Chapter 6: Logic and Hope

Man is a rational animal. Aristotle

Logic does not exclude madness. Erich Fromm

Insanity in individuals is something rare-but in groups, parties, nations, and epochs, it is the rule. Friedrich Nietzsche

Somehow I am not distressed that the human order must veil all our interactions with the universe, for the veil is translucent, however strong its texture. Stephen Jay Could

Can we inhabit this space of unity rather than just visit it? Mohale Ralebitso, a South African banker, on how the South African people came together for the 2010 FIFA World Cup.[1]

Comfort women, rape camps, the new racism, ethnic cleansing, Sudan, Somalia, Rwanda, terrorism, 9/11, Iraq, Afghanistan, global warming -- is this the fate of the twenty-first century? Will there be more of the same?

In the 1990s, the cold war gave way to dozens of ethnic, religious, and sectional conflicts. Millions of people were tortured, starved, and slaughtered. Many were innocent children. This photo of a vulture standing near a starving Sudanese child won Keven Carter the 1994 Pulitzer Prize for photography. A few months after receiving this award, Carter, who was only thirty-three years old, committed suicide. The war in Sudan was between an Arab Muslim-dominated government in the north, and black Christian insurgents from the south.
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A symbol for the 21st Century?

[1] Quoted by Roger Cohen in the New York Times, July 5, 2010

An essential tenet in Aristotle's philosophy (384-322 BC.) is that the human species is a rational animal. For Aristotle, implied is that because we have the power of reflective thought, we can learn about the world and make progress, and that we can not only improve our physical lot technologically but make moral progress as well. Does history support this claim?

In this short transitional chapter between informal and formal logic, we will discuss two questions. (1) Why be logical in an illogical world? (2) Is our reasoning ability a tool for making a better world, or is it actually responsible for violence, destruction, and exploitation—a tool in the service of our wretched nature? Obviously, I believe there are very good, positive, and hopeful answers to these questions, or I would not be writing this book. However, because these questions are of such great consequence, it is important that we be as honest as possible and confront directly the most negative possibilities.

The first question poses an immediate, personal pragmatic question. Why should you be logical if success in modern society involves the expert use of rhetorical, psychological, and inferential tricks? Why should you attempt to persuade others with logic when alternative means often work better? Isn't winning all that matters?

The second question raises a deep philosophical issue concerning the nature of human existence. From an evolutionary standpoint, the human species seems to be a "messy" result of many past successful survival strategies. Territoriality, tribalism, xenophobia, and the herd instinct, aggression, wishful thinking, deception and self-deception, rationalization—all behaviors based on self-preservation and personal well-being—can be seen as natural behaviors that once and probably still have survival value given certain situations. If eons ago an evolutionary ancestor of yours and its family were attacked, and no effort of cooperative defense and territorial bonding was made, you would probably not be reading these words now. Today, however, with modern technological advances, these natural behaviors have many threatening, inappropriate expressions in terms of the overall well-being of our species. We have the mass destruction weaponry to instantly annihilate the groups we fear. We have the multimedia and Internet technology to make our acts of deception so persuasive that the distinction between reality and fantasy becomes virtually nonexistent for many people. And, with enormous computer databases available to the rich and powerful, and their lawyers, just about anything can be known about you as a demographic bit of information in seconds—known in preparation for manipulation and control. In short, we have the same behavioral tendencies that evolved long ago for our initial survival now alive and well in a very different world.

The essential answer to the second question that we seek is whether our reasoning ability, a relatively new evolutionary characteristic, can be used to control, help control, work with positively, override, or at least not encourage the inappropriate and destructive expression of past survival strategies, or whether our reasoning ability is but a subservient tool to make the inappropriate expression of these strategies even more destructive and tragic. Do we reason just to win in a serious game of competition, or to learn what is true and cooperate based on what is true for the greater good?

Concerning the first question, many students often become quite cynical after covering the material in the first five chapters of this book. They tell me that they now see fallacies "everywhere," how resistant to change and the critical testing of beliefs most people are, how most people use the fallacies described in this book as excuses not to think, and how many people in power and in advertising take advantage of this situation by using the same psychological and rhetorical tricks to control and manipulate the average person. One young man once told me that after taking my class he got into an argument with his father over the wisdom of a presidential policy. After a few minutes discussion his father responded with, "Well, the president must be right. He is the president. Why else do you think he is president?"[2] When the young man accused his father of offering a very weak justification of his position, of offering an excuse not to think critically about the decision the president had made, his father responded with, "Kid, you wouldn't know your ass from a hole in the ground!" The young man was also grounded and he was not allowed to use the family car for more than a month.[3] After this experience, my student was very disheartened. How can a democracy work, he thought, if his own father thinks like this. He had just experienced the joy of critical thinking and was now learning, he thought, that it was not valued. Other students have told me that attempting to be logical gets them absolutely nowhere with their bosses, and even worse, that relationships with their spouses or significant others become dangerously imperiled if they try to be too logical. For many students who would consider themselves lucky to have a family car and a father who would ground them, life just seems to be one of basic survival in a very complex mix of subcultures, where manipulation is the rule interspersed occasionally with some shallow short-term contracts, "I'll help you with that, if you help me with this."

So, why be logical? If we can't beat them, shouldn't we join them? Recall Protagoras's formula for a successful life (Chapter 2). The game of life is not one of logic and truth, he said, but rather one of artistic persuasion. Not one of reasoning to or describing the truth, but rather one of creating reality, of molding a perspective and persuading people to live in that perspective. For Protagoras, as a relativist, everything is a matter of interpretation and any interpretation can be defensible if you are creative enough. Beliefs are not true or false, and behaviors are not good or bad. Like a good lawyer it is simply a matter of making the best "case" for one belief or another, one action or another. For Protagoras, the game of belief is all a matter of presentation, perspective, and rationalization. What matters most is SUCCESS, success in getting people to change their minds to your way of thinking. So, perhaps what you should be learning is how to use fallacies rather than avoid them!

