perhaps began to take form as humans figured out a working relationship with their environment. A practical rule of thumb prescribing appropriate behavior may have been: "If you do not want to feel pain, you have to be careful not to be involved in conflicts that could hurt you." It would have been known that ordinarily placid individuals could suddenly be provoked into rage intense enough to kill another person. The highly unpredictable nature of a provoked person would change the balance of power in a social environment. Even though early humans may not have been highly educated, the difference between a rational and irrational person would show itself in bursts of destructive rage. Learning what circumstances might trigger rage in a person was probably one of the early learning experiences of human beings.

Many forms of rage probably erupted over the division of property. If a hunter killed an animal and another person tried to take the animal away, the anger felt by the hunter

would change the nature of his judgment concerning pain and injury to himself. The thief's life would hang in a precarious balance in the presence of an armed hunter whose emotions were powerfully charged. Except for a few thieves who were skilled fighters, the thief could not expect to survive very long stealing the prey of other hunters. "Unauthorized taking" in any generation would demonstrably provoke emotions. From repeated observation of human emotions, a cultural wisdom would naturally evolve confirming this phenomenon. Such knowledge could only add weight to the notion that stealing was morally wrong. As the moral knowledge of stealing built upon wizened observation other fine points of its wrongness would be revealed. For instance, unauthorized taking inspires indignation, but more importantly it brings to life irrationality, and irrationality is very frightening to people. When a fragile peace is established, people begin to enjoy life. Opportunities unfurl and greater prosperity can follow. But until rules are set in place to clearly define property, the same war of emotional outrage will be fought time and time again until people do something about defining property.

Billions of people have lived in this world over thousands of years. Their experiences and social experimentations have helped formulate and refine rule systems and sensible moral attitudes and beliefs. There is another incentive for people to formulate rules in addition to suppressing outright violence. It is inherently efficient for a society to adopt rules against unauthorized taking. People compete with each other for scarce

resources. Nations do the same. One of the most powerful strategies a nation or person can adopt is the optimization of energies and resources. For example, laws against theft free up energies that can be used elsewhere because people no longer need to concentrate on protecting their possessions every moment of the day. Those freed-up energies can easily lead to the development of advanced weapons or commercial skills. In earlier times stealing may have been more accepted than it is now, but over time the most socially productive attitude toward killing would have the upper hand in effecting a change in the laws.

The disruptive effects of emotions are not the only reason for rules curbing theft and killing. The freedom to kill at will is counterbalanced by a person's desire to enjoy meaningful relationships. Human beings all experience a degree of epistemic loneliness that makes it a pleasure to be with other human beings. It is said: "People find their most meaningful emotions in other people." Socializing fills a need almost as essential as the need for food and water. Random killing obviously cuts off a rich source of meaningful experience.

In a primitive environment something prevents people from becoming too social too fast. There is a hierarchy of emotions that commands the behavior of people. As much as people are rewarded by social relationships, passions can drive them to take what is not theirs if they believe they can get away with theft. Killing can be inspired by overpowering selfishness or a true need to obtain food to survive.

If the evolving rule is that you can kill others for their food, or take their possessions at will, then everyone else in the vicinity can do the same. The logical result would be an increase in societal stress and a decrease in the enjoyment of life. Sensible people would likely recognize this relationship even in the most primitive of circumstances. Over long periods of social growth, the first rule tacitly acknowledging theft would be replaced by a more productive one restricting it. If people had the skill and energy to attack hunters and steal their prey, they would also have the energy and skill to hunt their own. This would be evident in an evolving community of people working toward a common goal. When people work hard for their possessions, it affects their attitudes. If such attitudes endure, they become integrated into legal and ethical systems. There is little incentive for hunters to hunt where there is a strong possibility someone will come along and take their prey. There is an economic disincentive for people to allow theft, and an economic incentive to prohibit it.

There would be chaos if theft were permitted through an absence of rules. Few would choose to live in a world where there was endless strife. Certain social conditions can create endless strife. When people experience this, their desire for peace increases. If people are bound by a common desire for peace, they are compelled to recognize that certain behaviors affect societal tranquility. Violence interspersed with times of peace forces people to think about their circumstances in an evolving way. In a rapidly evolving society, if the recognition

of personal property is what it takes to diminish conflict, the desire for peace will lead society to formalize ownership of property. At the dawn of civilization, how could it be otherwise that a hunter's prey was not his own? In later societies his prey might have belonged to his master; but, it was still his and not the property of an approaching stranger. In this cultural setting, there is likely to be no better and more efficient rule than one that gives property rights to those who have invested time and energy in tracking down an animal.

The idea of property soon evolved to a much higher level of abstraction in early societies. Since resources were scarcer, exchanging favors (that is, time and energy invested in the expectation of a return) would have improved the quality of life. But, like an urge to steal from the hunter, so might an urge have arisen in some people to default ("defect" in game theory) on their obligations. If they defaulted, they would come out ahead of those who did not. People barter in a world of scarce resources to optimize resource sharing, which in turn increases the prosperity of the entire society. However, if many people begin to default on their obligations, the barter system breaks down, resources become scarce again, and everyone suffers. If a person helping another gather food in the spring will need help in the fall to repair a shelter, a mutually beneficial relationship exists if labor is in fact exchanged. However, if the fall comes and help is not given in repayment, then a parasitic relationship exists instead of a mutually beneficial one. Obligations are many and difficult to define, but the

notion of obligation does exist in the minds of those giving time and energy to other people.

In order to share resources under primitive conditions, trust must evolve between people. Trusting another to repay time, energy, or product increases the number and kinds of energies and resources that can be exchanged. More people who have goods and services can participate in commerce if a system of obligations and duties evolves to keep track of favors. As more people are able to participate in an economic system, the more dynamic and healthy it becomes, because skills and resources are employed on a highly productive level. If trust breaks down, the rule of commerce becomes "payment in full" for every transaction. Consequently, fewer people can exchange goods and services since they would have to be exchanged at the same time. Trading help in the spring for help in the fall would become risky business, and thus impractical.

The moral rule to honor obligations is affirmed by the positive effects that the rule has on the peace, prosperity, and productivity of a society. Allowing people to default on their obligations returns society to a more primitive state, only this time in an abstract sense. Instead of tacitly permitting the theft of a hunter's prey, allowing defaults on obligations results in the theft of a person's time and energy. In both instances, the taking of another person's time and energy is a parasitic action. When those producing become afflicted with parasitic elements, the prosperity of the entire system suffers. Since the health of social systems will suffer, subsequent ethical rules must evolve to

define a duty to honor obligations. Considerations of systemic survival incessantly pervade the course of social development. It is not likely an inefficient system can long endure.

Good rules create a perceivable social equilibrium that affirms the wisdom of good rules. Good rules endure because they work time and again. A better rule supplants an earlier rule tolerant of theft. The new rule now regards one's prey as one's property. The new rule that says "get your own food" commands others to be self-reliant rather than parasitic. It is a practical and productive wisdom. If a person bleeds the energies of another without giving something in return, the victim will be impoverished. If enough people are victims of social parasites, vital energies necessary for creative social growth are lost in sustaining people who do not produce but could if forced to do so. The vitality of a nation could be thought of as a measure of how many people are maximally contributing to the nation. Allowing theft of property, time, and energy as acceptable social behaviors would eventually lead society into poverty. The consequences of a system running down in this way are poverty and an inability to defend itself from more organized societies. People must make their own rules and honor them, or the ensuing disorganization will lead them into poverty or an imposition of the rules of a conquering nation.

If people could act as parasites without moral censure, few would be willing to work, and the entire society would cease to function. The idea that people must pay their fair share must emerge in a developing society for the simple reason

that the society must be efficient enough to survive. Those who harmed or killed other humans in the process of taking their food would not have been highly regarded in an early society. Thievery that led to killing would deprive that society of potentially meaningful relationships. Allowing the thief to act parasitically would impoverish the society, particularly if many people were doing the same thing. With these things commonly known, it would be difficult for predatory people to survive in an increasingly hostile society. Their selfish actions would give a "reason" for others to act to restrain them, since it would diminish society's fear of random killing and allow their meaningful relationships to survive. Such ethical reasoning would encourage hard work by guaranteeing a state of peace in which the greatest number of people would enjoy the greatest peace, prosperity, and productivity.

Allowing people to experience reward for hard work is a powerful strategy to inspire people to create and add to civilization. In this respect, the idea of hard work integrates into the moral system as a held value worth rediscovering and affirming as true in each successive generation. But if hard work is to be recognized, so too would property have to be recognized. The evolution of ethical rules delineating conduct and property rights would be another benefit of allowing greater freedom and autonomy. Many things that would have never been created are brought into the world when a certain degree of personal freedom prevails and a state of peace can be guaranteed. The early idea that a man's prey was his own

property or the property of his tribe reasonably evolves not only from reasoned actions, but also from the joy an increased state of civilization equally brings to all people.

The larger the moral ecosystem grew in early society, the more evident it would have become that imprudent actions could eventually boomerang on a person and afflict them with unexpected suffering. As more people crowded into smaller spaces, people would have a need to cultivate their image. They also would have to be more sensitive about exhibiting imprudent behavior that could tarnish that image and inspire retaliation. Cultivating a good image would be helpful in maximizing cooperation from other people. The desire to have a good image thus acted to inhibit behaviors that would frighten or push people away. This is productive, since more opportunities for mutual benefit exist in a state of closeness. People who were left out of the loop of intimacy, or who were frightened by people they did not know, could rationalize a "reason" to retaliate when it assisted their schemes to survive politically or economically. There is a strong incentive in a developing world for people to protect their image. Defaulting on obligations repeatedly would tarnish that image and morally stigmatize those people as unreliable. This would deny them lucrative relationships with a broad spectrum of other people. Ethical systems in a society tend to categorize people in terms of their mutually beneficial characteristics. In knowing the rules, and following them, society would soon see what sorts of people were parasitic or tended to prematurely retaliate for imagined grievances.

Since people cannot be in two places at once, their property and unguarded families would be at risk while they were away. Crops could be destroyed and houses burned. People therefore had an interest in not provoking others. A way of systematically avoiding such incidents had to evolve. This inspired the emergence of manners in finer and finer detail. Being courteous evolved as a way of making sure one is not misunderstood to be predatory and aggressive. To act provoked or enraged is one of the oldest tricks of the jungle. Intense emotion tends to intimidate others into ceding property or resources. It is a double bind, since not ceding and calling the aggressor's bluff would give the aggressor a "reason" to retaliate. The most effective method of breaking the bind of intimidation has been the adoption of courteous ways to deny others an easy excuse for retaliation. Systems of ethics and manners informed people of what constituted default on obligations, and so in effect informed them of who to avoid. It also inspired methods of professionally coping with predatory attempts to extort resources. In this way, the higher evolution of thinking has slowly put primitive emotions at a distance.

Natural selection over a very long period of time favors prudent behaviors rather than hazardous behaviors. The excessively brazen who ignore good sense represent, perhaps, genetic combinations headed for extinction, as natural selection has likely favored the survival of intelligent and sensible humans rather than predatory, self-interested ones. A reasoning species would evolve where other types failed

simply because it was able to assess its survival capabilities clearly and realistically.

At the birth of a civilization, several events would immediately occur to stabilize the tendency of human emotions to thwart cultural growth. Murder and mayhem would spontaneously arise, inspiring a vicious circle of killing. As the chaos intensified, the societal desire for peace would also increase since early humans would begin to recognize that they were killing off their own species. The desire for peace would prompt a disposition in people to find a way to settle their conflicts. Three things would likely satisfy the conditions for peace in the primitive world: first, rules prohibiting certain types of killing; second, the definition of property rights; and third, the emergence of a strong leader to enforce the peace. The need for peace inspires the evolution of a hierarchy of authority. With that authority in place, a delineation of work and resources would follow. Once the idea of property was recognized and affirmed, and murder without reason suppressed, creative ventures and commerce could grow. Relationships would suddenly take a quantum leap in complexity, and an ethical system would soon become more assertive in an attempt to hold in check a growing web of obligations.

As the first ethical and legal systems came to life, several events should have occurred simultaneously. First, strong impulses to kill or harm others would have become counterbalanced by a strong desire of people to be together for mutual benefit. Second, more "reasons" to act or not to act would

thrust themselves consciously into the mind. Pain, starvation, suffering, and fear powerfully affect thinking and sometimes bring people's minds to consciousness. Third, as more and more people crowded closer together, there would be more instances in which crucial behavioral decisions would have to be made. With more people, possibilities for pain and violence would increase. The increase in conflicts and potential conflicts would force a quanta of evolutionary growth to hold the violence in check. Fourth, the increasing complexity would culminate in the development of formal and informal rules to allow people to live in closer spaces without violence. The rules would evolve from the knowledge that human nature goes awry under certain circumstances. The new rules, based on good sense, would in effect act as a memorial to future generations of the problems of the prior generation. Once a system of remembering "reason" was established, societal intelligence would increase, providing greater peace and security for the following generations. Peace would increase the possibility of the human species surviving much longer than it would if it existed at an evolutionary level of being subject to no social laws. At the genetic level or at the human level, a system of distinguishing good actions from bad ones is essential for survival.

In early times, human civilization, with very little at its disposal, bootstrapped itself toward a semblance of intelligence by observing, developing a memory of what was observed, and using the memory of that observation to forecast future events. The emergence of social and environmental consciousness

in early times must have been facilitated by a growing array of important memories. Initially, kinship memories would probably have been strongest, along with recognition of the difference between food and non-food objects.

Following natural selection's sharpening of the capacity of early humans to remember would have come the dawn of social consciousness, the recognition by individuals that an environment existed independent of them. Aided by sharpened memory skills, this consciousness was probably marked by the realization that there was a relationship between the availability of food and the seasons. The ability to recognize kin, food, and seasonal changes that could affect the availability of food, all relate to early humans' ability not only to survive, but to evolve. With an enhanced capacity to remember, there would evolve an information base to predict other relationships in nature that could affect early humans' well-being and ultimate survival.

Keeping track of "reasons" to take action or to repress behaviors serves as a positive feedback to society. As society keeps track of more and more significant events, in finer and finer detail, the energy of its intelligence correspondingly increases. If a society does not have to repeat its past mistakes, it has more energy and resources to creatively grow. As the quality and potency of intelligence bootstraps to higher and higher levels, distinct categories of knowledge naturally emerge. A wide variety of academic disciplines has evolved from the refinements of experience, thought, and experimentation. The evolution of ethical systems is a natural part of civilization

defining a secure position so that it can survive in a world occupied by many other types of organisms competing for the same scarce resources.

As society matures it refines its rules of conduct and sharpens its memory of the difference between a good choice and a bad one. In not having to be condemned to repeat its past mistakes, while thriving upon the peace that follows good choices, a society remembers the many dangers and pitfalls of life by encouraging the development of systems, morals, manners, and laws. With time, a civilization becomes increasingly complex, and there is less time for individuals to learn all the hazardous facets of life by direct experience. In a fast-paced, competitive world, reliable models of behavior must be sought out to serve as examples of how good decision-making can fend off potential trouble. Behavioral information handed down through generations becomes subtly entwined in the cultural ethic. Seemingly innocuous aphorisms such as "patience is a virtue" can have a powerful influence on the life of an intelligent person. After all, people have been around for thousands of years and have observed the productive effects of patience.

To be bound by rules, in one sense, is the same as being legal and moral. But equally important, it should be remembered that to be legal and moral is to be relatively efficient in one's actions. The long-term survival of an individual or a society is served better by orderly behavior guided by refined rule sets than it is by living without them. Individuals must compete

with other individuals, nations must compete with other nations, and the human species must compete with a whole array of other organisms for scarce resources. Between systems of equal size and resources, the tactical advantage will lie with the more efficient system. To survive is the mandate of the species. This mandate imposes restraints upon individuals and those restraints naturally evolve as ethical systems in response to the greater need of the whole of humanity.

