

Historical Perspectives

The editors, board, and staff of *Aquatic Mammals* are pleased to introduce a new feature to the journal: "Historical Perspectives." *Aquatic Mammals* is the longest-running, peer-reviewed journal with a focus on the science, husbandry, veterinary care, research, and training of aquatic mammals, and 2008 represents our 35th year presenting primary literature about aquatic mammals. The scientific study of marine mammals is only about twice that age. Reaching our 35th birthday gave us cause to revisit some of our history as well as that of marine mammal science and the scientists who make the field possible. As such, we decided to add this special feature as a regular section in each issue of the journal beginning with this issue.

Each contribution will include a brief biography of the author and an introduction to the topic on which he or she has written. The topic typically is one that was a focus or mainstay of the author's career in the science or management of marine mammals. These features might include mild commentaries as well as personal stories, funny essays, advice to young scientists, or shared journeys with colleagues.

Our inaugural essay for the new "Historical Perspectives" feature has been contributed by Dr. Victor B. Scheffer. Dr. Scheffer will celebrate his 102nd birthday in 2008! Dr. Scheffer has written a series of essays on topics that include marine mammals but also cover a variety of topics. It is an honor to have Dr. Scheffer's words and commentary launch this new feature to the journal. We hope that both our contemporaries and our current and future marine mammal scientists will gain as much from these essays (indeed from all future contributions to this section) as we have.

The written essays for the "Historical Perspectives" section of *Aquatic Mammals* will also have archived video interviews available for a nominal fee. The video-documented interviews will be compiled onto DVD with additional images, video, and other archival material from each author. DVDs will be announced on the *Aquatic Mammals* website (www.aquaticmammalsjournal.org) when available. Short trailers will be viewable on the website. These nominal fees will support the production of the DVDs as well as a fund to support graduate student assistantships for the journal.

We have a long list of individuals already writing their essays for the "Historical Perspectives" section of the journal. We will include one or two per issue, depending on total length. Videos will be available beginning in autumn 2008. If you have a suggestion for someone to contribute a "Historical Perspectives" piece, please visit the journal's website and send us an e-mail.

Kathleen Dudzinski, Co-Editor
Jeanette Thomas, Managing Editor
John Anderson, Terramar Productions,
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A Conversation with Vic Scheffer

It is not often that I am moved by something as simple as a conversation. Yesterday, I had the distinct privilege and pleasure of visiting with one of the world's greatest and certainly oldest naturalists—scientist Dr. Victor B. Scheffer. Dr. Scheffer's contributions to science and the natural world of marine and terrestrial mammals spans more than five generations, beginning in 1932. During our visit and subsequent video interview, it occurred to me that Dr. Scheffer had retired from fieldwork prior to my early interests in the topics that we were discussing. My mind raced back to the subjects that I had greedily consumed during my 40 plus years from my collection of William Beebe books and my collection of archival 16 mm marine films in the hopes that I could remember some information worthy of discussion, information that seemed to flow off the tip of Vic's tongue as if it were yesterday.

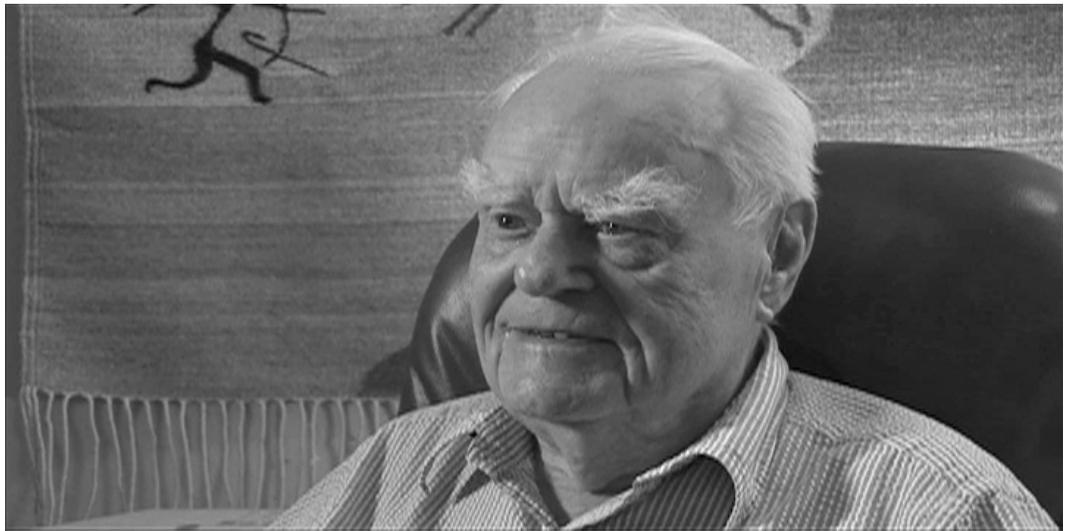
Vic is 102 years old now and writes daily. His series of essays runs the gamut from morality to