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[2] Depending on the interpretation, there are several possible fallacies implied. Begging the question is one possibility: the president must be right. To be president you must be smart, and you can only be smart if you are right about the issues. Another possibility is Appeal to Authority: the president is right, because he is the president.

[3] This stance can also be interpreted as a fallacy, one that we did not cover, called Appeal to Force, summarized as follows: "I'm right, because I have the power to make my position right." For a relativist, there is nothing illogical or unfair about this mode of persuasion. Given the non-relativist position adopted in this book, however, this argument would be a version of irrelevant reason. Having power to force an action is logically irrelevant to that action being right.

My answer to this challenge is, of course, to first reject relativism, and then remind you of the major themes of this book. Logic can be seen as a defensive tool that allows us to defend ourselves against the onslaught of persuasive appeals that bombard us daily, and it also forces us—as a society, as a culture, as a species—to test our beliefs to see if they are reliable.

Concerning relativism, I have thought about this question most of my adult life, and I would not be telling you the truth if I told you that relativism was not a challenging philosophical position that must be taken seriously. However, you must ask yourself the same question I ask myself after examining the reasoning trail of relativism as fairly as I can: Is there not an objective world of some sort that intrudes upon our most cherished beliefs? Even after acknowledging that every human belief is a result of some perspective or other, even after acknowledging that it is impossible for us to get completely outside our minds and cultures and examine reality firsthand without the filters of our biases, is it not really true that some beliefs are better than others? That some perspectives are better than others? The conclusion I come to is that some beliefs just do not work, and some beliefs are better than others, that some beliefs are more successful in long-term reliability, even though certainty for any belief is impossible, and all are fallible, tentative, and potentially revisable. No amount of spin and artistic persuasion will make the world flat when it is not flat.

Did our reasoning ability evolve just to win debates?[4] I don't think so. Imagine a vulnerable tribe of our early human ancestors, a nomadic group of hunter-gatherers trying to decide where to move next and the best place to intercept migrating herds of animals. To survive the right choice must be made. Truth will matter. What time of year is it? Where will the animals be at this time of year? In what direction should the group go? Suppose there is an argument between different subgroups of the tribe? Will authority alone matter? Will the best talking alone lead to success and survival? Authority and just winning a debate would be deadly if a great deal of migration effort is made to the wrong place at the wrong time. No, most likely in the long run our ancestors that survived placed a premium on truth, on knowledge of being right, and on the objective world. They learned the seasons and directions by being keenly observant astronomers. They reasoned from experience, but were open to new ideas. They listened carefully to opposing viewpoints and thought about who was right. Their survival depended upon it, and I suspect they gradually developed logical persuasion to motivate the group to follow the right path.

When considering the conceptual and empirical problems of some beliefs, the evidence is overwhelming that these beliefs will not be reliable and are not likely to help us be successful in the future, and that dogmatic adherence to them in the face of overwhelming evidence is like beating your head against a wall. Sometimes, perhaps much more often than we desire, reality "kicks back"; it responds and overwhelms our most cherished beliefs, often in a very forceful way, and resists what we want to be true.

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[4] Mercier, H., Sperber, D., "Why do humans reason? Arguments for an argumentative theory," ***Behavioral and Brain Sciences***, Volume **34**, Issue 02, 29 March 2011, pp. 57 – 74.

To paraphrase Stephen Jay Gould's opening quote above, the veil of our biases and perspectives are translucent, however strong their textures.

In March 1993, a religious group in Waco, Texas, ambushed and killed several federal marshals when the marshals attempted to confiscate an arsenal of illegal arms (automatic assault weapons, grenades, and homemade bombs) being held by this group of radical millenialists. Calling themselves the Branch Davidians, this sect believed that the end of the world would take place at the turn of the century, and that before the return of God's rule there would be an apocalyptic war between Christians and the secular army and police, representatives of evil secular political forces. They believed that they were the shock troops of the Apocalypse, that their use of force was biblically determined, and that the raid by federal officials was part of biblical prophesy.

For months after the ambush, police and marshals surrounded the heavily fortified ranch of this group of more than 130 men, women, and children, and a tense standoff ensued with their leader, David Koresh, a self-appointed prophet who at various times claimed to be Jesus Christ. At one point, Koresh announced that he would come out peacefully if he were allowed to do a radio broadcast explaining the mission of his group. Koresh was allowed the broadcast, but at the appointed time for the surrender he announced that he had changed his mind because God told him to wait for further instructions.

As the story unfolded, it became clear that Koresh really believed that he was Christ and that he was in direct contact with God. As a millenarian, he was able to convince his followers that because the world would end soon, whatever they had been taught about society's standards of sinfulness or immorality was no longer so, because he was operating with God's direct authority. Koresh admitted that he routinely had sex with many of his female followers, including married women and even some mother-daughter pairs. According to some of Koresh's former followers, the women were honored to produce a race of warriors who would rule in the new kingdom to come.