Ethical systems account for what it is to be human, developing from the knowledge of the many ways life can be hard and uncertain. Desperation leads to the rationalization of illegal or immoral actions. When times are hard, people attempt to make their problems someone else's. The fluid nature of morals, manners, and laws sense this about people, and so inspire rules to guide desperate people towards more original motifs of reason. If people manage their money badly, they begin to try to maximize taking from other people instead of sharing with them. Being short of money becomes an excuse to break the law or default on obligations to others. People who suddenly find themselves in desperate circumstances act differently than those who live a secure life. Given these factors, formal laws and informal moral traditions serve society by regulating the excesses of disruption that can arise from economic dislocations. The more this chaotic arena of human success and despair is regulated in a productive way, the more everyone will prosper. There will be fewer long-term disruptions that will dissipate people's wealth and emotional resources.

Ethical systems take into account the frailty of human emotions. If passions rule the laws of the land, life again becomes tenuous and prosperity is threatened. Many people yield to sexual passions that can disrupt society if they are not stigmatized and regulated. For instance, if child molesting evolves as an acceptable behavior, the situation benefits the short-term needs of the molester while disrupting the victims' entire lives. Consistency of reasoning in deriving laws is a factor in how much they will be respected. Disproportionate distribution of short-term pleasure and long-term emotional harm is less than reasonable. If parents are always concerned for the safety of their children because laws do not exist to protect them, then the society loses the resources those parents have to offer because much of their time will then be spent in protecting their children. If they raise children and invest considerable time and money in their upbringing, and that investment is destroyed for the sake of some person's short-term pleasure, there are wasted resources and damaged emotions that do not foster the growth of that society. Attitudes toward exploitative sex thus will naturally evolve in a complex society.

A prime mover giving people cause to "reason" in early civilization may have arisen from the tragic circumstances they experienced. Tragedy entwined in grief powerfully raises the human consciousness. In an environment where death and injury repeatedly occur, people begin to realize that some of the tragic circumstances could have been avoided by planning, patience, and better communication. As life becomes

more organized, the chances that tragedy will occur diminish. With more organization and better communication, fewer misunderstandings leading to violence occur.

If a society promotes the idea of reasoned behaviors rather than "felt" behaviors, suffering can be reduced. If there is even a semblance of a reason involved in a death, people can cope much better. But if death, destruction, and injury are the result of arbitrary actions, people are stimulated to seek reasons. Arbitrary actions generally emerge when people are not thinking; they simply feel like doing something that later leads to tragedy. Feeling that "something should be done" leads to more misunderstandings and possible retribution than do actions that are analytically reasoned. As more people pack into smaller areas, social order is better served by people whose actions are the result of reason rather than feeling. Biologically speaking, natural selection may favor a reasoning species as opposed to a sentient species. In early social formations, emotional and impulsive humans perhaps killed themselves off more often than cool-headed, analytically reasoning people, moving the genetic development of humans to higher and higher levels of order.

When people are killed in retribution for actions no one can remember, generations of people may kill each other for reasons that in the beginning were quite trivial. Small transgressions of morals, manners, or law can escalate into civil warfare. As social thinking becomes more advanced, there is a tendency to write finer and finer details into law. Small

behavioral problems are significant because they can lead to much greater problems. This means that violations of rules, both significant and insignificant, must be vigorously pursued.

Ethical systems evolve to warn people that certain behaviors can lead to larger problems. For instance, many people ignore moral sentiments to avoid gambling. What may start as gambling for fun can lead to an addiction that drives a person into poverty.

The idea of dangerous circumstances influencing the direction of law can be seen in traffic laws. The evolution of traffic laws is not unlike the evolution of a broad spectrum of statutory laws and moral systems. When cars first were introduced to society, they were few in number. Therefore, a tight regulatory system was not necessary. But as society became more dependent on cars for its prosperity, attitudes toward regulation changed. Rapid, versatile transportation has become inextricably linked with commerce. Public transportation that runs on time maximizes the flow of goods and services. If transportation is interrupted by repeated congestion due to lack of regulations, there will be a natural tendency for more and more laws to evolve to make the traffic system more efficient. If better laws minimize accidents, deaths, and injuries on the highways, there will be a gradual evolution of better laws. With increased transit safety, there is an increase in the predictability of traffic. With increased predictability, motorists can move faster over more miles than was formerly possible. Good rules are beneficial to all. Nevertheless, people

who might want to believe they could drive as they wished would be put at risk because of the highly unpredictable nature of highway traffic. The evolution of good motor vehicle laws would benefit them as well as the rest of the society. What started as fairly simple traffic codes later became a profusion of regulations filling hundreds of pages of text. Most of the rules have reasons for their existence. These reasons are often decided by experience, pain, grief, and later, in the writing of laws, by calculation and engineering. The rules have evolved to maximize the chances of survival on the roads, and they regulate the flow of traffic to the highest theoretical limit of efficiency thus benefiting both the motorists and their nation. Tragedy is thus diminished by good rule-making. Formal and informal rule systems exist for the same productive reasons traffic laws exist. They allow more people to intermingle with fewer problems and with maximum benefit to all.

There is a quirk of perception that leads human beings to believe there would be more freedom in the world without the existence of rules. If people could move about in the world and do what they wanted unimpeded, the social world could not have evolved to its present form. In restricting some of the unlimited freedom the primitive setting appears to give, people receive in return a more meaningful existence. This in turn gives them the intellectual means to better appreciate the freedoms they retain as well as to know the rewards of an expanded world. When people are married and have children, they knowingly restrict their own freedom by taking on obligations to tend to

other people's needs, but in return they often derive a greater satisfaction in living than they had as single people.

There is an inherent resistance in ignorant people to abide by rules of any kind because rules are often experienced as tools of repression. This defect of logic leads people to reject all the rules because some rules are bad. But bad rules will always be evident in any society where there is a hierarchy of power. Politically powerful people will always be able to impose their self-serving beliefs on a society, whether it is through formal laws or by subterfuge in the moral system. Simply because short-term and self-serving rules are spliced into a system of rules that have evolved for centuries does not destroy the integrity of moral or legal systems.

There appears to be a common thread of knowledge that runs through the development of ethics, laws, and manners that suggests some actions are better than others. Rule systems function as models to guide willing minds toward productive rather than destructive choices. Ethical commands that are a form of advice are different from legal commands. They are not perfect or free of self-serving interest. They are best viewed as statistically accurate advisory perspectives of behaviors. They define strategies that best serve every person's desire to achieve and become an accepted member of society. As difficult as it may be, ethics must be divorced from the notion of being a part of religion in order to facilitate an understanding of how ethical systems evolved in a developing world to stabilize it and contribute to the survival of the species.

An interesting facet of the growth of ethical systems is their power to enhance human existence. This is to say that there is a direct relationship between the growth of complex rule systems and the quality of life. As the quality of life improves, people are more willing to give up primitive impulses in favor of a much more rewarding acceptance by their society, allowing them to be a functioning part of it. But in theory, it may not be desirable that human beings give up all their predatory habits to build the most survivable society. Small transgressions of the cultural ethic give life charm and depth as well as an intriguing sense of the world of danger and anarchy whence civilization emerged thousands of years ago. As the elegance of the ethical system deoptimizes slightly (in the short term), it gives rule systems a "plasticity," thus humanizing ethics and giving flexibility to their commands. This plasticity allows for greater cultural experimentation that in the end serves to optimize the overall aims of the species to survive over long periods of time. While all people may not have the capacity to cooperate, it cannot escape their attention how tolerant a developing ethical world is toward their predatory presence. Sustaining that tolerance itself may well inspire a degree of cooperation even among the most hardened and predatory souls. People cannot help but cooperate. It would seem that in the design of humanity, the missing parts in people's lives lie in the lives of others on whom they come to depend.

Moving From Ethics to Cybernetics

The foundation of ethics ultimately rests on actions and their consequent reactions. This extends to inactions that themselves inspire reactions and the political and social forces that shape the world and influence the human spirit to produce and prosper.

*I*n the previous chapters, some examples were given, showing how conflicts are overcome by the evolution of social rules. Since people generally value human life, they learn from past experiences to avoid pain, suffering, and death by instituting changes in their morals, manners, customs, and laws. While this presents an oversimplified view of how morality arises in cultures, it does underscore the fundamental importance that human survival has on the development of moral and legal thought. To move from a simplified explanation to a more comprehensive one requires departing from traditional philosophical approaches and turning instead to science for a broader understanding of human morality.

It is in science that we find mathematically based field of cybernetics, which is most appropriate for describing the intricacies of ethical evolution. Using cybernetic theory to describe human actions is not a new idea. Norbert Weiner in his books, *Cybernetics: Of Control and Communication in the Animal and the Machine* and *The Human Use of Human Beings: Cybernetics and Society,* make the seminal linkage between cybernetics, culture, and human behavior. But very little of the work in cybernetics that has followed has centered on the application of cybernetics to human behavior. Instead, it has focused on technological advances in electronic and mechanical engineering.

Cybernetics can be thought of as the study of the complex relationships involving informational feedback in dynamic, self-organizing systems. The creation of stars, planets, and biological systems, as well as social systems, can all be considered to be part of a self-organizing universe, guided by cybernetic principles. Cybernetically inspired feedback would be useless information if it were not related to a change in the environment initiated by some action or event. For a person to sense environmental change there must be some reference point in her thinking, sensing, or perception which is addressed and then compared with some newer sensory information. Learning, and therefore adapting to the environment, is wholly dependent on an ongoing cybernetic process that provides informational feedback to a person. The evolution of moral systems is an integral part of this process.

Cybernetics in Human Societies

When ethics is merged with human behavior, the first outline of a moral science emerges. When cybernetics is added to the mix, the outline becomes more certain. There is a natural progression of reason that results from such a combination that moves the classical view of morality toward science.

When human morality is conceived of in scientific terms, it can produce an understanding of ethical principles where traditional approaches have failed. For instance, there is the philosophical problem of first principles and ethical relativism. The two ideas used in the same context seem to defy a logical outcome. If some moral beliefs can be shown to be relative to time and geographic place, how can there simultaneously be universal principles of human action?

When cybernetic and biological concepts are added to ethical reasoning, a solution to this perplexing problem is more easily realized. What one observes in biological systems is a tendency to compartmentalize. Compartmentalization is the logical outcome of systems that survive by utilizing feedback to define and contain forces that have the potential to overwhelm and destroy them. If there is a defect in one part of an organic subsystem that is compartmentalized, it does not lead to the destruction of the entire organic system.

It is the cybernetic principles that underlie the evolution of morality that in theory can be universalized, rather than any specific moral view or belief. Conventional ethics tends

to embody the idea that one universal moral system might be desirable, yet the physical construction of biological systems shows that universalization is not always desirable. Thus, the fundamental problem with past ethical theories is twofold. First, they present ideas of the mind not connected to the real world. Yet, quite evidently, real-world demands inspire the evolution of rules that define moral right and wrong. Second, past ethical theories have not been broad enough in their scope to resolve the complexities of the problems with which they are confronted. Therefore, the solution to many perplexing ethical problems seems to require a radical departure in thinking. One such radical change would be toward a new science that merges biology, cybernetics, and ethics into one unified discipline.

In order to appreciate the dynamics of such a science, it is necessary to conceive of a world where everything that is alive has a potential effect on every other thing. An example of this might be highway driving. Every action of every driver on the highway has an effect, however small, on the driving of every other driver. Under ordinary conditions, the effect one car has on another is imperceptible, although any given car can potentially disrupt the flow of traffic in significant ways. If one car goes out of control in a congested area, other vehicles may be idled for hours. People will be late for their appointments. Consequently, time and money will be lost in the disruption of the local economy that depends on a predictable flow of goods and services.

Many cars moving together manifest a state of systemic equilibrium from which other drivers sense subtle feedback, allowing them to speed up, slow down, or use extra caution in their driving. The way each individual driver synchronizes his movements in traffic has a direct bearing on how the traffic itself is moving. Everything on the road contributes to its ambient state. Written laws define in broad strokes a system of rules that coordinates the driving habits of many drivers who simultaneously use the highways. The ambient state influences peoples' driving sufficiently to fine-tune those rules. Thus, the prevailing sense of order on an enormously large system of roadways has the dynamic capacity to adjust to changes not anticipated in the actual traffic laws.

In theory, this same process operates on a much larger scale when thought of as the earth's ecosystem. Here, there are thousands of organic systems interacting simultaneously in ways that must be coordinated and synchronized to maximize systemic growth and survival of the entire planet. If one organic system modifies its behavior radically, it can trigger changes in other biological systems that in turn inspire multiple responses affecting the behavior of an even wider spectrum of organic systems. Since many biological systems are constantly acting and reacting to environmental changes, this activity develops oscillatory characteristics. These oscillations can also be visualized as a resonance, an environmental ambience, or a field from which all living things extract useful information to aid in their adaptation and survival.

The ambient field facilitates the synchronization of the activities of many systems in its capacity as the prime coordinator, without there actually being a conscious entity facilitating the coordination. Consciousness in this respect is the sum total of the conscious minds linked in heightened awareness, each deriving energy and instructions from the field. This coordination, in theory, is aided by a phenomenon similar to the interlocking tendencies of two sine waves whose frequencies are close, but not exactly the same. When this occurs the two will begin to oscillate at a single frequency. An example of this phenomenon in the social world might be seen in political uprisings where many peoples' emotions suddenly fall into synchronization to achieve a common goal. Another way to illustrate this is to visualize a highly coordinated swarm of bees flying very close to each other, yet rarely colliding.

To be alive is to sense change in the environment, as well as to be a part of those changes. Every single living thing exerts a force, however slight, to a matrix of forces that establishes a balance point or points of dynamic equilibrium from which subsequent action can be consciously sensed.

In the same respect that the larger world ecosystem maintains a certain state of dynamic balance, so do the smaller subsystems, all the way down to the smallest organic environment. Included in organic subsystems that make up the larger world ecosystem are human societies. The way in which people behave can be reasonably said to be an extension, in part, of their biological constituency. For instance, a large office of

workers comprises a social system that in its own way establishes a balance point or state of dynamic equilibrium that sets the tone for office behaviors. There are basic rules that govern each person's behavior. But beyond that, the fine categories of distinction that define right and wrong behavior evolve under ambient conditions. From this ambient state, individuals can gauge the appropriateness of their actions. The longer people work together, the more refined this sense of balance becomes.

When the balance is upset, there are disruptions in this ambient field that are noticeable to those who participate in it. Right and wrong behavior, to some extent, is derived from a dynamic process of feedback that establishes an ambient state. When a person is out of tune, it is quite obvious. An employee, who suddenly begins to sing just as his boss is trying to close an important transaction, will likely feel a subtle change in the ambient state of affairs in the workplace as tensions begin to rise because the customer is distracted, making it difficult for the sale to be closed.

From this example, it might be seen that the idea of moral right and wrong can be the end product of behaviors that disrupt the flow of socializing and commerce. They are behaviors that are so disruptive as to compel a society to set time and place constraints on certain human activities. Over many generations of socializing experience, there is a natural evolution of morals, manners, customs, and laws that govern every imaginable form of human activity. It is a self-organizing process that appears to maximize systemic growth, whether

it involves defining international politics or relationships in the workplace.

When a social system gets out of balance, it manifests a state of environmental stress. Like the infliction of physical pain to the body, the sensation of stress can move people to action. Stress can be an equalizing mechanism redistributing tensions in the social environment. Aside from its negative aspects, it is essentially a communicative process, even though those communications may sometimes operate at the subliminal level of sensory apprehension.