books, from education to organic foods ... whatever strikes him that needs commentary. He writes in long hand, stating that he has not much use for a computer. He is strictly old school.

Vic told me that time does not mean anything anymore. I disagree. He gave me a cherished gift, the gift of his time, and I gladly gave him mine. Time is something that should be freely given and gratefully accepted when offered. Vic also told me that he does not get too many interesting visitors anymore, and this is a shame.

I hope that you will take the time to read and enjoy these essays as I have and, in turn, pass along a bit of your time.

John Anderson, Videographer
Terramar Productions
May 23, 2008



Vic Scheffer, Seattle, May 2008 (Courtesy of John Anderson)

Reflections on the Human Condition

Victor B. Scheffer

Victor B. Scheffer was born on 27 November 1906 in Manhattan, Kansas. He earned a PhD from the University of Washington in 1936 and was hired as a biologist for the U.S. Bureau of Biological Survey in 1937. During this time, in his first experience with marine mammal research, Victor was asked to lead an investigation on the population dynamics of northern fur seals in the Pribilof Islands. From 1944 to 1952, he headed what is now the National Marine Mammal Laboratory in Seattle, Washington. In 1958, Victor's first book, Seals, Sea Lions, and Walruses: A Review of the Pinnipedia, was published. Victor became the first chairman of the Marine Mammal Commission when it was created in 1972 as a result of the Marine Mammal Protection Act that was passed that same year.

In a time when it was considered uncommon and bold, Victor was a strong proponent of animal ethics and conservation, fighting against the killing of fur seals for pelts. Several of his books, including the Year of the Whale (1970) and the Year of the Seal (1972), helped to bring the plight of marine mammals to the forefront of biology. In total, Victor has over 284 publications to his name, including 29 books. He is considered one of the first marine mammal biologists as well as a great author, photographer, lecturer, and conservationist.



Scheffer in his office in 1992 (Courtesy of UW Special Collections)

Introduction

These essays have been written by the author over the years and were compiled with the assistance of the author's daughter, Ann Scheffer Carlstrom, and of Toni Reineke and Jan Widgery. They have been read aloud by Marilyn Paulson at coffee hours in University House at Wallingford, a retirement home in Seattle. They were assembled and copy-edited by Ray Elizabeth Starks.

The author, who is in his 102nd year of life, gratefully acknowledges the help of these friends, and of the reference librarians of the King County Library System and the Seattle Public Library.

America's Library

In the year 1800, Congress appropriated \$5,000 to establish a library for the use of its members. The nucleus would be 740 books and three maps from the personal library of Thomas Jefferson. Duly installed in the Capitol Building in Washington, the new library was destroyed in 1814 by British troops in retaliation for Americans having burned the British Parliament Buildings in Toronto.

Within a month, Jefferson offered to sell 6,487 books as replacements. He estimated that 18 to 20 wagons could carry the lot to Washington in a single fortnight. Congress paid him \$23,950 over the protest of a congressman who feared that the library of Jefferson, a freethinker, might contain the books of an "atheistic, irreligious, and immoral character" (Peck, 1982).

The growth of the Library's collection accelerated in 1870 when Congress mandated that two copies of each book copyrighted in the United States be deposited in the Library. The present Library Building opened its doors in 1887. It is now home to more than 209 million books in 460 languages. It adds more than 8,000 books and other items daily. The variety of historic items is amazing, ranging in value from the first Barbie doll and George Washington's walking stick to a Gutenberg Bible and several Stradivari violins.