Obviously, Koresh was able to persuade many people to accept his vision of himself and the future, motivating these people to cooperate in an elaborate venture. In addition to amassing a small fortune in arms, the group had purchased a seventy-seven-acre farm and reconstructed a former farmhouse into a labyrinth of rooms, secret tunnels, and observation towers. But is persuasion equal to truth? Was Koresh's problem only that he failed to persuade enough people? Would the world have come to an end in the year 2000 if enough people believed this to be true? Or, was Koresh's vision of the future just not reliable, just wrong? Conceptually, was this version of Christianity logically consistent with a religion that believes in a loving and forgiving God, urges us to "turn the other cheek," and generally asks us to follow the nonviolent life-style of its founder, Jesus Christ? Empirically, how likely was it in 1993 that the world would come to an end by the year 2000?

Unfortunately for the followers of Koresh, reality does intrude upon our most deeply held beliefs. Although with a little Protagorean creativity and rationalization the tragic results could be made consistent with Koresh's belief system (more than seventy men, women,

and children died in a fire set by Koresh's followers when federal officials unleashed tear gas to get them out), at some point the message from reality becomes relatively clear. Like the tobacco industry's former position on smoking and lung cancer, at some point a reasonable person knows that it is not likely that this belief system is going to be a reliable guide to the future.

In August 2011, Rick Perry, Governor of Texas, decided to run for the Republican nomination for President of the United States. The main items of his argument to voters were his conservative religious views (prolife and anti-gay rights) and a relatively successful economy in Texas compared to many other states at the time. But by April of that year Texas was experiencing a severe drought that had caused about 8,000 wildfires. As governor Perry decided to publicly pray for rain.

> "NOW, THEREFORE, I, RICK PERRY, Governor of Texas, under the authority vested in me by the Constitution and Statutes of the State of Texas, do hereby proclaim the three-day period from Friday, April 22, 2011, to Sunday, April 24, 2011, as Days of Prayer for Rain in the State of Texas."[5]

The drought worsened and by August nearly all of Texas was engulfed in extreme drought. July was the hottest month ever recorded in Texas history. Governor Perry had also declared that human-made global warming was a hoax and that the Environmental Protection Agency regulations to curb greenhouse gases hurt the economy. As Governor he filed a lawsuit against the regulations on behalf of his state.

The British philosopher Bertrand Russell (1872-1970) once remarked that if everyone in the world were required to take at least one logic course, our world would be a more pleasant place in which to live. From the point of view of this book, Russell's comment means that much of the world's suffering is caused by the power that manipulative leaders are able to amass by exploiting the insecurity, confusion, and suffering experienced by many people. The remedy, simply put, is to be aware of the manipulative tricks discussed in this book, giving each individual an arsenal of defensive, critical tools, and thus undermining the potential power base of these leaders.

In other words, this book does not claim that by being more analytical and critical one will automatically be more ethical. In fact, many evil leaders are very logical in planning their manipulative adventures. As Eric Fromm noted, "Logic does not exclude madness." As we have seen, the direction of a logical trail must be guided by the values one starts with in the premises. This does not mean that values cannot be objectively argued about, but it does mean that no automatic or necessary relationship exists between being logical and being ethical. But a large part of the problem is the acceptance of unreliable beliefs and the power that unethical leaders have. Logical analysis and critical thinking are effective tools for testing beliefs and diffusing this power. In short, my answer to the first question is that we should be logical, because if more people were aware of the defensive and epistemological stances taught in this book, the manipulative ploys of the powerful would not work any longer.

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[5] http://governor.state.tx.us/news/proclamation/16038/

However, another question arises that leads to the second issue mentioned above. It would seem that the smartest thing to do would be to learn these defensive stances so that you could avoid having them used against you, but also so that you could use them to successfully persuade people to accept your conclusions! Shouldn't you watch out for the tricks used against you, but use them whenever you can against others? The point here is that the above interpretation of Russell's claim does not explain why we should be ethical. Or put another way, whether or not human beings are capable of being ethical, whether being logical helps in any way or is simply a neutral tool subservient to our baser nature.

Intelligent people can be very violent. In fact, a very persuasive case can be made for the claim that the greatest acts of violence have been made by people who have had the very best educations. Consider the Nietzsche quote at the beginning of this chapter. Think of the informational, mathematical, and logical capabilities needed to create "smart" bombs, nuclear bombs, and most recently, biological weapons. Consider a few examples:

Toward the end of World War II, British and United States military strategists carefully planned the firebombing of the German cities of Hamburg and Dresden. Special bombs were dropped in strategic locations in both cities so that a fire storm was created (the air caught fire). The German people were used to air raids, and because they were all in air raid shelters underneath the city when the bombs were dropped, many were roasted in an enormous oven, approximately seventy-thousand men, women, and children in Hamburg and eighty thousand in Dresden. Rescuers found grotesque dissolved corpses. The bodies were not charred as if they had been on fire; the flesh of most of the bodies of these people had simply melted like wax around their skeletons. Almost every one of the stripped skulls showed gaping, contorted jaws, no doubt a reflection of the trapped agony in which they died. Regardless of the possible justification of the Allied goal of the ultimate destruction of Hitler's Germany, the fact remains that the fire storm was not an accident; it was intelligently planned.

Forty million people were killed in World War II. By the end of the 1980s, our intelligence and knowledge in military matters had "progressed" to the point that the combined firepower alone of the former Soviet Union and the United Stares equaled six-thousand World War IIs. We are speaking, of course, of nuclear weapons.

A common measure of destructive firepower during this time was the megaton, a million tons of TNT. The total firepower of World War II was three megatons. By the end of the 1980s, the combined arsenals of the two superpowers equaled more than eighteen thousand megatons. A single United States Trident submarine carried twenty-four megatons, enough to "roast" every major city in the former Soviet Union. A single nuclear bomb falling on a city would subject millions of people to deadly radiation, blast waves, and incendiary levels of heat, such that they would be irradiated, crushed, or burned to death. But both sides targeted major cities and military installations with at least ten nuclear bombs.