Stress is feedback in process inspired by conflict. Overlaid on the negative characteristics of the conflicts themselves, are subtle forms of communication that can equalize tensions by raising people's thinking to implement more creative ways of behaving. Since stress is so evident in fast-moving dynamic social systems, the cultural morality invariably subsumes rules of behavior that deal with its reduction. The evolution of formal manners is one example of a stress-reducing mechanism active in civilized societies.

There are very few forms of universal communication. Emotions and body language are two of these. They may not always be very refined and delicate in their conveyance, but emotions can get a message across when other forms of communication fail. In a world of many people who fundamentally do not understand each other, there will be unavoidable conflicts. These conflicts do not always arise from predatory intents; rather they are expressions of miscommunication and

frustration in attempting to understand what is going on in the social field. Emotions are the predecessor to reason, yet they helped evolve a more rational world. Reason perhaps evolved to facilitate the long-term survival of humans. It has done so by evolving mechanisms of restraint to break the vicious circles of conflicts due to misunderstanding. While the miscommunications may inherently contain moral characteristics, the excess of passion that emotion-based language can inspire may send people out of control, provoking them to commit nonmoral acts of retribution.

In a civilized climate, people tend to hold their emotions back enough to try to work through conflicts. But there is a price for civilized restraint: necessarily enduring stress or finding creative ways to work around it. An example of this might be experienced in the workplace. The workers have certain emotional habits and quirks that they do not have time to sit down and discuss with their fellow employees. Instead, people discover the limits of other peoples' needs and emotions in the process of interacting with them. Teamwork, for instance, is something people learn on the job. When a member of the team no longer carries her weight, expecting others to do her duties, she inspires certain emotions from her fellow workers that put her under stress until she learns the merits of teamwork. When words do not sufficiently inspire people to action, conflict sometimes seems to do the job. And in a world where few people really understand each other, confrontation and eliciting stress is sometimes the only method to make things happen.

Since so much of ordinary life operates on an emotional level that may be highly unstable, certain regulatory mechanisms must be present to keep society operating smoothly. Morals, manners, customs, and laws have naturally evolved from the positive and negative effects manifest in certain behaviors. Thus, an understanding of cybernetics is essential to the understanding of human behavior and the laws and morals people invent to regulate themselves.

Cybernetic Ethics

The world can be conceived of as a self-contained, self-sustaining system. Picture in this respect a small self-contained ecosystem of ferns and mosses enclosed in a glass vessel, admitting only sunlight from the outside world. Proceed from this example to the conceptualization of a self-contained world of actions and consequent reactions. The moral world might be part of this world.

*O*rganisms, animals, and humans share a common cybernetic environment. As organic life has evolved over billions of years, an intricate system of relationships and dependencies between biological systems has developed. Among these are relationships between individuals, groups of individuals, and between humans and other life forms in the environment. Theoretically, every living system has some influence on every other system in large or small ways. If the emergence of ethical systems can be reasonably linked to these relationships, the resulting moral theory will be extraordinarily complex. But no matter how complex it may seem, if the evolution of ethical systems is in fact based upon cybernetic principles, it can be reduced by mathematics to understandable proportions.

Cybernetic ethics is a way of viewing the evolution of ethical systems in terms of the informational feedback certain human actions generate. Feedback can arise from the consequences of specific actions that are easily observable, or from a change in a "state of affairs" that has slowly evolved as a result of the accumulation of formerly unseen problems. Examples of what might cause this might be seen in the excesses of human immaturity and selfishness. Although it could be said that these causes are the result of some earlier cause or neglect, for purposes of illustration they are cited here as immediate causes.

People have observed the behavior of other people for thousands of years. When certain negative effects that accompany particular behaviors repeatedly manifest themselves, those behaviors become prominent memories firmly implanted in the societal memory. As this memory becomes enlarged, it sets in motion a counterforce to contain behaviors that consistently cause social problems. Much of morality in this respect is parental in nature because the impetus for creating restrictions tends to come from more mature and experienced people. Some of this parental urge comes from the observation that time appears irreversible. You cannot put the bullet that killed someone back in the gun, nor wish away an automobile accident as though it had not happened. But tragic circumstances sometimes reconcile themselves in the good they inspire in the behavior of civilized people. The recurrence of a similar tragedy is many times prevented by the constructive remembrance of specific behaviors that led to trouble and those that did not.

This conscious process of civilization building can be seen in the proliferation of many types of formal and informal rule systems. Counted among these are moral, manner, legal, and customary rule systems.

Human beings are born immature and thus cannot be expected to know morally proper behavior without guidance. With immaturity comes expressions of selfishness that are a natural part of life. But the aggressive nature of selfishness and immaturity would soon undo all the refinements and achievements of civilization if there were not some counter-force to thwart it. People more or less define themselves by an intricate web of relationships. Security and success often depend on a support system of interpersonal relationships. If excesses of immaturity and selfishness arise, these otherwise harmonious relationships can fall into conflict or even deadly violence. Mature adults are sensitized by the prevailing moral sentiments, education, and laws to recognize selfishness that has crossed over the line of propriety. These sentiments represent complex abstractions of what constitutes fair play given certain established boundaries of behavior. They are not defined in a book; rather they are learned and accepted through experience.

Selfishness is contained by the continued societal memory of it in each generation. When a person repeatedly crosses over boundaries of acceptable behavior, he or she generates feedback that can be detected by others. For instance, a person can easily cheat another in a business transaction, but if that sort of exaggerated selfishness continues, he or she acquires

a reputation that arises as a function of feedback that slows the person's ability to continue to defraud people endlessly.

Reference points and boundaries guide human development as mechanisms of the cybernetic process. Some reference points are more important than others, given time and circumstances. A superordinate reference point might be viewed as the collective or individual urge of human beings to survive. This paramount concern sets the conditions by which smaller concerns evolve. Whether they are subordinate or superordinate in nature, they all appear to exist to maximize survival, minimize human harm, and avoid extinction.

In conventional ethics, reference points are not described as such; rather, they are expressed in terms of values. These values represent models of behavior, whether they are economic, educational, moral, or social. But here ethics is being placed into a context of cybernetics. Thus, the idea of morals evolving as reference points must be addressed in order to efficiently convey an understanding of ethical evolution. To illustrate the importance of reference points in a cybernetic system, one need only look at the operation of an autopilot that guides an aircraft without the pilot's intervention. Planes ordinarily lift off with a specific destination in mind. The desired destination is translated into a set of coordinates and downloaded into the autopilot's memory. These mathematical coordinates thus become superordinate reference points by which all subsequent behaviors of the aircraft's control systems are evaluated and acted upon. The coordinates defining the destination can

be changed, but until they are, any deviation in the flight path of the aircraft will generate electronic feedback forcibly keeping the flight path in correspondence with the programmed coordinates.

Autopilots can be designed to be more sophisticated than this. For instance, a plane may not be able to fly directly to its destination because such a path would violate some nation's airspace. Thus, secondary coordinates in this autopilot system could be set to conform to a pattern of behavior causing the airplane to avoid a boundary the plane cannot cross over. By this construction in reasoning, reference points and boundaries are seen as determinants of the right and wrong behavior of the airplane's control system. In the same way, the important values of a culture contribute greatly to the perception of behavioral right and wrong.

Three superordinate reference points that guide human behavior can be thought of as: 1. Concern for individual survival. 2. Concern for the survival of the entire culture. 3. Abstract or transcendent concerns that enhance the quality of life. This last concern adds meaning to existence that might not otherwise occur, further strengthening the cultural or individual will to survive and thrive. Tension arises between important values such as these, which ultimately determines which values will prevail, when they will prevail, and under what circumstances. Human experience is a living situation and so are the dynamics of the values that guide them. The evolution of formal morals, manners, laws, and customs is

essentially an end product of centuries of human effort to find a tolerable balance among all of the demands of living. This never-ending process of cultural refinement reconciles the clash of many values, while still trying to hold onto the most important ones.

In order that the maximum number of important values be retained in the life of a person (or that person's culture), there must be some organizing protocol. This is ordinarily done by prioritizing one's activities and setting reasonable goals. The more dependable the routines are that can be incorporated into such a strategy, the more likely the goals are to be achieved because of a built-in systemic efficiency. To illustrate this, one might look at the lives of young students attempting to enter the highly competitive world of professional medicine. Here they are under tremendous pressure to meet the demands of their course load. Unless they are extraordinarily talented, or possess tremendous physical and emotional energy, they must find an effective, simplifying algorithm of behavior to achieve their ends. When time, energy, and income are in short supply for the average person, it is necessary to be extremely efficient if that person is to compete with gifted people. Thus for many medical school applicants, excessive party-going and substance abuse would be deleterious to reaching their goal.

The end result of this type of planning creates in effect a secondary set of moral rules by which students begin to guide their lives. If excessive party-going severely impinges upon their ability to successfully compete, a violation of their

commitment to reach a goal will be felt from the feedback of increasing failure in school. Thus, every moment of time they invest in leisure activities questions the sensibleness of that investment based on a model of behavior they have previously established.

There are many reliable moral, professional, and educational models to choose from, replete with their own internal values. Since human experience spans thousands of years, many varieties of moral models and lifestyles have already been tested for their inherent moral worth. What comes with the adoption of tested and reliable ways are behaviors that work around destructive feedback, and so help people attain their goals.

Ethical rules evolve from dynamic circumstances. In theory, these situations can be quantified (or can approach reasonable quantification) in the same way that an engineer reduces natural phenomena in electrical or mechanical engineering to workable principles. Quantification in the moral realm essentially comes down to making the most reasonable choices under a given set of circumstances. Some choices are better than others if certain fundamental values can be agreed upon. Thus, choices can be evaluated as to their inherent worth in a systematic way.

The situation of the premedical students illustrates a simple moral dynamic. But human experience is more complex and fast-moving than this simple illustration allows. Decisions people have made in the past affect social conditions in the present. Many marginal choices made over years can create an

ever-escalating array of obstacles to overcome. For instance, if a person gains a reputation for exploiting other people and businesses for money, such behavior eventually leads to a poor credit record. A poor credit report in turn leaves that person at a disadvantage when he or she genuinely needs money in an emergency. Thus, the reputation a person builds today can impair his or her ability to move forward in society tomorrow.

Some categories of decisions have a more profound affect on people's lives than others. Human situations involving sex, wealth, status, and power can, and many times do, lead to high emotions. When several emotionally charged situations converge at the same time, a person can be driven to emotional instability. Since, in theory, all of human experience can be broken down into separate but interlocking systems, destructive emotional oscillations in one system can affect the stability of other systems.

To illustrate the systemic nature of human experience, it is easy to visualize the difference between the human physiological system and a marital system. Physiological problems can lead to instability in a person's marital situation or vice versa. The human body has informational feedback loops that sustain it, and so does a healthy, growing family. High emotions can interfere with the perception of needed informational feedback in all interlocking systems. Thus, an emotionally charged situation can undermine the stability and tranquility of other systems such as family life, professional life, or the many delicate systems of the body that comprise human physiology.

Ordinary human experience can be defined by a complex matrix of interrelated systems working together in synchronization. Each system is sustained by a cybernetic process that can be destroyed by the intrusive nature of extreme stress and emotions. Given the possibility that this may be true, it is easy to see why centuries of observation have repeatedly affirmed the moral view that sex, wealth, and power are forces in human affairs that require wariness.

Inverting established values leads to conflicts between human systems that ordinarily work in harmony. If a student bound for a prestigious university really is intent on being accepted, why would he place hedonistic pleasures before the business of studying? People tend to invert their values when they think they are getting something for nothing. An aggressive male who is simply out for a night's fun may think at the time he is getting away with something by taking advantage of a naive woman. But his exploitative intents may inspire a counterforce of powerful emotions from a woman incensed by the affair. What the man might have thought he was getting was some easy sexual pleasure, but instead he has become involved in an emotional struggle that ultimately impairs his ability to concentrate on his studies.

In sum, there is a logic to the way that mature people organize their lives that lends a priority to certain activities. These ways of living become known and respected for what they produce. Behaviors such as these that have endured for centuries eventually become part of the foundation of the

cultural morality. Since so many problems revolve around the strong passions that sex, wealth, and power produce, the presence of passion in the actions of immature people is a highly predictable phenomenon. The systemic feedback these situations produce are some of the most powerful experienced by human beings. Their predictability throughout centuries of human experience inspires the notion that there is a sense of mathematics to it all, which shows people how to behave and what the consequences will be for such behaviors.

Mathematical Concepts Implied in the Evolution of Ethical Systems

*M*athematics seems to permeate the very essence of the many things we call experience. It gives meaning and measure to the physical world. But how can an idea of a particular human behavior be looked at in the same analytical way that water is determined to boil at 100 degrees centigrade? In theory, much of the problem can be attributed to a lack of reliable information concerning a wide array of human actions and their consequent reactions. It is a problem similar to one that chemists faced hundreds of years ago when they were trying to make sense of chemical reactions. Instead of trying to chart the chemical elements, perhaps it is possible to chart human emotions in an organized and meaningful way. Even though there may be thousands, or tens of thousands, of actions and consequent reactions inspiring emotions that result in predictable outcomes, this complexity should be reducible to understandable proportions using mathematics.

When chemistry was becoming a respectable science, there was a growing body of evidence that the physical universe was comprised of a few basic building blocks known as the elements. When these elements were mixed, they produced something entirely different from their component parts. After many years of research it became evident that certain mixtures produced certain results. Once the nature of most of the elements was known, the chemical reaction resulting from a mixture of chemicals could be precisely predicted. The periodic chart of chemical elements did not emerge overnight; rather it evolved by way of hard work from a speculative idea into a respectable science.

Except at the theoretical fringes, the mathematics of elemental relationships is more or less exact and reproducible. On the other hand, the mathematics associated with sociology, psychology, and economics is much less exact. The former, chemistry, is called a hard science and the latter categories, soft sciences. The soft sciences are not usually held in the same esteem as the hard sciences. This is perhaps because they cannot be pinned down to any notable degree of consistency, verifiability, and exactness. While many people would like to believe that there are solid mathematical connections to these disciplines, their reputation for overstatement and inaccuracy leads many hard scientists to harbor a healthy skepticism. Thus, to posit that mathematical principles lay at the foundations of evolving ethical systems would land even a good theory on already contentious grounds.

It is one thing to theorize that mathematical relationships exist, and another to produce the mathematics themselves. Human behavior encompasses such a wide spectrum of activity that it would take an immense effort to quantify all possible behaviors. At present, one can only paint in broad terms simple relationships that appear to exist between mathematics and human behavior. Still, there are some tangible relationships that can be established. For example, one could begin by analyzing the influence of money on human behavior. Lending money is a fairly common practice, often producing a predictable outcome as one views it from hindsight. Mathematically expressed in terms of many conditions and variables, the dynamics of lending money are quite complex. A simple query might go as follows: Given that it is reasonably constant that money can corrupt, alter, or influence the good intentions and professional work of even the finest humans, what is the mathematical relationship between lending a variable sum of money and receiving a timely and trouble-free repayment of that money, given a diversity of conditions and people under which the loan was made?

What is important here is the fact that relationships can be established between specific behaviors and the outcome of events linked to those behaviors. The conventional approach to analyzing such relationships is to rely on a statistical analysis of actions and events. But thinking of relationships solely in terms of statistics overlooks the deeper and more subtle concepts implied in the living language of relationships.

A mother does not need to know the precise statistics about how many children are injured or abducted while playing in an unsupervised environment. She only needs to know that a significant relationship exists between her caring for her child and the avoidance of many types of harm that children can encounter. She may not be able to communicate effectively why she knows such a relationship exists, but at the same time she may possess real knowledge of the human condition. It is one thing to understand by experience that certain relationships exist between actions and events. It is another thing to be able to convey that knowledge to others in a clear and understandable way.