A clay tablet in the collection has been dated from the seventh century BCE. It is a library catalog of ten classes: Grammar, History, Law, Natural History, Geography, Mathematics, Astronomy, Magic, Religions, and Legends.

Those of you who have visited the Library of Congress will appreciate the words of biographer Edmund Morris: "To work in the central, circular reading room is to get the surreal impression that one is inside Thomas Jefferson's cerebellum. The vast yet intimate space . . . silently throbs with knowledge. Invisible connections—fact to fact, thought to thought, thesis to antithesis—flash back and forth at who knows how many million times a minute whenever we lesser scholars . . . puzzle out our own connections below" (Conaway, 2000, p. iv).

I'm told that evil men in lands far away are now planning to attack the United States. They are plotting critical targets. If true, I pray they never learn that the soul of America—her center of culture and intellect—is not in her White House but in her library.

Animal Rights

The end of World War II with its ferocious cruelty brought a reaction in American thought that would come to be known as the liberation movements. By the mid-1950s, millions of us were demanding government action to alleviate suffering in disadvantaged classes: women, Blacks, and other ethnic minorities; the physically handicapped; the poor; and the elderly. Over the next 20 years, Congress responded with a surprising number of do-good laws. Compassion was rising in the air above Washington, DC.

Concern for people spread by a sort of spiritual osmosis to concern for the animals with whom we share the planet—the wild ones and the livestock, those held captive in zoos and aquariums, those held for research, and those that serve us as companions. In 1972, law professor Christopher Stone wrote an article titled "Should Trees Have Standing? Toward Legal Rights for Natural Objects." The thrust of his proposition was this: whereas all objects in nature (including animals) are subject to damage by humans, perhaps they should be regarded as jural entities, having the right, equally with faceless corporations, to sue for justice. In 1975, Peter Singer, Australian philosopher, wrote the campaign manual for the animal rights movement: *Animal Liberation: A New Ethics for our Treatment of Animals* (1975/1990). He affirmed that animals have rights that humans are morally obliged to respect; however, when we must treat one species at the expense of another, we should sacrifice the one having the lesser capacity to suffer. And, "if possessing greater intelligence does not entitle one human to exploit another, why should it entitle humans to exploit nonhumans?" (Singer, 1973, as cited in Scheffer, 1991, p. 30).

The animal rights movement gave rise to many new nonprofit organizations, among them the Society for Animal Rights, the Animal Rights Network, Attorneys for Animal Rights, the Society for Animal Protective Legislation, and the Society for the Study of Ethics and Animals. By 1983, 19 American colleges were offering courses on ethics and animals.

At the federal level, Congress had expressed little or no concern for animals as individual beings having feelings and interests. However, in 1959, Congress passed the Wild Horses and Burros Act. No longer could resentful livestock owners poison their waterholes. The Airborne Hunting Act of 1971 brought an end to the killing of animals from low-flying aircraft—a practice that stacked the odds heavily in favor of the killer.

The historic Marine Mammal Protection Act of 1972 was the first of its kind anywhere in the world. It established a first precedent for the right to make and to enforce laws respecting the compassionate treatment of animals. It specified that seals, dolphins, whales, and other marine mammals were to be taken or held humanely. And no product from a marine mammal that was pregnant or nursing, or was less than eight months old, was to be imported into the United States.

In retrospect, I see the birth of the animal rights movement as the reaction of sensitive and considerate Americans who, feeling helpless as individuals to ease the suffering of their fellow humans, turned to easing the suffering of nonhuman animals—the only other beings on the Tree of Life who can feel pain as we can feel it.

Joseph Wood Krutch (1985) was a New York drama critic who retired to the Sonoran Desert. There he saw wildlife in all its naked beauty. "Either love is something that we share with animals," he wrote, "or it is something that does not really exist within us."

Art for Art's Sake

I offer a short essay in memory of Professor Walter Isaacs, my neighbor and friend for many years. As a painter, he was at the forefront of the art movement known as Modernism, which spread across America from about 1900 to 1970. In 1921, University of Washington's president, Henry Suzzallo, invited Isaacs to head the Department of Painting, Sculpture, and Design at a salary of \$3,000. Isaacs declined. He wrote, "I cannot think of stopping my painting—I am much nearer to a realization of maturity in my painting than I was even three months ago." (His "maturity" is, I think, equivalent to personal fulfillment.) Isaacs was an artist's artist. He knew the meaning of Art for Art's sake. A year later, the importance of

teaching had grown in his mind to the point where he signed on at the University. Here he served for 30 years (1922-1951).