By the 1990s, both superpowers began to get smart. The economic exhaustion experienced by both countries of attempting to fund this gruesome arsenal of guaranteed extinction, and the dissolution of the Soviet Union, prompted serious efforts to cut total megatonnage to six thousand, or two thousand World War IIs. Although this was euphorically promoted as the end of the cold war and the opening up of a safer and saner new world order that would replace military competition with peaceful economic competition, cynics claimed that a significant factor was simply a change in military strategy from virtually useless nuclear weapons to cheaper and potentially more manageable biological weapons. Making use of our knowledge in biological matters, it is possible that viral or bacterial agents could be manufactured that would kill people more selectively. For instance, by taking advantage of the fact that certain races are more susceptible to certain diseases, it is possible to design and deliver a fatal disease to, say, only Jews or Arabs.[6]

Whether the cynics were right in this matter or not, the euphoria of the new world order was short lived. Soon the front pages of our newspapers were covered with a plethora of ethnic wars. In the former country of Yugoslavia, Orthodox Christian Serbs, Catholics, and Muslim Croatians were attempting to "ethnically cleanse" each other from the face of the Earth. They put each other in concentration camps, gruesomely tortured and then killed captured soldiers, systematically raped each other's women, shelled innocent children trapped in cities, and attempted to starve each other to death. In the former Soviet Union, Georgian Christians and Abkhazian Muslims began a bloody battle over prime tourist real estate, Armenians and Azerbaijanis fought over Nagorno-Karabakh, and in Tajikistan a bloody battle between north and south Tajiks for power and economic resources soon involved Uzbekistanis, Turkmenistanis, and Afghanistanis as religion and ethnicity were used to rationalize the hatred and slaughter. Elsewhere in the world, to give but a small sample of ethnic warfare and other group against group violence, Turks and Kurds fought each other, and Iraqis tried to terminate Kurds and Shiites, Jews and Arabs continued their relentless cruelty to each other, Irish Catholics fought Irish Protestants, Indonesians attempted to cleanse their country of Timorese, Hindus and Muslims fought each other throughout much of India, Hutus killed at least two hundred thousand Tutsis in Rwanda, and in the inner cities of the United States large ethnic gangs with firepower to equal some third world countries emerged to kill each other. By 1993, CNN reported that $600 billion in weapons were sold worldwide in one year, there were 200 million hand guns in the United States, and ninety thousand gang members in Los Angeles alone.

And now with 9/11 we have radical Islamic groups declaring war on the United States, with the United States retaliating by invading two Islamic countries and spending over $1 trillion by 2010. History has also shown that when one group of people hate another group of people they will do everything they can to use technology to kill the other group. The usual danger of unintended consequences that results from any new technology will soon be greater than ever. The nuclear, biological, and chemical fears of

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[6] See David Suzuki and Peter Knudtson, ***Genethics: the Clash between the New Genetics and Human Values*** (Cambridge, Mass.: Harvard University Press, 1989). Perhaps, regrettably, we will soon hear our military commanders speak of "collateral biological damage."

20th century developments will pale in comparison to the new knowledge-enabled potential weapons of mass destruction (KMDs). The essential aspect of the new KMDs is that they will have the power of self-replication. According to Bill Joy, the former chief scientist for Sun Microsystems, the "new Pandora's boxes of genetics, nanotechnology, and robotics are almost open," and the unintended consequences of such self-replicating processes will be very serious.[7]

The one thing that stands out about all these tragic rivalries is how well human beings cooperate in groups to fight other members of their species. It is time for us to recall a theory first discussed in passing in a note in Chapter 1. According to Harvard naturalist Richard Alexander, we can only begin to understand the moral and immoral behavior of human beings by honestly reflecting on the historical evolutionary conditions of our species' social behavior. For Alexander, evolution is true, and ignoring it is like trying to ignore the law of gravity. We can build planes to defy gravity, but not without knowledge of gravity. We can also adjust to evolution, but we must understand it to do so, just as we must understand gravity and other laws of nature to design our planes. So, what should we understand?

Other animals also sometimes kill members of their own species, but only human beings do so at such an unprecedented level. The cause is obvious – our intelligence! Other animal groups spend much of their time competing against the hostile forces of nature, but because of the special trait of intelligence—our self-consciousness, our ability co reflect, plan, and reason—for the most part many human beings no longer have to worry as much about the hostile forces of nature. So, we have replaced competition with nature with an "ominous group-against-group within species competition."[8] And, according to Alexander,

> . . . in no other species do social groups have as *their main jeopardy* other social groups of the same species—therefore, the unending selective race toward greater social complexity, intelligence, and cleverness in dealing with one another.[9]

In other words, our intelligence not only eliminates much of our competition with nature, fuels complex forms of deception and exploitation as we compete with each other for resources (more and more lawyers, greater and greater expertise in media persuasion), but allows us to create massive forms of destruction with which to deliver our brutality to each other. According to Jonathan Schell, in a powerful book written in the early 1980s on nuclear war and human extinction,

> . . . the fundamental origin of the peril of human extinction by nuclear arms lies not in any particular social or political circumstance of our time but in the attainment by

[7] Bill Joy, "Why the Future Doesn't Need Us," ***Wired***, April, 2000.
[8] Richard D. Alexander, ***The Biology of Moral Systems*** (New York: Aldine De Gruyter, 1987), p. 228.
[9] Alexander, p. 80. Emphasis added.