Even though most people cannot articulate complex ideas in an understandable way, they often find a common bond of knowledge and experience by adopting values, morals, and cultural sentiments that express their ideas and experiences effectively. Thus, cultural moralisms and the sentiments that accompany them, often give people reasonable cause to discourage behaviors which they consider harmful. These "moralisms" can be thought of as simplifying abstractions of complex relationships that generations of experience have determined time and again lead to trouble. If one thinks of the evolution of specific moral sentiments as functional abstractions of complex human interactions, then it should be easy to see how useful they are in everyday life for making fast and trouble-free choices.

The language of social cybernetics is reflected in the very idea of human relationships. The world of interpersonal

relationships is a dynamic, give-and-take situation. Human relations possess a living ambience, that involves real, multi-dimensional activities. A statistical analysis of those same relationships is often devoid of the wide spectrum of subtle interactions necessary to make the dissemination of large quantities of complex information possible in a short time. Given that the mathematics of human relations involves something more than dry statistical numbers, it might follow that mathematical analysis would be better served by focusing on the mathematical nature of relationships instead of the numbers. Statistical numbers are, of course, relevant in the assessment of relationships, but not so much so that the essence of what one is trying to communicate is lost.

Models of Ethical Evolution Evident in Physical Systems

*T*he evolution of ethical systems can be illustrated using many types of physical and mathematical models. In concept, the cybernetic model is perhaps the most important one underlying human evolution. But the fine details of a wide spectrum of social phenomena that come to life as a result of cybernetic feedback are better described in other terms. A few of these, discussed in the following sections, are social chemistry, social physics, and social engineering.

The idea of placing human behavior in the context of engineering is appropriate, even though conventional engineering deals mainly with nonliving systems. Cybernetic principles that apply to nonliving systems can also be seen to be an integral part of living systems. Once human behavior is framed in engineering terms, the possibilities for insightful explanations of it multiply into many other categories. Some of these categories are efficiency, synchronization, communication, assimilation, dynamic balance, flow, and social equilibrium.

In the following pages, several different models of social and ethical construction are presented. These models are only a rough approximation of possible human relationships and psychological phenomena related to ethical development. One of the more complex models is the physics model that is presented briefly in abstract form, but is a crucial area of inquiry because it may have the greatest potential to define human conflicts in fine detail.

The Social Cybernetic Model

Cybernetics can be thought of as a universal language linking both the living and nonliving worlds. It is, in and of itself, communication *in process* wherever a dynamic system is governed by feedback. It can be used to describe the operation of movement in a mechanical system as well as a social system. The flow of information in any type of cybernetic system can be disrupted and distorted, sending the system out of control. As organic systems have evolved over millions of years, it seems as though compensating mechanisms have coincidentally evolved to stabilize feedback, filter out environmental noise, or implement secondary behavioral routines when essential feedback has become distorted. The evolution of social rule systems on the whole seems to follow a pattern of providing the greatest systemic growth in the most reliable and enduring way, benefiting the largest number of people.

Cybernetic terminology that in the past has been used to describe dynamic principles in electronics and mechanical

engineering, now can be used to describe human behavior. This is made possible by employing cybernetic considerations such as stability, response time, delay time, settling time, sensitivity, and disturbance rejection.

Stability: In mechanical and electronic systems, instability will set in if destructive oscillations caused by too much feedback are not dampened by design. In the same way, cultural systems will break down from strong feedback if stabilizing systems have not evolved coincident with the intellectual and technological growth of those cultures. Another example of coincident evolution might be seen in the example of clotting mechanisms in physiological systems to repair breaks in blood vessels when they are punctured or cut.

The idea of stabilizing mechanisms developing in social systems follows to some degree the example of feedback in electronic systems. If the microphone of a public address system is placed too close to the speakers, some of the output of the amplifier is reamplified again and again until the amplifier breaks into oscillation. If these oscillations are sustained, they can drive the electronics in the power amplification section to overheating and failure. In the same way, human conflicts can foster circumstances where the intensity of conflict rises to higher and higher levels in a vicious circle of action and retribution until something catastrophic happens to stop the oscillatory and escalating nature of the conflict. On the one hand, a vibrant social system needs a high level of creative tension to drive its evolution forward. On the

other hand, it cannot survive and prosper if the tension exceeds a certain threshold perpetuating a destructive cycle of conflict. In this light, the evolution of moral, manner, legal, and customary systems of rules intervenes in the dynamic tensions of a growing society and reduces them to a tolerable and productive level.

Take, for example, the influence manners and customs have on wearing down strong emotions that would otherwise destabilize the prevailing social equilibrium. People enter and leave many kinds of systems day in and day out. They may visit a physician, shop for groceries, meet with a teacher, and deal with institutions of all descriptions. All these systems are input/output economies. Each promotes a similar theme of protocols and decorums. While customs vary slightly from system to system, they facilitate effective communications, mitigating stress and emotions by their familiar and repetitive nature. If powerful emotions surface, they are *chopped* and dissipated in the process of navigating the many demands and customs of each of the systems a person must enter and leave daily. This dissipating force is further strengthened by the effects of wired-in behaviors learned over many years of formal education that give emotions reserve and restraint. Imprecise communications can exacerbate already heated conflicts, driving relationships to instability and breakdown. A person's emotional state prior to a conflict can affect the dynamics of feedback that govern the emotional level that a conflict will reach. If a person is upset, in a state of stress,

and afflicted with fatigue, imagined words and actions can impinge upon the clarity of his or her thinking. For instance, two nations at war reach a settlement. A few days later a village is attacked and several people die. But the attack was carried out by an extremist group that was not in touch with the political developments that brought about the peace. Those being attacked might overreact under stress believing this was a sure sign of renewed hostilities. But there was, in fact, no intention of either nation to break the peace. There simply was not enough time for either nation to fully coordinate the activities of their various remote political factions.

Strong emotions have momentum. They simply cannot be stopped in an instant. In this respect, both participants in a heated confrontation may have a predisposition to act immediately and powerfully on their negative emotions brought on by coincidental or imagined events. Thus, some mechanism of restraint must be present in conflicts to stabilize the clash of powerful emotions. In practice, customs and social protocols generally do the work of calming emotions enough to allow peace and understanding to grow.

Intense human relationships appear to stabilize themselves when facilitated by a highly evolved system of roles prescribed for people in each particular situation. These roles come from learning, literature, and formal rules. Thus, from the beginning, each well-educated person in a highly organized society has the means to overcome the greatest obstacles in life by adhering to certain customs and values.

Learning a culture's customs conditions a person with responses that stabilize their emotional actions, reactions, and potential overreactions in the social environment. One only need to think of two people under the pressures of stress and deadlines who have bumped into each other. Both may be quite ready to make an issue of the collision were it not for the ordinary protocols and decorum required of civilized people whenever there is a mishap. Even if a person is not at fault it is sometimes customary, in highly charged circumstances, for the person who is not responsible for the accident to excuse him or herself if that is what it takes to defuse the situation. Custom forces communication along tried and true paths of expression. With few exceptions, custom requires a person to respond to serious problems by gradually communicating strong emotions, instead of holding back and then suddenly blowing up full force as a tactical means of solving personal problems.

Response time: Response time can be thought of as a measure of the quickness of a system to reply to a necessary change. The responsiveness of, say, the read/write heads on a computer hard disk are necessarily faster than the responsiveness of the cruise control on an automobile. Each of these cybernetically controlled systems demands a predetermined response time. In social cybernetic systems, circumstances and environmental settings dictate, to a certain degree, responsiveness in human social systems. Certainly a person's response time to danger should be faster at night on a dark inner-city street than during the day, in the heart of the city's business district.

When a person is driving an automobile, he or she becomes part of the vehicle's feedback loop that governs its speed and direction. The more responsive drivers are to changes on the road, the more likely they will reach their destination safely. However, if they are under the influence of drugs or alcohol, their response time will be slower and their chances of having an accident will increase. The proliferation of these types of problems is perhaps the inspiration for the creation of finer points of law and morality where drugs and alcohol are concerned.

Too slow a response time can endanger a person's life, but too much responsiveness can be just as deadly. Hardly a week goes by in a large city without a violent confrontation occurring in which someone dies. In some instances, one or more of the combatants has reacted too quickly and with too much force. They possessed a weapon, but did not have the emotional restraint to use it properly. Emotions overshot their mark as their reactions fell out of phase with their thinking. Since they were emotionally immature, they could not coordinate their emotions and thoughts sufficiently to make fine distinctions of action and reaction. Thus they were left to play out their primitive instincts in a raw and violent way. In this respect, one of the greatest moralizing agents available to human beings is education. The process conditions people with many fine points of behavior that slow and temper the extremes of involuntary emotional responses. It does so both formally, by way of classroom studies, and informally, by way of immersing young people in a highly fluid, social-cybernetic setting where

they must learn to deal with their emotions effectively in order to completely assimilate into the school environment.

Delay time: Maturation and acculturation is an almost endless learning process that requires people to leap over one hurdle after another until their emotions are tempered. This type of learning tends to slow reactions down, while at the same time encouraging time for thought and reflection. Such conditioned behavior delays and frustrates the expression of inappropriate impulses. While a woman might want to express rage, she must be at the same time in tune with the customary ways of dealing with intense emotion, thus protecting her future relationships and opportunities.

In a society comprised of a diversity of people and backgrounds, miscommunications occur constantly. Consequently, a slight delay is needed in the dynamics of interpersonal relationships that have reached a level of conflict. Delay compensates for a disparity in maturation, education, intellect, and acculturation.

Settling time: In situations where hostilities have already broken out, response times to stimuli are operating in full force and on a survival basis.

Combatants in this condition are hypersensitive and under considerable stress, potentially inspiring runaway imaginations. They may begin to see and believe things that do not exist or have not occurred. Since their response time is very fast, they think less of what they are doing and rely more on what they believe they see. De-escalating the dispute thus becomes difficult

if the contentious parties are not willing to let the hostilities die out. Emotions lead to emotional over swings that inspire other overreactions, and so forth. Thus, if there is to be an enduring peace, something must occur so that transient and spurious oscillations are filtered out. There must be a pause after an agreement long enough to allow these emotional oscillations to subside. Otherwise the conflict will simply regenerate itself, and nothing will have been accomplished.

The idea of settling time begins to merge with another mathematically-based system called mathematical game theory. If there is a decision to declare peace, the idea follows that one party or the other may defect from their commitment and take advantage of that peace if they see an opportunity. But there is a fine difference between predatory games of advantage and unintentional conflicts that demonstrate a unique oscillatory pattern. In the former, conflicts continue to escalate not because of oscillation, but because a calculated behavior was based upon a predatory algorithm where the rule of action is to take advantage of peace in the smallest of ways. These ways operate at the level of plausible deniability. They are small infractions that over time produce large gains by tactically *denying convention*. Here, an unwary person is leveraged into ceding more and more benefit to the manipulative and aggressive person. Eventually, the exploitative tactic can provoke a powerful counter-response. However, settling time is less an issue in conflicts that arise from calculated aggressions than it is in more innocent circumstances.

Game theory overlooks the dynamics of a preset system of rationales defining *just cause* for predatory or non predatory attacks. People have emotional and financial limits. When they do not feel that they have been treated well, they may defect from agreements if given the opportunity. Thus, the way in which people treat each other in interpersonal relationships can, in and of itself, become the just cause for defecting from agreements. Or, if there is a high level of stress, either of the players may perceive imaginary events that frightens them into an early withdrawal from an agreement and into taking what they can from an established position of strength. And, when people prematurely defect, good relationships are broken and people are hurt simply because they were neither considerate nor sophisticated in their dealings. Consequently, if settling time were not forced by custom and moral rule, there would be far more egregious acts in the society.

Defecting from agreements can have deadly consequences in which the person being taken advantage of finds the resolve to overcome the adversary. But what appears to have survived thousands of years of civilization-building are the values of patience and restraint, rather than the predatory values of taking advantage of others, because there are rewards for patience and restraint that can be seen and understood.

Sensitivity: Social cybernetic systems are perhaps unique in the way in which excessive feedback can lead to destabilization of nations, groups, or individuals. In a social system, feedback comes from a wide spectrum of activities. If cultural and individual

growth is maximized where feedback is held within tolerable limits, it correspondingly forces constraints on a person's level of sensitivity to stimuli. This means that some compensating system, such as imposed rules, social sophistication or reasoning ability must adjust for the exaggerated reactions of a person who is over-sensitized to ordinary social stimuli. An example of this might be two combatants caught up in an intense emotional struggle in which each person's will to prevail exacerbates the conflict to the level of raw survival. In this state, both combatants become hypersensitive to any type of stimuli. They can become so sensitive that they tend to exaggerate the importance of ordinary events. This means that ordinarily low-level feedback is suddenly perceived in an intensified form. Although they are not strong feedbacks, they nevertheless affect the emotional stability of a person as though they were.

Disturbance rejection: There appears to be a relationship between the adoption of strong values and significant goals and the likelihood that a person might achieve his or her dreams. If a man of average intelligence is attempting to get admitted to a graduate school, he is setting a goal that is difficult to achieve. One very effective strategy for him to adopt to overcome adversity, is to become increasingly efficient in his actions. This may mean numbing the senses to all forms of outside noise, producing an increase in concentration that makes achieving one's goals a viable reality. The adoption of strong values and significant goals adds an intensity and responsiveness to feedback.

If the man begins to drift even slightly into pleasure-seeking activities, the feedback loop is so tight that he cannot help but notice the deviation from his established goals or values.

There is a secondary benefit to establishing a tight feed-back loop to achieve one's ends. When goals and values powerfully influence behavior, people are better able to synchronize their thoughts with their emotions. When their emotions and thoughts are in phase (an electronic term), it is more difficult to pursue an agenda of hostility, anger, or rage. For example, a student is studying for his or her final exam. An immature prankster walks into the student's room and removes a much-needed book. The owner of the book, later discovering this, could easily break into a rage. But since there are only a few hours before the exam, a state of rage could impair the student's ability to study. Even if the anger suffices to inspire an intense search for the book, and leads to its return, the high emotions of anger must be suppressed. If a person's commitment to his or her goals is powerful, a temporary surge in high emotions will not break that commitment. If succeeding in school remains the student's main focus, then it will become immediately clear that maintaining a grudge against a prankster is less important than studying for an exam. So, when strong goals and values are guiding peoples' behavior, they tend to lock thoughts and actions into patterns conforming to a tightly disciplined world; so tight that disturbances can easily be dismissed while they are pursuing their primary goals.

When emotional restraint is practiced, there are fewer unexpected *response emotions* to deal with, allowing a more efficient use of time and energy. Restraint allows a person's emotions to rise very high in order to communicate their frustration, yet immediately drop to a very low level without burning bridges in a rage. This allows a person to *shed power*, dissipating emotions more quickly than new ones can arise. Responsiveness and full communication are maintained, all because a system of goals and values has sustained them through emotionally difficult times.

When the feedback loops by which people seek their ends are tight, they can synchronize many events at once. If the people involved have not created many problems, which later come back to haunt them, they will be in a better position to plan for the future. The fundamental idea of being ethical is that life becomes very predictable, with a minimum of problems. The side benefit of staying on an even keel is that one can work toward his or her goals in an extremely efficient way.

There is an analog to this in the cybernetics of mechanical systems. If there are several conveyer belts working in synchronization leading to the rapid assembly of some product, maximum efficiency will be realized if all the parts being assembled come together at the right time. But if some of the conveyer belts slow down every time an irregular load is placed on them, they cannot predictably deliver every part in synchronization with every other part on the assembly line. In order to synchronize the speeds of all the delivery systems, there must be some sort

of compensating system built into the electronics of the drive motors. Thus, disturbance rejection in a mechanical system operates in the same way that social rule sets help keep civilization running on time, and on course, day in and day out.