Art has many meanings—the *Oxford English Dictionary* gives no fewer than 19. So I turn to the voices of poets and painters who seem to have captured the spirit of non-utilitarian art, or Art for Art's sake.

Renoir believed that art should be “inimitable and indescribable.” Nonetheless, art does have two qualities upon which there is general agreement: it must spur emotion and it must reveal the passion of the artist. “Art,” said Amédée Ozenfant, “must exalt.”

From Keats (1817), “The excellence of every art is its intensity, capable of making all disagreeables evaporate, from their being in close relationship with Beauty and Truth.”

From Flaubert (1964), “Art has no other end, for people of feeling, than to conjure away the burden and bitterness (of life).”

From William Hazlitt (1909/2007), “Rules and models destroy genius and art.”

It is a point of interest that the ancient Greeks had no word in their language for art. The nearest was *techne*—the root of technique. Yet they were artists by nature and habit; art was in their fingertips. They understood that beauty, as well as utility, should be put into everything they created, from tools to temples. The poet Keats (1884) was aware of this when he wrote *Ode on a Grecian Urn*, with its graceful maiden “forever painting and forever young.”

A cartoon in *The New Yorker* shows two men dressed in animal skins looking at a fresh painting on the wall of a cave. “It’s clever,” says one, “but is it art?” Three hundred centuries later, we still have not decided.

Beauty Bare

In a poem by Edna St. Vincent Millay (1922), there’s a line that calls for examination: “Euclid alone has looked on beauty bare.” What does the poet mean?

Euclid (1998) was a philosopher in Ancient Greece who fell in love with numbers and shapes. He is known as the father of geometry and, in a wider sense, as a pioneer in mathematics—the science of space, number, quantity, and arrangement. He tinkered with cubes and cones, pyramids and prisms, spheres and spheroids.

He preserved his ideas in a small book titled *Elements*—a model of clarity and reduction. Consider this definition: “A point is that which has no part” (Definition 1). In *Elements*, he defines the Golden Ratio, an arbitrary way of dividing a line into two parts so as to achieve an esthetic result.

The footprint of the Parthenon is based on this ratio.

I like to think that Euclid saw numerical beauty in all living things: the twin buds of the lilac, the three petals of the trillium, the four of the dogwood, and the five of the rose. The starfish has five arms (though one kind has 20). The brood-cell of the honeybee is six-sided. In fact, almost all the larger organisms are built on the plan of 2, 3, or 5, or a multiple thereof. A newly discovered beast having seven toes is an unlikely prospect.

So, what may have led the poet to write of “beauty bare” is the sheer economy of nature—its parsimonious arrangement of matter and energy in the process of creation. Euclid, in searching for order in the world, found this economy and translated it (to the benefit of mankind) as beauty. He could not have known, in the fourth century before Christ, that nature is an unfinished work.

Bird Navigation

The seabirds known as Short-tailed Shearwaters feed in summer on the North Pacific Ocean and then fly south 10,000 miles to a second summer on their breeding islands off Australia. After half a year, they repeat their course in reverse. On a September day in the Aleutian Islands, I saw thousands of Shearwaters fishing for the energy-rich food that would support them on the long journey ahead. I wondered why—surrounded by ample food and in mild weather—they seemed so intent on preparing for an uncertain future.

Flocks of birds, flying above Cape Cod at night, have been tracked by radar at elevations of up to 20,000 feet—or a mile higher than Mount Rainier! I suffer at the thought of their beating wings against the thin, cold air.

An ornithologist writes that the Golden Warblers, leaving their breeding quarters in Central Europe, fly southwest toward the Iberian Peninsula, then they shift their migratory direction to the south in order to reach their central African quarters—otherwise, they would fly into the Atlantic Ocean. I wonder how far their “internal map” extends beyond the fringes of their immediate position.