> mankind as a whole, after millennia of scientific progress, of a certain level of knowledge of the physical universe.[10]

And Alexander again,

> Humans alone have been equipped by their evolutionary history with traits and tendencies that, *as a consequence of their normal functioning*, can bring about human extinction.[11]

From a broad evolutionary perspective, we see that ancestor species to modern Homo sapiens were greatly "out-gunned" by competing creatures in terms of superior physical characteristics conducive to immediate survival. The human species is an evolutionary irony. Our initial physical inferiority was an important accidental condition that led to our present success on this planet. Many creatures have always had better eyesight and hearing, some can directly experience electromagnetic fields or experience chemicals at long range, and some even have sonar. Many creatures can run faster and are physically much more powerful, with razor sharp claws and teeth. Our ancestors survived because they cooperated against these outside threats and because they had the ability to symbolize, to abstract, to reason, plan, and reflect. The vast majority of creatures on Earth have what can be called a direct survival interface with their environment. They do not need to think. The indirect survival interface of reflective symbolic processing is not needed. Initially, and up to the present, the human way has served us well. We dominate the Earth with our intelligence and science; we can duplicate with machinery the direct sensing abilities of other creatures. Now, however, the very characteristic responsible for our initial survival, threatens our extinction as a species.[12]

This is not an unusual situation in the evolution of species. Often a characteristic that initially plays a positive role in a species' survival, with time and environmental change will play a very detrimental role, often being the cause of extinction. Consider the Irish deer. The male of this species gradually evolved larger and larger antlers. By the time of its extinction, some antlers extended horizontally to twelve feet and had huge palm-like spiked lobes at each end. As is often the case in nature, this characteristic served as a sexual selection sign for the female of the species. The male with the largest antlers had the most mates. But as this trend continued, the large antlers probably became dysfunctional, and coupled with other environment changes, the species became extinct. The modern peacock is another example of this process. If not protected by humans, the beautiful male of this creature would easily follow in the footsteps of the Irish deer. Is human intelligence just another version of large antlers and beautiful feathers? Initially a characteristic of great value, is it now a characteristic that will guarantee our extinction?

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[10] Jonathan Shell, ***The Fate of the Earth*** (New York: Knopf, 1982, p. 48.

[11] Alexander, p. 232. Author's original emphasis.

[12] For further elaboration of this theme, see Ronald C. Pine, ***Science and the Human Prospect*** (Belmont, CA: Wadsworth, 1989, online edition, 2001, 2004; Pearson, 2005, online 2011), particularly Chapters 9 and 10.

Or is our problem fundamentally different? Could the very characteristic that has contributed so much to our uncertain current state be the source of a solution for us as well? Could the late Isaac Asimov have been right when he said, "The dangers that face the world can, every one of them, be traced back to science. . . .(but) The salvations that may save the world will, every one of them, be traced back to science"[13]? Or, according to Alexander, "This means that the problem before us is an absolutely stupendous one: we have created it with our intellects and now cannot relax until we have used those same evolved intellects to resolve it."[14] Can we use our intelligence to not only be aware of the destructive tendencies of our intelligence, but to make our intelligence work for us rather than against us?

In 1932, Albert Einstein asked this same question. No doubt envisioning the dangerous combination of a rise in ethnic nationalism and resentment in Germany and Italy and the destructive power of science and technology, he wrote a letter to Sigmund Freud, asking, "Is it possible to so guide the psychological development of man that it becomes resistant to the psychoses of hatred and destruction?" Freud's response was not encouraging. "It seems," he wrote on the systematic killing of members of our own species, "to be a natural occurrence, biologically well founded and . . . scarcely avoidable."[15]

Such destructive tendencies may be biologically well founded, but I think Freud was wrong about successful avoidance. Success and hence hope are possible, and at a very fundamental level that connects the concepts we have studied in this book, it will involve two levels of understanding: (1) A humble understanding of the power of our intellect, an understanding of the constructive and uplifting, but fallible nature of our scientific, deductive-inductive reasoning abilities; (2) A thorough understanding of the wonderful product of centuries of application of this reasoning ability, the world view of modern science. Sections of this book thus far have been concerned mostly with the first level. If you understood the message of Chapters 1- 3, you are aware that logic does not automatically produce truth and certainty. At their best, the tools of deductive and inductive reasoning produce tentative, relatively reliable beliefs that a reasonable person ought to accept at a given time as a practical guide to the future, given the evidence and alternative beliefs then available. An understanding of this epistemological result should produce a playful, open-minded, hypothetical, tolerant, experimental attitude toward most beliefs and traditions. It should produce a willingness to accept fallibility and self-correction.

This understanding should also underscore the importance of values. As we have seen, logic is viciously neutral. Like a computer, it produces a product that is contingent on what you start with. If you want to blow up a city and kill millions of people, science and logic will show the necessary reasoning trail to accomplish this goal. If you want a child to grow up sane and happy, science and logic will help accomplish this goal. Conclusions follow from premises. Hence, the premises we use must be based, not only

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[13] Isaac Asimov, ***Today and Tomorrow***, 1974, p. 304

[14] Alexander, p. 237.

[15] Einstein, A, ***Why war?: The correspondence between Albert Einstein and Sigmund Freud***, Chicago Institute for Psychoanalysis, 1978.

on our most reliable knowledge, but value commitments as well. And we know what kind of commitment is needed for a better world. We know that given our present predicament, to fuel the cooperative efforts necessary to control population[16] and human-made global warming, and better distribute the world's resources, we need a commitment from a critical mass of people to the human species as a family and to the Earth as one ethical unit. We need a critical mass of people to recognize the human species as one species of people whose differences are trivial compared to their similarities, as one family whose real threat is not other members of this family but our fragile, contingent existence together on this planet. We need a critical mass of people to experience enlightened self-interest and the realization that the health of the whole is vital to the health and prosperity of the individual.