The Chemical Model

Social chemistry is like the fine wine of human understanding, revealing infinitesimally fine details of human interaction that flow uninterrupted from one element of human knowledge to another. There is a sense of poetry to be observed in the chemistry of good human relationships. Like an appreciation of fine wines, the delicate knowledge of human behavior, known in an instant of insight, shows a rare elegance of life evolving from behavioral observation into art. There is love, greed, and revenge. There is a thirst for power, sex, and wealth, all mixing and fermenting in society to produce a wide spectrum of human emotions. From this ferment, one sees the inspiration for centuries of fine writing as embodied in the highly sensitive emotions woven into Greek tragedies and Shakespearian plays.

It would seem, on the surface at least, that human beings are emotional creatures first, and rational ones second. In many cases, the expression of human emotions, reacting to other emotions, operates as a silent language behind the less *affective* words people use to communicate. In this fundamental emotional state, people possess a distinct *reactivity* to specific times, specific places, and circumstances. Most everything

known of the social condition of humans is known in terms of relationships. Some relationships, like flowers, bloom only when certain conditions exist.

Some emotional reactivity seems genetic, while other aspects appear learned. Fortunes can rise and fall in an instant based on a heightened sense of what people's reactivity to certain conditions and events will be. In business and politics, the object is to move people to action. Finding a person's reactive points is as much an art as it is a science. If changing the ambient mood is what it takes to get customers into a buying mood, then music will be used as a sales strategy. Sometimes the strategy incorporates symbols that catalyze a process that moves people to action. Other times, the catalysts are colors, smells, or words.

The most common forms of human chemistry can be seen in the dynamics of romantic affairs. There is also the chemistry of large numbers of people coming together in a unified social movement that is remembered in the cultural lore for generations. These are examples of chemistry leading to positive circumstances. There is also bad chemistry, which leads to trouble and tragedy. This is sometimes seen in the activities of small children who, without proper supervision, can become intoxicated with malicious fun. A building that has several windows already broken can suddenly become the object of such fun if there are rocks nearby on the ground. Another example might be the situation where several alienated adolescents are riding around in a car, under the influence of alcohol, and in possession of a gun. Under ordinary circumstances, none

of these adolescents would be so reckless as to kill someone. But the chemistry of the moment may create an ever-escalating thirst for excitement to such a degree that fantasy and reality are destined to collide.

When many people are forced to live and work with each other in confined spaces, variations in their cultural backgrounds can lead to some form of discomfort or conflict. A person who grew up poor, having to fight for everything they have, can be an annoyance to others who grew up in better circumstances. Each of these people is predisposed to a certain reactivity to emotionally charged words, events, and actions that can trigger certain responses sometimes predatory, sometimes aggressive. A man may think he is being exploited by what he perceives as aggressive behavior, unaware that his seemingly insignificant words or actions set off the aggression in the first place. Thus, the chemistry of human interactions requires the discernment of even the least significant of reactions that can grow to such a degree that they inspire overt conflicts.

The way the presence of morals, manners, and customs operate to minimize social friction goes almost unnoticed. But rule sets are the means by which a very large, complex, and technological society can grow and prosper. They integrate a diversity of backgrounds, while mitigating the harsh collisions between separate social realities.

The methodical construction of social rules might be thought of as the tactical development of chemical retardants to keep powerful human reactions from going out of control.

Sometimes the wrong mix of people creates a dangerous situation much like the careless manufacturing of explosives. If there is not sufficient filler in the nitroglycerin used to produce an explosive such as dynamite, it will explode when jarred. Likewise, social customs and rules act like a chemical *filler* to mitigate the unexpected effects of two very reactive people coming together. The protocols and decorums required of people in all social settings have a tendency to "chop" emotions so they do not escalate out of control. In effect, they act as chemical retardants to stop the spread of *fast-breeding* social reactions that lead to violence.

A high level of stress or tension can increase the level of a person's reactivity to others in the vicinity. As tension escalates, there is a greater tendency for undisciplined minds to say inappropriate things. These emotional excesses are often expressed in the form of some cultural stereotype, ethnic slur, or insult. They are spoken as though saying something will relieve the tension. But instead of relieving the tension, such words may convey a meaning or attitude that only catalyzes the chemistry of conflict. Cultural refinement, in this respect, is learning how to restrain the "wired-in" tendency to respond to environmental pressures by saying inappropriate things. A person knowing little more than good manners can successfully avoid the tendency to let emotions propel him or her into unnecessary trouble. Social selection and fitness, it seems, bear a relationship to the ability of a person to control impulses by using politeness and restraint in speaking of certain feelings.

When a person's health and welfare is at stake in unfamiliar territory, his or her tendency to react to anything must be minimized. For instance, a wealthy suburbanite whose car has broken down at night in a dangerous drug-infested neighborhood cannot react as he or she normally would to the people in the vicinity. First, the person cannot react in fright because that might invite attack. Second, the pressure of being in imminent danger places severe constraints on what the person can say. If people are nonreactive to those around them, the social chemistry remains unaffected. If they are reactive, they invite trouble. People who have been in tight situations tend to have a keen sense of where the chemistry of inappropriate words and deeds can lead.

The Physics Model

Momentum: In physics, an object set in motion, remains in motion until some force slows it or stops it. Similarly, human conflicts can be viewed as inspiring powerful emotions that once set in motion tend to remain in motion until some intervening force stops or stabilizes them. In social systems, instead of friction slowing movement, it is the sensibility learned from generations of human experience that slows disruptive and dangerous emotions. People responding to predation, manipulation, or abuse will sometimes bootstrap their emotions to a high level of intensity in order to convey a message to an aggressor that they are serious about defending themselves. But once boot strapped to a high level, these

emotions can trigger a vicious circle of violent acts if certain social mechanisms are not in place. Such emotions can attain such a high degree of momentum that they will cause people to lose control of their rational faculties.

For example, in the workplace, a worker might find he or she is being abused by another employee. The conflict eventually leads to a situation in which emotions rise and gain momentum. Every verbal exchange sees an increase in the intensity of the conflict. Voices naturally begin to rise as one angry party attempts to communicate the intensity of his or her feelings to the other. But the intervention of customs and convention will generally break the gathering momentum of conflict. A simple reminder by other people in the vicinity that loud talking is inappropriate can jar the senses of emotionally distraught combatants, keeping their responses at a more civilized level. Social rules, in this light, serve as behavioral guideposts when emotions run so high that the people need direction in their thinking to lead them back to sensibility.

High emotions can be set in motion by productive or destructive manipulation. A healthy society thrives on a diversity of emotional exchanges. While humans might want to believe the world operates on a purely rational basis, in practice many relationships operate at the symbolic and emotional level. Words spoken without emotional content can only communicate so much information in a short time. Emotions, on the other hand, can be rapidly communicated in the context of words, tightly abstracted and condensed,

so they immediately rouse another person to action. Since the ambient level of stress in the workplace increases using such techniques, mechanisms of restraint must also evolve to stabilize high emotions.

An example of constructive emotions that possess little momentum can be seen in the case of an office manager under intense pressure from upper management to get things done who overlays his communications with *snarl words* to provoke employees to immediate action. The conveyance of emotionally powerful words is sometimes the only way to move people to action, even though it inflicts pain and discomfort. Thus, condensed languages of symbols and emotional abstractions exist that do the work of moving people to action in a meaningful way. In a fast-moving and highly dynamic society, a considerable amount of stress is generated in this way. The intensity of emotions under such conditions can rise to a level analogous to working inside an environmental pressure cooker. In these highly charged circumstances, the emotional momentum must in theory be minimized, or extremely violent reactions can follow. In most cases, momentum that gathers where strong emotions are present is mitigated by the rational content of such exchanges compensating for errors and oversights in the communication. Thus, the curve of emotional momentum in reasoned exchanges is far different from the curve of increasing emotional momentum in nonrational exchanges that have no accompanying compensating rationales.

The movement of energy in a system: Conflicts are the end product of an endless process of defining levels of social status, wealth, political power, and educational stature within a social system. While this may only occur at the subconscious level, the conveyance of personal power represents human struggle at the primal level of competition. Each person possesses what could be called *personal power a* form of energy that, like electricity, can be used for productive or destructive ends. Possessing sexual knowledge, for instance, gives the more sexually experienced person a form of power over a more naive partner in romantic exchanges. The way people exploit this tactical advantage over other people can influence their success and acceptance in society. If the use of personal power creates too many negative repercussions, a person may well miss many educational and employment opportunities as the result of being distracted by the many interpersonal conflicts he or she has engendered or been drawn into.

The sum total of the social currency a person possesses can rise or fall each time one person connects with another person. If a heated conflict arises, disruptive negative emotions can emerge that cling and afflict a person's life for days or even years. If people burn bridges of opportunity in these exchanges, they then place themselves at a competitive disadvantage to others in the society. When this happens, emotional energy moves out of a person's system in significant ways. Immature action represents the movement of energy out of a personal system. Since everyone is susceptible to the migration of emotional

energies into and out of their systems, the ultimate outcome of an energy transfer depends upon a person's long-term ability to be balanced and restrained in all emotionally charged situations. For many people, such ability comes with age and experience.

The presence of stress and fatigue in a person's life might be thought of as the end product of many energy transfers that go unseen by the conscious mind. An example might be seen in the seemingly playful nature of certain human involvements. Immature people sometimes play pranks on other people to get under their skin. But the object of some of these pranks appears to be quite predatory. If a man can be thrown out of balance enough to get him to respond in anger or rage, the prankster can receive a pleasure sufficient to encourage him or her to move to higher levels of exploitation. Such transfers of personal power are ultimately serious. Emotional energy in this example moves from the afflicted person to the prankster in what might be considered a parasitic attack on the victim's emotions. The attack has the insidious power to drain off much-needed energies. It is a concealed form of aggression that leaves the victims unaware of their exploitation by way of symbolic losses. Such exchanges may depress and dampen the spirit to produce and prosper, and therefore inhibit a person's ability to compete with peers.

Growing tension brought on by parasitic emotions inspires the afflicted person to respond in some physical or symbolic way to relieve the agony and pain of the attack. But acting out runs the risk of escalating a subconscious conflict into an

open and very conscious conflict that can build to destabilizing proportions. And emotions will rise unless they are *shed* by letting go, if only briefly, of some temporal impulse (i.e. to get back at someone, or reach equity in all transactions). An ability to shed power by letting go of what one thinks he or she needs to hang on to, allows a person to handle the power of many personalities in his or her life without having powerful personalities destroy the tranquility of the person's life. Parasitic emotions have the uncanny ability to make seemingly insignificant problems more important than they really are. Thus, if the loss of a few dollars in a transaction is exaggerated because of a fixation on the symbolic nature of the situation, a person may lose more than a few dollars being obsessed with less important concerns.

The heart of morality concerns the promotion of a better world in which predatory actions and parasitic emotions are discouraged in favor of more productive ones. A wide spectrum of fair and unfair forms of energy exchange exists in organizations, education, business, and friendships. In this respect, the methods by which a person gains power or an "edge" of any type is determined by traditions of morality, custom, and law.

Thermal energy: The movement of *social currencies* shows characteristics similar to the movement of heat in various mediums. If a hot liquid is poured into a thermos bottle, the liquid stays warm for a long time because it is well insulated. If the container is not insulated, heat will move from the liquid to the colder environment. Thermal insulation thus can be

thought of as a barrier preventing the migration of heat energy. Likewise, there are legal and moral barriers that prevent the immature or careless movement of money (an abstract form of energy) in a society.

Money is a form of currency that is highly coveted in social systems. Very small children do not have a sufficiently refined knowledge of money to possess huge sums of it. Because of a lack of education in its usage, or a lack of experience dealing with predatory elements in society, children are not capable of handling their finances. The money would simply disperse into a highly receptive environment because of some flattering words or the turn of some emotion, prompting the child to give it away. The abject exploitation of inexperienced people likewise is obstructed by the prevailing moral sentiments in a society, which inspires more experienced people to intervene in an exploitative transaction if it catches their attention.

Social laws and moral sentiments create barriers of all descriptions, in all avenues of life where immaturity and inexperience would see the loss of either money or some abstract form of social currency. The freshness and spirit of youth, for instance, is well protected from exploitative adults by laws that keep older people from intruding on the lives of the young. Among the things carefully protected from exploitation is a boy or girl's sexuality. Their youth, and all of the dynamics of their intelligence, talent, and sexuality, have value. It is value they inherit or acquire. Most important, perhaps, is protecting this personal wealth in the sense that it may exist as a function

of genetic design that allows an individual to find a suitable mate. Thus, if this currency is corrupted, it can destroy many opportunities in a young person's life. When there is sexual exploitation of the young, the currency exchange is so out of proportion that one person may gain a moment's pleasure while the other has problems for the rest of his or her life. Therefore, barriers evolve to protect the treasuries of youth.

Possessing a doctorate, a professional license, artistic talent, and the like, can also be thought of as currency which is vulnerable to the physics of currency movement in social systems. A professor who suddenly becomes the chair of a department in a large university comes into possession of a source of social currency. But more experienced and motivated people can rapidly dissipate that currency in clever seductions of the professor's emotions. But for the evolution of department rules dealing with such exploitation, the chairperson would become so mired in questionable activities as to be unsuitable for the position.

Societies structure themselves to "port" energy transfers to specific places at specific times to keep the rest of the system insulated from unauthorized energy leakage. Input/output economies thus are more efficient and more likely to flourish where less efficient systems fail. A social system must be rigidly constructed at certain points to maintain a level of efficiency high enough to survive. If energy can disperse in a structured system at will, there will be a loss of systemic efficiency. If a radio is immersed in water, it is likely to stop working. It will

cease operating because the water has corrupted its electronic integrity. Its circuitry will be short-circuited in areas crucial to its operation. Likewise, if administrators and department heads in a university are allowed to govern their activities by rules of their own invention, the structural integrity of a thriving input/output system will be corrupted. Strict rules create barriers that work together to produce a system that works. Breaking departmental rules short circuits the integral construction of a fine-tuned educational system. Thus, rules of honesty and integrity often accompany high positions in a community or business. The requirements and purposes of integrity in personal actions are the same whether they apply to an institution or to a moral system. The same principle of systemic efficiency applies.

Electronic model: Social rules seem to have evolved without there being any comprehensive explanation for their existence. What has survived in the cultural customs, morals, and laws is essentially what works, even though the rationales for upholding such rules cannot be explained. Most people have goals and ambitions they seek all of their lives to realize. Some are more successful than others in achieving their goals. If one were to analyze successful strategies, perhaps one of the most common would be the capacity to learn how to integrate well socially. Insightful people realize early that the established society has the wealth and power they desire. It is attainable, but only by integrating one's talents and lifestyle with the needs and values of the established society. Thus, the process of integrating a small

personal system into a larger social system has characteristics much like impedance matching in an electronic system.

A fundamental tension exists between the needs of individuals and the greater society. Each depends on the other. The culture can maximize its power by accepting a wide diversity of people. While it needs this diversity, it can only nurture those who do not excessively disrupt the order of things within society. People of many backgrounds comprise a system of authority. Assimilation into any cultural system requires, to some extent, acknowledging the power, talent, or educational abilities of long-standing members of its power structure. Those who assimilate well over a broad spectrum of relationships are in a better position to succeed than those who frequently clash with accepted customs and authorities. Knowing a culture's customs and manners increases a person's ability to systemically integrate. As the large number of fine-tuned integrations increases, there is an exponential increase in systemic integration, leading to greater social power, wealth, or professional stature. In some instances, people have power and position due to their extraordinary sensitivity in matching their communications, body language, and attitudes to the people around them.