I am advocating what is usually viewed as a very idealistic perspective. How can competing groups see themselves as a family after centuries of mutual brutality and cruelty, in a world of growing population and shrinking economic resources? The response is that, given what modern science tells us about human nature, this is not an unrealistic idealism, but rather long-term pragmatism. What do we know?

According to Alexander, we know " . . . that there is one basic functional substrate for trends toward cooperative group living and that is active and cooperative defense against some common extrinsic threat or uncertainty . . ."[17] And what is our most common extrinsic threat or uncertainty? It is not each other, but rather our fragile, contingent role in an awesome universe.

Let's call this view of life the cosmic perspective. Here are some of its details:

Our Earth is but a defenseless grain of sand, a small speck of some relatively recent leftover star stuff, floating in a rather hostile cosmic ocean that is about 14 billion years old. How big is this ocean?

Our sun is approximately 93 million miles away and a million Earths could easily fit within it. Trillions and trillions of miles farther away are stars so large that millions of suns could easily fit within them. Our sun and billions of other stars make up a single galaxy. This galaxy is currently whirling around like a gigantic pinwheel or merry-go-round. Our Earth spins around at one thousand miles per hour at the equator, revolves around the sun at a speed of approximately sixty-six thousand miles per hour, and sails around our galaxy with our sun at more than five hundred thousand miles per hour. As you read this sentence, our apparently stable Earth will rush through 150 miles of space. Trillions and trillions of miles farther away are as many as 10 billion other galaxies, many much larger than ours. Some whirl their stars around at more than a million miles per hour. In the entire universe there are at least 150 billion galaxies. But so large are

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[16] Human species population growth took tens of thousands of years to reach the 2 billion mark in 1927. It took just 70 years for that number to triple to the 6 billion plus total now. By 1995, every twenty-four hours enough people were added to the Earth to fill a city the size of Newark, New Jersey. By 2009, over 200,000 people a day were still being added to the Earth's human population.

[17] Alexander, p. 65.

galaxies that even at their great speeds of revolution, millions of years pass before one star can complete one circuit around a galaxy. Our sun requires 250 million years to revolve once around our galaxy.

The stars within galaxies have a life cycle of birth and death. The largest stars die with cataclysmic explosions, called supernovas, and seed the galaxy with heavy elements that could become new stars and new planets. Surrounding our one sun and eight or nine planets[18] are several layers of comet debris left over from the formation of our solar system from a collapsing cloud of galactic dust; the collapse was probably initiated by an exploding star. Pieces of this debris periodically get gravitationally kicked into our solar system. In July 1994, pieces of a disintegrating comet slammed into Jupiter with a force estimated at 40 million megatons of dynamite, 500 times more explosive power than all the world's nuclear weapons detonated at once.[19] We know that in the past pieces of this debris slammed into the Earth causing explosions and environmental destruction equal to full-scale nuclear war. Today, we believe that after a successful reign on Earth of more than 150 million years, the dinosaurs (except for their ancestors, birds) were destroyed by such an event. Several comets slammed into the Earth 60 million years ago, destroyed the environment of the dinosaurs, and made the current dominance of mammals possible. We know we are bound to be hit by this cosmic debris again. Given enough time, enough debris (there is plenty), and gravity, like strangers in the night our Earth and some of these cosmic visitors will meet. Some scientists believe that our Earth takes significant hits every 25 million years or so. But even without these cosmic hits, our Earth as we know it will perish. Our sun will die 3 billion years from now, and in just five hundred thousand years it will be too hot to sustain life on Earth. Comet collisions with Earth and the death of our sun may be far in the future, but the only reason life on Earth appears calm and secure from cataclysmic outside forces is time.

If this is too remote for you in terms of the immediate present, think of your life this way. Human infrastructure that seems so durable and impressive resides on relatively thin shells or plates of solid rock. These plates are slowly, but relentlessly, moving and crashing into each other. Constant earthquakes that can flatten our infrastructure in seconds and slosh the ocean around to produce massive tidal waves are the inevitable result of these moving plates. For perspective, consider that one hundred thousand years from now Los Angeles will be next to San Francisco, because Los Angeles is on a plate sliding toward San Francisco.

Beneath these relatively thin shells are massive amounts of molten rock—99.9 percent of our Earth is an inhospitable hell. Inevitably, the plates move and crash which produces pin pricks and fissures that allow some of this fiery mass to explode to the surface without regard to where humans reside. We are speaking, of course, of volcanoes. Along with the molten lava, impossible to stop from inundating human habitats, gas, ash, and debris are thrown into our atmosphere, sometimes disrupting worldwide weather

[18] Depending if one counts Pluto or not.
[19] Stephen Jay Gould, "Jove's thunderbolts," ***Natural History***, vol. 103, No. 10, October 1994, p. 8.

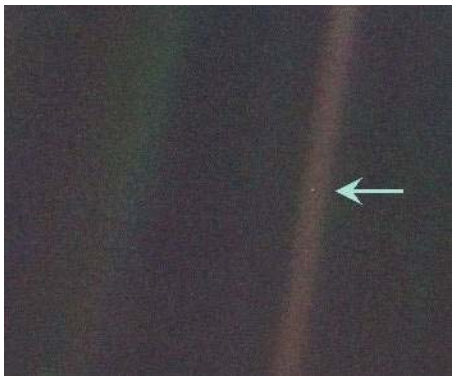
patterns for years. Some scientists believe that massive past volcanic eruptions produced major extinction disruptions for all life on Earth.[20]

Think also of the fact that just a few miles above your head is a relatively thin blanket of ozone protection from deadly ultraviolet radiation from the sun and cosmic radiation left over from the inevitable march of exploding, dying stars. Only within this thin layer then, a small slice of oasis, sandwiched between a bottomless molten hell and an endless deadly cosmic ocean, can humans live unprotected. We live on a small, momentary slice of biological heaven, spinning dizzily through inhospitable astronomical space, surrounded by an inevitable procession of violent and destructive events, and look what we do with this fragile, momentary gift!