To realize one's potential is sometimes to attain a high level of social integration where jobs come easily, work is less stressful, and life is more enjoyable in a wide circle of friends. Each level of sophistication a person aspires to requires that certain protocols and decorums be recognized. Once they are

known and implemented, opportunities and desirable employ-
ment benefits will naturally go to those who share common
cultural values. But such integration only comes when there
is a state of matching characteristics between the person and
the cultural system she seeks to enter.

Effective social assimilation has its analog in the operation
of electronic circuits. In an electronic system, if the output
power of a transmitter is to be maximally conveyed through a
wire to an antenna, all of the components of that system must
have exact matching impedance characteristics. No matter
how powerful the transmitter is, if there is an impedance
mismatch, power will be wasted in the resistance produced
by such a mismatch. In a social system, an example of this
might be seen in formal banking procedures. An error in a
bank account might provoke an angry customer to argue
with the bank teller. But if the customer begins to shout as
the tensions increase, the teller may find the situation out of
character with required protocols and decorums of banking
and shut the window, breaking off communications. No matter
how upset the customer is, he or she can only communicate
the problem effectively by discussing it in normal tones. The
customer cannot force the bank to meet his or her demands,
even though an error has been made. Other social requirements
go along with the exchange of money in this transaction.

The larger social system, like the banking system, functions
at a precise level of communication where excessive emotions
dampen rather than enhance communications. So, as people

mature, they begin to recognize the virtues of ordinary protocols and decorums that help facilitate their daily needs and transactions. And, as people rise in stature, they attend to finer and finer details of how they communicate with others in order to increasingly garner an advantage for themselves. In this respect, good communications, social integration, and morality combine as one function to further social productivity and harmony.

Social Engineering

The idea of social engineering reasonably follows from the integration of cybernetics, mathematics, and ethics. From the synthesis of these disciplines, the evolution of ethical systems can theoretically be shown to be a highly organized process. However, methodically uncovering this organization would likely involve a time-consuming process of research and experimentation, following a path similar to that which science took to uncover the basic principles of engineering.

A comparison can be made between the evolution of engineering principles in the field of structural engineering and the as-yet undefined engineering principles of human societies. If a building is constructed in conformity with prudent engineering principles, it obviously will withstand the effects of an earthquake more successfully than a building that is not. Societies can also be said to have structure. Structure is ordinarily thought of in terms of economic or political arrangements, but there is a deeper structuring of laws, traditions, and customs that form the backbone of a thriving society.

When people abide by the rules of their culture, they reinforce and add to its structural integrity. Integral systems, whether mechanical or social, can clearly survive uncommon stresses and strains better than poorly constructed ones.

A building's ability to survive in an earthquake is a function of its conformity to basic engineering principles. Similarly, a person's ability to assimilate into a culture and derive benefit from it can be said to be a function of conformity to certain laws, customs, manners, and moral traditions. Not all poorly constructed buildings will fall in an earthquake, nor will all people's lives be harmed if they do not conform to social standards. However, when people do not want to leave their future to chance, they tend to follow more conservative path-making decisions. For instance, property owners often have considerable investments in their buildings and thus may not want to put those investments at risk. Likewise, people who have carefully built their careers may not want to get involved in questionable practices that jeopardize the product of years of hard work. Therefore, to insure that problems are held to a minimum, people adopt practices that are known for their beneficial effects. In both structural and social engineering the object of good design work should be to make events (mechanical and human) both predictable and functional.

A society builds structure when it evolves in an organized way. Likewise, people build structure when they adopt certain rules of order. If the way people structure their lives is poorly defined, the relationships they establish with others will lack

definition and integrity. The bonds such relationships create will not always be strong enough to withstand the intense ups and downs of conflict and stress that often occur between people in stressful times. Therefore, it is possible to make a comparison between the effects of stresses and strains on the integral construction of a building, and the effects of uncommon stress on the integral construction (emotional and physical stability) of a person's life. In an orderly society, certain behaviors are discouraged because they undermine the integrity of a person's thoughts and actions. Likewise, in structural engineering, the use of certain materials and the implementation of certain construction practices are discouraged because they weaken the structural integrity of a building.

In human cultures, the evolution of ethical systems is facilitated by the remembrance of the many human actions that undermine the integrity of a person's thoughts and actions. These remembrances are recorded in the cultural lore, research, technical writings, and literature accrued over many centuries. The remembrance of human actions in this way may not be an exact science, but it does have scientific characteristics. Both the scientific approach and the more informal accumulation of human knowledge evident in social rule sets manifest ever-higher levels of social organization. At some point, however, the pace of social evolution will increase to such a level that the traditional method of determining ethical behavior must move from an informally evolving system of knowledge to a formally evolving one. Social engineering is an ideal way to

meet the high level of responsiveness to change that a highly dynamic social system demands.

Social engineering cannot become a respectable science if it cannot define certain forces and principles of action that lie at the foundations of cultural growth. The discovery of precisely which principles of human action extend the survivability of the species, and which do not, can only follow from a thorough analysis of human behavior. A survey of laws, customs, manners, and beliefs that have survived for thousands of years might be an appropriate starting point for such an inquiry. If an immense number of behaviors have been tried over centuries of social construction, then those behaviors that have prevailed will begin to form an outline of the hidden forces that sustain them. And, if there are forces hidden from direct experience, and those forces ultimately influence the survival of organisms, animals, and humans, then evolutionary biology takes on a whole new meaning. Survival thus becomes a function of acting in parity with fundamental principles of organic action, and extinction becomes a function of falling below a threshold of sensitivity sufficient to survive and adapt to the environment.

An example of this might be seen in structural engineering. Investigation into the nature of the physical properties of materials uncovered a series of clues and information that led to the formation of the engineering sciences. As more became known about the different kinds of structural material, the more clearly an outline of the principles of materials science emerged. Physical materials have very real limits and

characteristics. If these limits are not considered in structural designs, the buildings they produce may eventually fail from uncommon stresses and strains.

In engineering, the sum total of all turning, deflecting, and stressing forces on a structural member at a particular point is calculated as its moment. In social engineering, the same type of calculation is possible. An ethical moment might be calculated as the sum total of all influences and conditions under which a person decides to act on a problem that is inherently risky or stressful. Since human relationships are complex, many stresses and strains can suddenly converge, putting a person's emotions to a severe test. The negative effects of many questionable behaviors overlaid on one another in the same moment can accumulate to produce stresses and emotions that go out of control and invite disaster. Social morality, in the main, has always reflected a conservative estimation of which activities are healthy and should be pursued, and which can cause problems if one is not prudent in the entire management of one's life system.

Encouraging the evolution of moral science is inherently risky. There is a certain elegance to human deceptions that justifies wrongdoing. In this respect, the idea of an ethical moment is itself questionable. It is an interesting idea, but can it really produce ethical understanding over extended periods of social evolution? Thus, there is, in theory, a certain priority to classical moral thinking that takes precedent over newer ideas a moral science may attempt to assert.

Part of the risk inherent in using a new science to further self-serving political causes can be offset by the way it is broken down into separate categories of description. A theoretical model thus can be verified from several scientific viewpoints. Some of these have already been discussed. Other more specialized areas might include dynamic equilibrium, social equilibrium, flow, systemic efficiency, synchronization, dynamic balance, and systemic interface. In all these categories, subtle reasons for the evolution of ethical systems become apparent. These influences may not seem as important as larger moral concerns such as lying, cheating, stealing, and killing, but they do have an important influence on the fostering of higher and higher levels of civilization.

Social Equilibrium

Even though dynamic systems are in motion, they experience a form of equilibrium. Music has motion, yet it also establishes a familiar theme, defining a sense of dynamic equilibrium. Once a fairly predictable system of variations on a theme is presented, notes falling outside the norm can create a dissonance in the listener's ear.

Life in process is much like a symphony. While there is a wide spectrum of variation in human behaviors, there are, in theory, boundaries of equilibrium that cannot be crossed without causing dissonance. When cultures have experienced what can be called boundary problems for generations, certain moral views are likely to have evolved that assign a

certain degree of moral value to a particular behavior. Social engineering, in this light, becomes a science concerned with discerning limits and boundaries across an immense spectrum of possible human behaviors.

Social equilibrium can be either of the positive or negative type. Positive social equilibrium is highly tolerant of extremes. It accepts a wide diversity of talents in order to gain the maximum social benefit. Negative social equilibrium does not tolerate a wide diversity of ideas and talents, particularly if they come from outside a closed circle of authorities. In such a tightly closed system, peace and tranquility are maximized at the expense of diversity. This yields a certain uninspired peace, but undermines long-term survival, as outside competition will, given the opportunity, throw off the authority of an ingrown power structure.

Both types of equilibrium possess desirable qualities. Evolving systems may experience times when they close, in much the same way humans need sleep to regain their focus and energy. Tolerance of diversity creates certain discomforts that are eventually overcome by the benefits which tolerance inspires. If nothing good comes of it, the system moves from a positive to a negative state in defense of its energies.

In either case, exceeding certain levels of disruption engenders societal disequilibrium which in turn inspires a response to curtail such activity. In this way, certain moral practices are encouraged or denied on the basis of their effects on the social equilibrium. The established equilibrium becomes a reference point by which

subsequent behaviors are gauged. While the moral nature of certain activities remains more or less fixed, behavior in general is determined in a flux of systemic changes that can be estimated in the conceptualization of an ethical moment.

Flow

Social engineering has been an integral part of society for countless generations. Its influence can be seen, for example, in the construction of a vast highway system. With highways, many rules have evolved to govern the traffic. The primary focus of these rules relates to a necessary flow of traffic uninterrupted by accidents. Once traffic rules are implemented, there is greater systemic efficiency, reduced risk to health and welfare, and the synchronization of the policies of many communities into a single unified system.

The ideas of flow and equilibrium have some common characteristics. In both instances, the outcome of good social flow, or social equilibrium, is a greater predictability of events. Once a certain amount of flow is established in a society, people can plan for the future in ways that they could not if such predictability were not present. For example, if there were no predictable patterns of flow on the highways, it would be very difficult to plan a long trip. Good flow allows for planning, and planning facilitates a higher level of systemic efficiency through the synchronization of activities, which results in good flow.

Good flow is something many businesses, such as banks, are interested in. Take, for example, a person's credit rating.

If a man repays all his debts on time, without reminders or coercion, he receives the highest credit rating. If he must be prompted to repay what is owed, this fact is recorded in a personal credit history. Large financial institutions, which process immense numbers of loans, are under pressure to take only those applicants whose credit record is the very best. If it is not as good as it could be, the lender will charge a higher interest rate to offset the potential cost of the slight risk and of having to occasionally remind the borrower that he has a debt to be paid. If his credit record reveals many problems, he will not be loaned the money at all. Lending done on an immense scale, at low interest rates, requires a certain predictable flow of revenues from interest and principle payments. Borrowers who are constantly late in their payments incur costs that disrupt the flow of business. When this happens, banking begins to move from being a lending process to being a collection agency. Those with bad credit must then seek out the more marginal lending institutions that charge considerably more for their services and are better positioned to deal with the disruptiveness of troublesome clients.

Dynamic Balance

The flow of information reaches its theoretical maximum in balanced systems. When a large system approaches a state of balance, the subsystems that comprise its construction are reasonably in balance. In this efficient state, feedback and information cross systemic boundaries, freely and unobstructed.

Another meaning of the word balance has to do with the emotional and economic exchanges that operate between people, their friends, and the community. In close relationships, actions spontaneously arise and information flows unobstructed. In these relationships, the participants strike a balance, and with effort, maintain it. This is necessary in a fast-paced, dynamic system that, like a rapidly spinning wheel, can fly apart from vibrations set up by imbalance. The fluidity of communications in balanced systems facilitates immediate feedback so a problem can be immediately remedied.

Systemic Efficiency

If the evolution of rule systems can be shown to be linked to the survival of humans as individuals or as a species, then systemic efficiency becomes an important element in the construction of those rule systems. In a highly competitive world where humans not only compete with each other for scarce resources, but also with other organisms in the environment, the efficiency of each competitor's actions may determine who prevails.

The evolution of human moral systems appears to be a highly efficient method of maximizing human potential and minimizing conflicts and inefficiency. In a society in which people are defined by their moral characteristics, the economics of operating a large social system becomes much easier. In order for business, government, and education to run smoothly, efficiently, and productively, the many parts

that make up their construction must be interchangeable. For example, a person's work habits and reputation as an honest, diligent, and methodical worker are important considerations in hiring new employees. Employers do not always have time to train new employees. Thus, behavioral characteristics, as well as occupational characteristics, allow a greater efficiency to be manifest in a society as there is an increase in the interchangeability of its parts.

Another aspect of morality implied in consideration of systemic efficiency is time and place constraints on certain types of human activities. A female bank teller who goes to work in attire more appropriate for a nightclub will invariably disrupt the tranquility and flow of business. Since it is more appropriate and profitable for banks to focus on aspects of business rather than sex, behaviors that profit the bank will naturally prevail over all other considerations, reinforcing and perpetuating a social custom that separates all activities by their times and places.

Simply because a certain activity is not wholly efficient does not mean it is automatically out of place in the construction of a harmonious society. Efficiency done for efficiency's sake creates a tyranny of efficiency that diminishes the spirit of human endeavor. Deoptimization is sometimes necessary to sustain other, more important considerations.

In theory, the interaction between culture and biology results in societies moving to higher levels of order and efficiency, which then results in finer distinctions of law and

morality. The original human impulse to make rules may be traced to the need to survive. But as societies have become more sophisticated, efficiencies of societal organization have begun to dictate what the rules will be. As the world becomes more complex, an increase in the synchronization of its many parts becomes vital to its long-term survival. Societal efficiency is achieved by organizing activities congruent with the priority and appropriateness to their time and place. Customs and manners, therefore, evolve as an extension of the social morality to further distinguish between behaviors that are good and bad, efficient and counterproductive.

If there is not a concomitant increase in synchronization, the social frictions and inefficiencies that follow will invariably affect the quality of life and the ability of that culture to compete militarily and economically with other nations. These results occur because in a highly dynamic system reliant on a high degree of systemic coordination, small disruptions can have an exaggerated effect on the peace, prosperity, and productivity of the larger society. Morality thus evolves to another level of complexity when viewed as a function of societal efficiency. What follows, in ethical terms, are time and place constraints on a multitude of human behaviors to increase social synchronization.

Communications and Systemic Interface

Verbal and written communications are highly refined and efficient forms of social feedback. When problems arise, there

is cultural feedback by way of verbal, nonverbal, and written communication. Over centuries, an accumulative remembrance of these feedbacks begins to define those human actions that work and those that do not. This knowledge in turn becomes part of the foundation of a culture's formal educational system.

Learning to communicate, and learning about the society, is not all that a person must do to cope effectively in a highly competitive environment. One must be able to interface a personal world of ideas, skills, and desires with an external world that may have considerably different ideas, skills, and desires. As a person matures, he or she becomes part of an increasingly complex system of relationships, obligations, and hierarchies of authority. As society evolves more rapidly, a person's ability to assimilate into it with ease becomes more difficult. Failure to communicate well, or failure to acknowledge simple manners, customs, and laws, can lead to violent conflicts between people. Therefore, communicating and assimilating in a dynamic social system require ever more complex and sophisticated educational techniques.

A comparison can be made between educating a child and programming a computer to function. A computer's behavior is defined by its operating system. A child's behavior is determined by education, cultural climate, and genetic variables. Before a computer can begin to function, it must have its operating system installed. Before children can fully assimilate into their culture, they must have a working knowledge of their culture's operating system by way of an understanding of its history,

morals, laws, and customs. A person can gain such knowledge through direct experience or formal education. Since the number of experiences needed to assimilate well is immense, the more efficient route is by way of formal education. In other words, a person must know something about the world if he or she expects to function well. While learning history, language, and literature may sometimes seem useless, these studies are a complex and sometimes subtle means by which powerful behavioral abstractions are conveyed to young people, allowing them to participate in, and enjoy, a civilized world without having to repeat the mistakes of the past.

On each level of human experience, there are many people who have worked for years to establish themselves as a political, social, or intellectual force within a particular group. This means that a young person who is attempting to assimilate into a particular social system must first accommodate its power structure. Consequently, gaining acceptance in society requires the use of good assimilative techniques. A person must not only learn how to communicate well, but also to interface well morally, culturally, and intellectually.

In theory, social growth is maximized under conditions in which social assimilation occurs with the least amount of friction. The socializing dynamic is like an opening and closing circle of life that relies on the energies of more and more people to sustain its high degree of harmony and productivity. At some point, there is a triple point, (a chemistry term) where the socializing process, the communicative process, and the

systemic interface processes merge as one. In this highly efficient state, dissemination and comprehension of societal feedbacks are at their maximum. But in order for people to attain a high degree of integration with social and political power structures, they must overcome a certain degree of selfishness. Thus, the price of admission to society must begin with the genuine recognition that there are other people in it. And this fact must be learned repeatedly on every social and economic level.

Recognizing that other people exist in a society, and have rights and considerations owed to them, is also part of the moralizing process. It is a process that begins in early educational training. Since students must learn to cope with a wide spectrum of behaviors and cultural backgrounds early in their lives, they are learning not only assimilation skills, but communication skills as well. If, in this process, people lose sight of the virtues of the rules of the society in which they are growing up, they will be at a disadvantage in being able to fully assimilate later on.

Society is a highly compartmentalized structure. A person may wish to migrate through the society either horizontally or vertically. In either case there are certain matching requirements that must be met in order to move much distance socially. A person cannot force himself or herself from one system to another. Each level of aspiration can be thought of as a separate system. To move easily from one system to another, an effective interface must exist or be built to facilitate the journey. A computer does not simply download binary bits of information

directly into a telephone line to communicate with another computer. It must first establish recognizable protocols with the other computer. It does so through modems that provide an interface between the two computers. Similarly, it is refined communications that ultimately pave the way for effective social assimilation. This takes place by means of the construction of a workable interface between people in all social systems.

If a person has moved from one system to another by way of good matching characteristics, staying in that newer system is another matter. Movement between systems requires not only a knowledge of protocols, but also an acceptable way of behaving. For instance, if a woman enters an elegant and well-maintained mansion with dirt on her shoes, it does not take much awareness to see that she does not belong in that house. In the interfacing process, subtle feedbacks will illuminate the indiscretion of such insensitivity. If the woman responds, she moves forward to the next task of learning the subtle proprieties of being in elegant houses. If she does not respond, she is not invited back and therefore fails to interface with this particular system. It is a process that goes on continuously as a person matures and learns to integrate with society as a recognized social member. Sensitivity to a vast array of morals and manners is an essential ingredient in the interface process, as well as respect for the structure of its authorities.

In the final analysis, it is difficult to regard morals as relativistic notions of right and wrong that, after all, are only people's opinions. There simply is no way to maximize the potential of

a nation or a person without pursuing and instilling a sense of propriety in the smallest detail. Civilization today, while theoretically only in its infancy, is an immense and powerful structure composed of thousands of highly refined subsystems. The refined areas of knowledge and cultural experience form the foundation of a conceptually stable universe. While some moral prohibitions that evolve from this knowledge may seem prudish and out of place, they are, nevertheless, the end product of thousands of years of careful civilization-building that have wisely used certain information implicit in environmental feedbacks to guide the future. In this light, when cybernetics is incorporated into the idea of ethical evolution, grasping the notion that reason (or reasons) lies at the foundation of ethics becomes both clear and necessary. And once the idea of reason is discerned, the notion that first principles of ethics do in fact exist becomes that much easier to understand.

Charting Human Emotions

For social engineering to exist as a science, we must better understand how human emotions affect the growth of civilization. Ethics derives from a cybernetic process of actions and consequent reactions. In cybernetic ethics, information is extracted from societal morals, manners, and laws to quantify ethics. Take, for example, the study of etiquette.

Examining social protocols and the rules of decorum are the best approaches to describing etiquette. As rules go, they might not look like much, but they are important. Protocol refers to a social communication procedure; decorum refers to the communication behavior or tone. Both protocol and decorum relate to rules of etiquette. For example, the procedure for correcting an awkward social situation in which two people bump into each other is for one or both to say, "Excuse me." The tone in which the words are spoken must convey sincerity and concern. The person who caused the collision may not even say, "Excuse me," while the other person may say it.

Why, one might wonder, do we have to say "Excuse me" at all? The reason we do so is to defuse any high emotions that might arise from the collision. Some might perceive the collision as an intentional act of aggression. It could be said that a statistical number of people will make no apology, and a larger statistical body of people will—and for good reason.

In scientific terms, no repository of statistical information exists. However, if we consider society to be an evolving environment we can conceive of the idea of a societal mind capable of discerning good and bad behavior. Over thousands of years people have observed and experienced a vast range of human behavior from which one learns that actions have consequences. Not saying "Excuse me" is a bad choice because it contradicts the cultural memory of good choices.

Peace, prosperity, and productivity are socially desired ends. Arguments that arise from social collisions rob the peace, drain the social prosperity, and diminish productivity. The rules of etiquette in its many forms reflect the strife that will arise if rules are not present to suppress it.

Examining many of the rules of etiquette reveals the face of human emotions. It is no easy task to pick apart the various emotions at play in the simple example of two people bumping into each other. However, one must remember that the periodic chart of chemical reactions also took a long time to develop. Building a periodic chart of human emotions is no less daunting.

To understand human emotions one must know much about a person's state of mind at any given moment. If two

people bump into each other, and one person is in an aggravated state of mind, that anger might transfer to the other person, causing an explosive emotional display. If the aggravated person is under the influence of drugs or alcohol, the emotions might be more intense. However, if both parties are intoxicated and in aggravated states of mind, the rule of law or etiquette tends to devolve into a physical struggle.

Societal memory plays a role in etiquette as well. Take, for example, the consumption of alcohol. The societal memory of alcohol goes back hundreds of years and is manifested in literature, laws, and moral codes. Adults have had experiences of their own that contribute to the perception that excessive alcohol consumption is wrong. In a sense, the societal memory suggests danger: one should always say "Excuse me" when one bumps into someone because, statistically, a percentage of collisions will spark hard feelings or violence.

A moral "ought not" is an expression of societal memory. And, invariably, each "ought not" leads back to human emotions that can be charted. All ethics are cybernetically derived formal codes that, like legislation, serve to engineer a society.

Realizing that actions and consequent reactions define the foundations of society will lead to a quantifying of moral and ethical behavior that will broaden the scope of ethical understanding.

Visceral Morality

Visceral morality addresses the seminal ground of social morality because it profoundly shapes the evolution of ethical systems. It is not morality learned from a book; rather, it is acquired through emotions and experience. For example, imagine that you have been standing in a long line on a hot day at the supermarket. As you approach the checkout someone cuts in front of you. Depending on other issues of stress and fatigue in your daily life, you react with annoyance or outrage. This is visceral morality expressing itself. Moral expressions such as this are not always fair and reasonable. Encounters such as this become part of societal memory. Some memories have endured over decades or centuries and taken on a form of legitimacy in written codes of conduct that define behavior in almost every aspect of social life.

Visceral Morality as Moral Knowledge

Most of the accepted, credible moral theory of the past 300 years would dispute the existence of "moral knowledge."

One cannot define morality or right and wrong behavior or claim murder is morally wrong by conventional meta-ethical reasoning because, by conventional rules of logic, one cannot logically move from "what is" to "one ought to do."

Emotional Reactivity

Emotional reactivity relates to the intensity of a response to environmental stimuli. A normally unreactive cerebral person can suddenly flip into a highly reactive state given a certain convergence of events. Such a person might have recently broken up with a romantic partner after an intense fight or lost a job in a power struggle at work. In such a highly charged emotional state he might respond to a mechanic over an expensive repair job on his car with intimidating language and mind games. In response to that mental provocation, the mechanic reacts powerfully in an emotional way that further sets off the car owner who is now in the unfamiliar territory of high emotions. Morals and ethics addresses both the mechanic's and the car owner's need for calm.

Quantifying Visceral Reactivity

Quantifying ethics and social morality would reasonably lead to the study of the five types of visceral reactivity.

Emotional Reactivity or Level 1 Behavior. A newborn responds to the world viscerally. As the child grows older, visceral responses are replaced with other types of responses

more appropriate to the civilized world. Visceral reactivity comprises at least two categories for adults: (a) environmentally triggered behavior, such as being startled by a spider, and (b) interpersonal situations that trigger behavior in terms of stages of maturation—childhood, adolescence, or adulthood.

Those interpersonal situations trigger **Cultural Reactivity Level 2**, which shapes and refines raw urges and passions. A child will express an urge at will, such as blurting out a need in the middle of a conversation. With time, the child learns the consequences of acting on impulse in relation to achieving important goals (i.e., not being inappropriate during a job interview). A person who has aged but not matured might consider staying out of jail an important goal. For a person seeking acceptance in high society, the goal might be avoiding offending important people.

Moral Reactivity Level 3. Moral and religious training inculcates certain responses to moral situations. Lying or attempting to deceive might provoke a response of disgust and disdain. A person with moral or religious training might react strongly to inappropriate language or dress. The active consciousness of morality and issues of right and wrong drives one's reactions to events.

Professional Reactivity Level 4 (disciplined and educated responses, including occupational learning): Optimally, to reach one's goals one must temper both moral and cultural reactivity with disciplined reactions that follow professional codes or instructions, formal training, education, or years of

experience. Visceral fears do not burden a pilot when flying through a violent storm because his reactions correspond to a set of procedures established in early training. Disciplined responses maximize survival at all levels of existence. Through training and discipline people can exist outside a food chain that depends on gross responses of vulnerable people to thrive. Here, a person exists beyond mere genetic definition.

Intellectual Reactivity Level 5. Level 4 behavior aligns closely with level 5 behavior. Here, a person does not always respond immediately to a set of codes, training, or social obligations. Level 5 people make reasoned, intelligent responses. For argument's sake, we can divide intelligence into two parts. First, optimizing intelligence involves being brilliant or smart but self-serving: for example, a person might bootstrap himself by his emotions to high levels of cultural, religious, or intellectual achievement. Second, non-optimizing intelligence is intelligence that is not self-serving in thought or deed. The use of genetic or behavioral templates to guide responses is rare here. Achievement in this world is deliberate, and well reasoned. Passions and pleasures, although significant, play a minor role in motivating a person here.

Level 5 reactivity can also include a highly sophisticated form of "emotional reactivity;" a highly sensitive and acutely perceptive view of social interactions. Successful and wealthy business people and professional diplomats often hone emotional skills in much the same way that a professor hones intellectual skills. Persuading people to work together or

finessing million-dollar business deals often depends on one's discerning insight into a client's or future business partner's emotions. The reactions of these people to those around them are highly quantified and executed in their delivery. It is not a literate or mathematical quantification; rather, it is an emotional and symbolic quantification that almost constitutes a language unto itself. The achievements of these people provides the evidence of this quantification.

The Cybernetic Trigger and Boundaries

Crossing a boundary triggers a cybernetic reaction of social feedback. For example, in a large department store where there are no clear boundaries between the cash register counter and the rest of the showroom floor, a customer inadvertently walking behind the counter and standing next to the cash register would naturally trigger the store clerk's concern. In another example, a stranger who inadvertently touches a woman might cause her to react viscerally and physically because the stranger has crossed a boundary, and it is of great concern to the woman to thwart unwelcome advances. In rough neighborhoods, many street people react strongly if someone accidentally bumps into them. In such incidents, unbridled emotions express themselves in the absence of police. Ordinary people might not recognize they had crossed a boundary and might suffer a beating as a result. In a final example, an unrefined person who sits down for dinner at an upscale restaurant crosses a boundary; a waiter offended by that

person's attire or language might ignore the patron, resulting in expressed raw emotions that could lead to the patron's physical removal from the restaurant. Boundaries define levels of emotional reactivity evident in a complex society.

Vibrant societies need a finite amount of inappropriate boundary crossing, within controllable limits, to give them meaning, romance, and depth. Wealthy people will dine in a rough neighborhood, putting them at risk in the same way that a mountain climber takes risks on the slopes. When boundaries are crossed and risks are known, life becomes more meaningful because one slip may put a person in serious trouble.

If we view human beings as biological machines, cybernetic triggers play an important role in notifying the human machine of a change of state. Crossing a perceived boundary will trigger a wide spectrum of responses, given differences in genes and acculturation. Scientifically, we could define this as a person's "reactivity" or predisposition to react to specific stimuli. A person's genes produce a wired-in response that, with time, is tempered by another wired-in response derived from acculturation. As people mature they learn to restrain the powerful impulses reactivity can produce. Emotions can undershoot or overshoot their intended targets or manifest as well-balanced responses. A culturally sophisticated person can respond to social stimuli in a way that minimizes conflict and maximizes social harmony and productive relationships.

A balanced response (a state of peace) does not trigger a cybernetic cycle. However, because it is so precise it

communicates information and a civilizing force that can become model behavior for others to strive for. Each personal encounter sets up a cycle of actions and consequent reactions. The relationships of immature people are often fraught with intense emotions that trigger other strong emotions in an endless cycle of actions and overreactions. Age and experience create emotional balance and reduce emotional excess. Thus, acculturation's powerful effect on a person's wired-in impulses diminishes the likelihood that a person will act in ways counterproductive to social and personal growth.

Behavioral Templates: The Relationship Between Ethics, the Civilizing Force of Acculturation, and (perhaps) Genetics

Human behavior generally follows what we may call "behavioral templates." Living is much more enjoyable if a person does not have to be alert to every danger and detail of existence during every minute of the day. For example, you board an airliner with hundreds of others. You are traveling with your friends. Your reactions are contingent on the actions and emotions of the other passengers. Your behavior is not focused; rather, it loosely follows a behavioral template of "how to behave in public on an airliner." The pilot, on the other hand, is expected to be fully "present" at the controls. The pilot must be focused, thoughtful, and alert to all possible dangers that could affect the lives of hundreds of passengers. The pilot's routine derives from a disciplined set of procedures.

The passengers' contingent reality has no place in the cockpit environment. The pilot's actions and reactions are finely tuned to be precise and balanced. Any overreaction or underreaction might cause the airplane to crash.

The existence of behavioral templates (genetic or cultural predispositions) creates yet another problem. If a person's actions and reactions are predictable, an unscrupulous individual can exploit that person. Again, one must think of the human being first as a biological machine. That is, most human actions and reactions are exercised at the subconscious level following this or that behavioral template. Only a small percentage of human experience is disciplined and well thought out. Because most people are so predictable, they invite exploitation.

People are vulnerable biological machines who need to express their identities in the context of some larger, more protective organization. Moral and religious codes of conduct fulfill the need to belong to something that can guide people through life's treacherous waters. In many ways the urge to survive inspires the growth of moral and legal systems to protect the highly vulnerable human machine from the excesses of human emotions.

The Philosophical Implications of Cybernetic Ethics

Moral Knowledge

The way that people react involuntarily to certain social stimuli demonstrates the presence of not only an emotional predisposition but also a form of moral knowledge. One might say that, in any society, visceral morality is an expression of "moral knowledge" at its most basic level. This type of moral knowledge may not be as precise as higher forms of knowledge, but it inspires ethical codes that are more enduring.