With all the group-against-group violence and destruction mentioned above, we are like two men on a raft headed for a deadly waterfall, who are too busy fighting and trying too kill each other to notice where they are or to cooperate to save themselves. And even within this biological heaven, we must remember that it is also heaven for many other forms of life, that this life is constantly changing and evolving, and inevitably some of these changes will be great threats to us as the AIDS epidemic tragically underscores.[21]

As Alexander points out, people are capable of incredible acts of cooperation and sacrifice when faced with an outside threat. Can billions of people, or at least a critical number, be educated of this cosmic perspective, of the real threat to their children's, children's children? Can we inhabit a space of unity rather than just visit it once in a while for short term gain?

According to the late astronomer Carl Sagan, when viewing the Earth from deep space it is hard not to see how viewing the Earth as one ethical unit of sustainability would not be our highest priority.



The Earth from 4 billion miles away. This picture was taken by Voyager 1 in 1991 as it approached the outer limits of our solar system.

According to Sagan,

"The Earth is a very small stage in a vast cosmic arena. Think of the rivers of blood spilled by all those generals and emperors, so that, in glory and triumph, they could become the momentary masters of a fraction of a dot. Think of the endless cruelties visited by the inhabitants of one corner of this pixel on the scarcely distinguishable inhabitants of some other corner, how frequent their misunderstandings, how eager they are to kill one another, how fervent

[20] For a summary of nature's cataclysmic control over our lives, see Charles Officer and Jake Page, ***Tales of the Earth: Paroxysms and Perturbations of the Blue Planet*** (London: Oxford University Press, 1993), and Bruce A. Bolt, ***Earthquakes*** (New York: W.H. Freeman and Co., 1993).

[21] The AIDS virus is thought to be a mutation of a monkey virus that was previously harmless to humans.

their hatreds. Our posturings, our imagined self-importance, the delusion that we have some privileged position in the Universe, are challenged by this point of pale light."[22]

Cynics will slam this view as a hopeless romantic idealism. Teach people about the stars, and they will be nicer to each other? Well, my response is that we have not even tried yet. Less than one tenth of one percent of humankind is aware of what I have described in the last several paragraphs. Is it not at least an idea worthy of testing?

Perhaps not all people will even have the reaction we desire upon learning of the cosmic perspective. Many may become so afraid that their natural selfish aggression may be enhanced.[23] But hopefully many will have the reaction of a former student of mine. She had already raised a family and was now coming back to finish a college degree that she had postponed for thirty years. She told the young people in our class that when she thinks of the cosmic perspective, when she is able to put aside all the mundane, daily commotions that call for her attention, she feels "like family." She has an urge to hug and educate children, to hold her neighbor's hand, to lecture people not to take their families for granted, to contemplate, and to prepare emotionally and intellectually for the greatest threat the human race will ever face—our survival within this cold, apparently loveless, and heartless universe.

This last statement may give the appearance that I believe that we are alone in a godless universe. This book has made no commitment to whether God exists or not, and you should not hastily generalize from this lack of commitment that you know how I personally feel about this issue. My views on God will remain private. There are many religions and traditions, and it would not be fair to you for me to give my opinion. However, I do claim that the cosmic perspective sketched above constitutes not only a set of our most reliable beliefs, but is consistent with all enlightened religious views. It is consistent with all religions except those who wish to deny our true predicament, who feel that God is on their side and will help them kill other members of the human species; it is consistent with all religions except those that feel that they need not be responsible or fear the consequences of their actions.[24]

There are also many similarities between the cosmic perspective and traditional attitudes toward God. We should fear and respect the universe. It will always be in charge, regardless of how smart and powerful we become. But we should also love it. In the words of physicist Heinz Pagels, the universe is an "unfathomable beautiful ocean of existence." Science has not destroyed the religious feeling of mystery and awe, but has enhanced it. As very lucky guests the universe is not only our home, but the natural universal processes that threaten us also have produced us through a grand evolution and

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[22] Carl Sagan, ***Pale Blue Dot: A Vision of the Human Future in Space***, Random House, 1994.

[23] Some of my students get mad at me after I have told them of the cosmic perspective. They say I frightened them, and knowing how big the universe is has ruined their lives. But this reaction is better than from those that find the information irrelevant to their lives.

[24] It is especially not consistent with those views that assert that the end of the human race is fine, because then members of their select group will go to heaven. See W. Martin, "Waiting for the End," ***The Atlantic***, 249, June, 1982: 31-37. LaHaye, T, Jenkins, J., ***Left Behind: A Novel of Earth's Last Days***, Tyndale House Publishers, Inc., 1996.

given us a chance at life.[25] In other words, science has revealed the same religious sense of living at the mercy of a wondrous foreboding power. With each deductive and inductive scientific trail followed, with each solution to a previous mystery, new mysteries and wonders are revealed. With each new mystery, we are humbled by our informed ignorance. With each new wonder we are encouraged to have an unpretentious view of and reverence for existence. With such reverence we can express the best in ourselves: Our ability to cooperate for the common good, to be tolerant of and promote diversity, and to be true cosmopolitans—citizens of the universe—who see the universe as both a sovereign threat to our significance and welfare, and a magical playground for unending learning.

So, my answer to the second question posed above is to take seriously certain reliable beliefs produced by science. To take seriously the results of testing our beliefs, and to have a reasonable faith in the thinking tools covered in this book, the same tools used by Eratosthenes to follow the trail that first shattered humankind's egocentric complacency.

Chapters 7 through 12 may not be easy for you. You will be made to experience firsthand the challenge of symbolic reasoning. However, for your motivation, steadfastness, and discipline, keep in mind that you will be made to rigorously exercise the same symbolic reasoning faculty of mind that has helped produce such a startling view of our lives in the universe.

Exercises 

Exercise I

Indicate whether the following are true or false.

1. According to this chapter, people who are logical are never violent.

2. *According to this book, relativism is wrong because it is possible to achieve absolutely certain beliefs.

3. According to this chapter, we should use logic to defend ourselves against the persuasive appeals of others, but use fallacies as persuasive techniques to get what we want from others.

[25] There were an astronomical number of contingent events that had to be just right to produce the Earth in its present state. To name but a few lucky results: The Earth is just the right size, just the right distance from the sun, and our sun is just the right size and in the right Goldilocks place in our galaxy.

4. According to this book, relativism is still wrong even though it is not possible to achieve absolutely certain beliefs.

5. According to this chapter, being more logical will automatically make us more ethical.

6. *A major theme of this book has been that an accurate account of the power and limitations of our reasoning ability implies a playful, open-minded, hypothetical, tolerant, experimental, and tentative attitude towards most beliefs and traditions.

7. According to this chapter, given the nature of evolution, the human species is doomed.

8. According to Alexander and Schell, the possibility of human extinction is due primarily to the natural functioning of human intelligence.

9. By the end of the 1980s the former Soviet Union and the United States targeted each other's major cities with at least 10 nuclear bombs apiece.

10. *According to this chapter, acceptance of scientific reasoning and the results such as the cosmic perspective are inconsistent with a belief in God.

11. Soon it may be technologically possible to biologically engineer viruses or bacterial agents that will selectively kill only people of a particular ethnicity.

12. According to modern science, our universe is only a few thousand years old and a few trillion miles in circumference.

Exercise II

Essays

1. One of the themes of this chapter is that our most common extrinsic threat is our fragile and contingent situation as a human family in an apparently indifferent very old and very large universe. Furthermore, that it is important that people have this cosmic awareness. Write a two- to three-page essay analyzing this theme and its implications. Do you agree with this perspective? Is a cosmic awareness relevant? Will it help change the world? Should we be sure that children learn the cosmic perspective, of how old and vast the universe is?

2. Write a two- to three-page essay explaining the interpretation given in this chapter of the Stephen Jay Gould quote from the beginning of this chapter. Hint: This will involve summarizing the theory of reliable beliefs and my arguments against

relativism presented in this book.

3. This chapter presents some very controversial opinions. I hope I have made it clear that in my opinion the world view of modern science gives us a set of the most reliable beliefs we have. However, according to A. B. Alcott, "The true teacher defends his pupils against his own influence." With this in mind, write a critical essay making a case that I have committed fallacies in this chapter.

   Here are some possibilities:

   A. Straw Person. My presentation of relativism may be a Straw Person. Do some philosophical research and see if I have distorted the relativist's position.[26]

   B. Hasty Conclusion. One reviewer of this book from Georgia claimed that I have unfairly generalized from the facts of modern science -- that the universe is old and vast -- to a "metaphysical" interpretation -- that humans are insignificant and unimportant. Did I make this claim? Suppose I did. Make a case that this is a hasty generalization from the results of science by making a case that the results of science are consistent with human beings being very important in the universe.

   Here are some possibilities to think about.

   1. Einstein once remarked that the most incomprehensible thing about the universe is that it is comprehensible. His point seems to be that it is amazing that we are able to figure out how vast the universe is if we are so insignificant. Perhaps we are not.

   2. There is also an old saying, "Astronomically speaking humans are insignificant, but astronomically speaking humans are the astronomers." In other words, just like Einstein's statement, how are we able to figure all this out, if we are not special in some sense?

   3. During the Renaissance, several scientists of that time saw no inconsistency between believing in a big universe and God. In fact, that the universe is big and that we can figure it out was to them almost a proof that God existed and that he has given us a special status with a reasoning ability to figure out His great work. Copernicus, Kepler, and Galileo believed this.

   C. Questionable Dilemma. In this Chapter I talk about only two ways of viewing our reasoning ability, and then later in the Chapter reject one of these alternatives. Is there a third alternative that significantly weakens my premise and hence my argument?

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[26] For some challenging, but relatively accessible reading on this topic, see Paul Feyerabend, (1981), "How to Defend Society Against Science," ***Scientific Revolutions***, Ian Hacking, ed. (New York: Oxford Univ. Press), pp. 156-167, and Larry Laudan, (1990), ***Science and Relativism: Some Key Controversies in the Philosophy of Science*** (Chicago: Univ. Chicago Press).

I, of course, don't believe I am guilty of these fallacies. But I would be very interested in reading what you come up with; these are very important issues. Again, feel free to correspond via the e-mail address listed in the Introduction.

Answers to Starred Exercises:

I.

2. False. It has been argued throughout this book that just because we can't have certainty, it is not true that anything goes. We can obtain reliable beliefs given alternatives and the weight of evidence for those alternatives. I have argued that what I call the world view of modern science is true, in the sense that we possess an overwhelming amount of evidence that the universe is very old and vast, that our Earth is a small grain of sand in comparison, and that life on our planet has evolved over billions of years.

6. True.

10. False!