Two cultural mechanisms are at work here. First, the culture imposes constraints on behavior, in part because of the close proximity in which people live and work. Some mechanism of order and restraint is necessary to check intense emotions. Second, voicing moral concern reinforces and perpetuates those constraints when laws and customs are violated. At its core, a society is fundamentally a machine that inspires "an order to things" to maximize social and individual survival.

When a violation of custom offends adults, their reactions play an important part in a larger civilizing process. This is where cybernetics plays an important role in a society's survival. The first time a person behaves inappropriately, that person experiences unpleasant forms of cybernetic feedback that may be subtle or more overt, such as stares that induce embarrassment and humiliation. That informational feedback leaves a person uneasy and unsatisfied and can run the gamut from light annoyance to poisonous remarks that can deleteriously affect a person's confidence and/or self-esteem.

Numerous potential areas of human conduct can generate unpleasant responses. With time, people develop a sense of propriety in unfamiliar settings. Becoming an adult requires development of a certain amount of skill in ferreting out behavioral boundaries. For example, once a person becomes sexually aware, any inappropriate gesture can provoke an explosive response. In time, a young adult learns when and where touching is appropriate, when to be discreet and uninterested, when to mind one's own business, and so forth. Without a firm knowledge of behavioral protocols, moving from adolescence to adulthood can be difficult. Most adults have moral knowledge of a wide spectrum of behaviors; the law removes from society those who do not and imposes an even more stringent set of rules on their every action.

Moral knowledge manifests itself at each level of reactivity. An adult's ability to discern right from wrong might involve assessing right and wrong on all five levels. For example, at level

1 adults sense right and wrong based on a vague experience of "the general order of things" based on pleasant and unpleasant responses to their behaviors.

At level 2, interpersonal relationships evolve. Rewards and punishments for good and bad behavior are clear-cut, even without explicit definitions of "good" and "bad." A child undergoes socialization by participating in culture and experiencing a common educational system. For example, children must frequently stand in line at school and, under supervision, cutting in line is not tolerated. This lesson in "the order of things" is reinforced and perpetuated throughout a person's life. When an aggressive person cuts in line, that behavior violates the general order of things. Early childhood training and participation in "culture" predisposes a person to certain responses to certain reactions of others. It is inappropriate to cut in line, but it is appropriate to complain about someone doing so. At this level, the raw emotions of responding to social stimuli are shaped and tempered.

At level 3, people tend to align with a variety of groups and associations. If one of those associations is a religion, one aligns one's beliefs with a formal set of behavioral rules, strict adherence to which predisposes a person to certain sensitivities that, when a rule is broken, lead to powerful visceral responses. For such a person, adultery and extramarital sex might provoke a stronger response than for the general population. Informal groups, clubs, or associations can also align people's sensitivities to react to the group's internal rules.

In criminal societies, informing on a member to the police would provoke an outrage similar to the reaction explicit sex might provoke for sensitive religious people. Thus, moral reactivity is relative to time, place, and cultural situation. In each circumstance, individuals react to fairly established behavioral "wrongs." Morality would forever remain at this level if it were not for higher planes of ethical and moral discernment.

At level 4, individuals respond to the many mixed and conflicting feelings of visceral, cultural, and moral reactivity in a thoughtful, disciplined way. Military personnel respond to environmental stimuli in terms of training rather than emotion, as do airline pilots. For such people, moral knowledge enters the conscious mind by way of reasoning and training.

At level 5, a matrix of competing sources of information determines moral knowledge. The stability of this form of moral knowing requires a disciplined and discerning mind and discerning emotions. The propriety of an action is derived from a mix of reasoning, knowledge of theory related to behaviors, and a galaxy of other kinds of knowledge.

We should note that the words "morality" and "ethics" are used almost interchangeably. However, they are different. At its most fundamental level, morality derives from the visceral experiences of everyday living that come with age, education, and considerable experience. Shared human experiences inspire the evolution of a more formalized set of ethical rules. In general, people care about others' lives and do their best

to prevent past tragedies from afflicting future generations (paternalism). The spontaneous emergence of morality in the field of human experience is not totally without cause.

Moral Knowledge and Paternalism

Like a diamond, morality has many distinct facets. Paternalism includes the protective concerns of wiser and more experienced parents as well as that of older siblings, close friends, or concerned neighbors. For example, a young woman who has just begun a rewarding career, is well liked, and is a good worker recently has been coming to work late and excusing herself with initially credible explanations. Many established employers have seen it all, and some are quick to dismiss those who act in this way. A coworker who genuinely likes the woman and appreciates her talent strongly advises her to show up on time. This intervention is parental and addresses a fundamental problem of discipline and truth telling. Lying and exaggerating the reasons for tardiness have consequences. An inexperienced person may be unaware of the problems predecessors have caused and the lies they have told to minimize their tardiness. An environment in which making a profit or providing a service is essential has a finite tolerance for behaviors that deviate from established norms. In the long term, the working environment is a goldfish bowl of activity and intrigues that eventually becomes transparent to all. In this light, coworkers almost universally will take the high moral ground regarding an issue and present it to a new

or inexperienced worker. The woman might brush off the suggestion to show up on time by saying, "Who are you to tell me what to do?" However, the issue is not that of who is to say but of what has gone before. In other words, a person can express a bit of occupational wisdom.

At issue is the tendency of those in power to dismiss those who do not perform no matter how skilled they are at talking themselves out of trouble. Remember, throughout these writings the relationship between the presence of "power" and the threat of harm underlie a significant number of moral concerns. In this light, morality serves to educate people in the art of navigating life's dangers.

Types of Morality

So far we have identified five types of morality or moral response including visceral morality, cultural morality, doctrinal and religious morality, professionally based morality, and intellectually based morality (covering nonverbal and high-culture morality). These are but a fraction of the possible categories of moral responses, attitudes, or ways of experiencing life. These five categories summarize learned behavioral responses. In each category, either a system of formal learning or one of rewards, and punishments affirms and perpetuates the notion of right and wrong.

Traditional ethical thinking recognizes no evidence of what might be called moral knowledge. The constant affirmation or censure of specific behaviors forms the basis of human

moral knowledge. The ways in which humans come to know right and wrong are so numerous that knowing and charting them in detail is difficult. Cybernetic ethics aims to provide a platform of rational analysis on which to examine the many details of moral knowledge. This is similar to creating an enormous chart of human actions and reactions given certain other social pressures, inducements, or dangers.

Occupationally Based Morality

Occupational experience profoundly shapes the moral lives of most workers. For example, Susan admonishes Lisa, a graphic designer at a newspaper, for surfing the Internet during working hours. Susan's stature in the workplace is equal to Lisa's, but Susan takes the high moral ground in criticizing Lisa. What right does Susan have to declare that something is wrong with Lisa's work habits?

We can think of a business as a large organic machine that assembles the raw materials of information, talent, and management to produce a profit or perpetuate the enterprise in a positive way. In this respect, Lisa performs a job that must integrate well with other departments at the newspaper. Her performance, good or bad, has an effect on the newspaper. If Lisa slacks off in her work, other people must pick up the slack. In the workplace, employees are not always free to do as they choose. Bad work habits affect others' lives. The negative impact an action has on the lives of other people in the workplace defines moral wrong. If Lisa's advertisement

design is sloppy and careless, the poor quality of her work reflects badly on the newspaper. However, if Lisa has mastered her job description she is an artisan with regard to the finest detail whenever business economics allows. In the workplace excellence, rather than personal freedom, often defines good and bad behavior.

Why Evolutionary Ethics Should Be Considered in Science Rather Than in Philosophy

Formal ethics cannot resolve the issues of ethical theory for several reasons. The very language of ethics hinders problem solving in ethics. The development of engineering provides an analog: before the invention of calculus, tall buildings and long bridges over deep water were not feasible; the language of algebra and geometry could not address the complexities of their construction. Similarly, meta-ethical discourse does not contain the necessary tools to describe the complexities of ethical or moral theory. The history of evolutionary ethics tells us otherwise.

Attempts to construct a theory of the evolution of ethics have failed. Two of the more significant reasons given are G.E. Moore's naturalistic fallacy and David Hume's is-ought dichotomy. Part of the argument says that because words like "good" and "moral" cannot be defined, one cannot state what is moral and what is not. However, if one changes the language of ethics from meta-ethics to cybernetic ethics, a solution to complex ethical theories is possible.

Other Related Problems with Philosophical Language

Scientific terms can explain ethics in meaningful terms where conventional ethics cannot. In meta-ethics, there are three reasons that arguments cannot be resolved. First, words impose linguistic limitations on philosophical concepts. Certain words have "intensional" meanings or extensional meanings.[1] S.I. Hayakawa defines this term as follows: "The intensional meaning of a word or expression is that which is suggested (connoted) inside one's head. Roughly speaking, when we express the meanings of words by uttering more words, we are giving intensional meanings or connotations to things. When utterances have extensional meanings, discussion can be ended and agreement reached; when utterances have intensional meanings arguments may, and often do, go on indefinitely."[2]

The second problem with meta-ethical language is that no meaningful distinction exists between the general and specific cases of words. Using words like "good" and "moral" means that one begins with words that are general yet, in the end, begin to represent themselves as the real thing. The word "good," as used in meta-ethical dialogue, is not the thing symbolized.

S.I Hayakawa says, "The symbol is not the thing symbolized. The map is not the territory. The word is not the thing."[3] Third, words like "good" evolve from the doing of specific acts of good,

resulting in conflicts with the deductive approach to meta-ethical reasoning in which one moves from the general to the specific.

A good machinist is noted for the precision of his or her work. If the machinist meets every specification called out by an engineer, his or her work is called good. If he or she cannot perform the work within specified tolerances, his or her work is considered bad.

The total of all acts of good converges on a theoretical center defined as the generalized word *good*. Meta-ethics does not distinguish between *indefinable good* and *definable good*. As such, it lacks the requisite precision to solve ethical problems. In cybernetic ethics, the goal is to reduce all statements concerning the evolution of ethical ethics "to accounts of observable phenomena." Cybernetic ethics is, after all, about evolution in the real world, where evolution is driven by adaptation, which, itself responds to systemic feedback.

Summary of Important Philosophical Ideas

The ideas put forth in cybernetic ethics run counter to ideas proposed by philosophers such as David Hume, who rejected the idea that rational cause lay at the foundation of moral theory. For Hume, morality derives from the moral sentiments. Here, morality is not rational and not considered to have rational causes. One cannot logically move from *what is* to *what ought to be*. He says that "no ethical or, indeed, evaluative conclusion whatsoever may be validly inferred from any set of purely factual premise."[4]

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Drinking alcohol and driving is an example of moving from *what is* to *what ought to be*. Here, a hundred years of traffic data reveal a relationship between drinking, driving, and fatalities. They show cause for laws prohibiting drinking and driving. Traffic statistics form the basis for a factual premise that drinking and driving is wrong. Using the philosopher's logic, one might think that these laws are somehow illogically founded. If society did not make the leap from *is* to *ought*, then laws would cease to be enacted. If an intersection having no stop signs experiences accident after accident, is it unreasonable that one erect a stop sign to stem the pace of accidents? No, it is not unreasonable. Laws prohibiting drinking and driving and the subsequent placing of stop signs are inspired by systemic feedback in the form of traffic statistics. Here again, cybernetic ethics is about informational feedback that drives adaptation. Traffic statistics illustrate systemic feedback, and putting up stop signs illustrates adaptation.

Morality and the formal ethics that follow from it are based on cause (right or wrong). Morality is a natural phenomenon. It is not the same as philosophy. The words of philosophy are not necessarily the same as the words of morality because they often derive from a static context of language, not the dynamic context of human experience. The invention of the word *good* was preceded by the experience of it in the evolution of a language. In cybernetic ethics, some of the logic of philosophers finds conflict with science and reason.

Moral knowledge at the lowest level of its existence is viscerally known. Here, it is derived from experience. Meta-ethics

rejects the inclusion of experience in its logic, however; this is somewhat like rejecting the inclusion of the integral sign in calculus. Is it any wonder then, that ethics of the past have been unable to state whether murder is right or wrong? Being unable to discern right from wrong leaves a void in philosophy that can be filled by evolutionary ethics.

Business and professional ethics are a prime example of ethics based on experience. Because a business must make a profit, it must behave in a manner that maximizes profits. If the ethical command says, "One ought to be polite at all times," then it is a command steeped in the knowledge of what can go wrong when a businessperson angers a client by being rude. It is only reasonable that ethical codes evolve from actions that maximize peace, prosperity, and productivity.

Endnotes

[1] Extensional is an utterance that points to the physical world. Something one can feel, touch, photograph, or scientifically examine. S.I. Hayakawa, *Language in Thought and Action* (New York, Chicago, San Diego, Austin, London, Sydney, Toronto, Harcourt Brace Jovanovich, Publishers, 1978) p. 53

[2] *Ibid.* p. 53

[3] *Ibid.* p. 28

[4] Stanford Encyclopedia of Philosophy. *Hume's Moral Philosophy*. Published Friday October 29, 2004, Section 5, Is and Ought

The Practical Application of Evolutionary Ethics to Theoretical Problems

The following is an example of how cybernetic feedback shapes and sharpens through experience the definition of a moral term such as rape. When you look at moral and ethical systems as having evolved you begin to see the foundations of moral systems resting on human experience. Take for example the morality of rape. Professor Singer in "Practical Ethics" says to the effect that centuries of moral thinking have been unable to determine if rape is morally right or morally wrong. However, traditional philosophical reasoning has systematically omitted certain facts that might lead reasoning to the clear discernment of right and wrong. If you were to question ten adults about what is right or wrong about rape facts would begin to accumulate such as rape is violent physically and emotionally damaging. With enough people surveyed the list of reasons citing rape is

wrong would grow. On the other hand, hardly anything good would be said about the rightness of rape. Centuries of time and millions of instances of rape would sharpen rape's reputation as being a morally wrong behavior. Rape is but one behavior of hundreds which moral rightness or wrongness can be assigned. Omission of the facts that accompany certain behaviors contribute to a climate in philosophical discourse where nothing can be resolved. The evolution of moral systems evolves slowly in society. Over large amounts of time behaviors and actions that cause pain, suffering and death gain an indelible reputation as wrong behavior. Actions that contribute to social peace, prosperity and productivity gain a reputation as morally right behavior.

Another reason the determination of right and wrong may be difficult to determine has to do with linguistic principles. S.I. Hayakawa in "Language Thought and Action" says that the meaning of words falls into two categories. There are extensional meanings and there are intensional meanings."The extensional utterance of a word is that which points to the extensoinal (physical) world..." Here the word-concept of rape is definitely not an idea of the mind, it is something real and can be experienced. On page fifty-two he goes on to say: the intensional meaning of a word or expression, on the other hand is that which is suggested (connoted) inside one's head." Hayakawa reminds us "the word is not the thing." Thinking about rape that is defined in terms of human experience is the way forward when trying to determine the rightness or

wrongness of rape.

Philosophers need to consider the nature of arguments, over large amounts of time, to gradually deteriorate, become indeterminate, relative or ossify. In a very narrow sense "semantic infiltration" could be considered the gradual corruption of reason. Without an element of experience to anchor ethical concepts ethics remains only an idea of the mind.

Evolutionary ethics has the potential to unlock many perplexing issues in philosophy. For example, the question sometimes arises asking how can ethical systems be relative from region to region or nation to nation and yet be unified by first principles of morality and ethics. In nature one finds great diversity. Diversity fortifies the integrity of biological systems. If there is a flaw in the design of one system, and the system fails, all other systems do not fail as well when you have diversity. To design a world where there was only one moral system would lead to catastrophic failure. Not only is there relativity from system to system but there is a unifying theme of cybernetic principles that govern the evolution of moral and ethical systems.

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