Research on bird navigation began in the 19th century with the placing of individually numbered metal bands (or rings) around the legs of migratory species. A fraction of these would eventually be recovered along the migratory flyway. Research quickened in the 20th century. Early on, it was discovered that seasonal changes in the length of day trigger the onset of migration. Perhaps the most important breakthrough was the invention of the Emlen Funnel, a large birdcage in the shape of a truncated cone. The narrower end



With father in Hell's Canyon in 1927 (Courtesy of the Scheffer family)

is the floor, where a bird is held captive during its natural migratory periods. The bird is obliged to sleep from time to time on black-ink pads arranged around its feeding station. The upper, wider end is a virtual sky. It is a lid that can be changed to simulate a changing length of day or a night patterned with stars. A horizontal screen of white cloth hangs below the "sky." When the bird, feeling the migratory urge, tries to reach the sky it is blocked by the screen, where it leaves inky footprints. By counting the number of prints and noting their compass bearing, it is possible to estimate the strength of the migratory urge and the direction toward which the bird was instinctively headed.

The Emlen Funnel has revealed two avian navigation aids: the brains of some birds contain crystals of iron-rich magnetite, enabling them to align their bodies with the Earth's magnetic lines of force, and, equally amazing, birds can navigate by the stars.

Almost all of the sensory faculties known to exist in the animal kingdom are found in some species of migratory bird. Why? Because acquiring the ability to move long distances in a distinctly three-dimensional and open-ended environment has forced the natural selection of birds to produce an especially large bag of tricks. So, think twice

before you call someone a "bird-brain." He or she may take the words as a compliment.

Concern for Posterity

Henry Steele Commager has written, "Posterity is a word that has disappeared from our vocabulary. As far as I know, no modern president has used it in any presidential address, though in the Era of Enlightenment, Washington, Adams, and Jefferson couldn't give a speech or write a letter without invoking posterity." In our time, presidents are becoming less and less presidential. Their vision rarely extends beyond eight years.

Concern for posterity is the uncalculated sentiment that leads elderly folk to plant acorns or to endow museums and wetland sanctuaries. It is the sentiment that inspires care for endangered species. In its pure form, it is selfless, for it benefits those who can never reciprocate.

Concern for posterity is closely related to the conviction that human life has purpose. I mean purpose in the everyday lives of individuals, not some grand cosmic purpose that must lie forever beyond the reach of our animal brains. Individuals find purpose through personal choice or invention. Some create art; others search for new planets, build bridges, serve the community, or simply do—as Orwell (1935/1950) puts it—"what is

customary, useful and acceptable.” Yet even those who give little thought to the purpose of life can feel compassion for those men and women who will someday inherit the earth.

As a career student of organic evolution, I feel that the most satisfying purpose of life is to think and to act in ways consistent with the idea of the “perfectibility of man” (as Alexis de Tocqueville [1835/2000] puts it). This is a goal which, like the square root of minus-one, is unattainable though useful. I envision a better world—one in which men and women will steadily fine-tune the civilized habits that protect individual rights within the constraints of democratic law. In that utopian world, men and women will celebrate the singularity of *Homo sapiens* as an organism that is evolving at an incredible rate compared to other species. It is the freest among all other forms in its potential to adapt to changes in its environment. It is the only species that might think its way to survival in the event of a global catastrophe such as a hit from a giant asteroid. A poet might say that we should feel concern for the future of humankind if only as a perpetual source of astonishment.

Concise History of the World

This is the title of a book published by the National Geographic Society (Kagan, 2006). I bought a copy, partly to learn how the people at the Geographic managed to cram the story of civilization into one volume.

The text presents a chronological timeline of significant events throughout the world. Written by seven historians, it is enriched with facts and photographs from the Geographic’s century-old library.

The first cut of the story is divided into eight periods: (1) The First Societies/Prehistory, 3000 to 500 BCE; (2) The Classic Age, 500 BCE to 500 CE; (3) Faith and Power, 500 to 1000; (4) Invasions and Advances, 1000 to 1500; (5) Conquering Worlds, 1500 to 1750; (6) Empires and Revolutions, 1750 to 1900; (7) Global Conflict, 1900 to 1950; and (8) Toward a New World, 1950 to the Present.

The second cut is divided into four regions: (1) The Americas, (2) Europe, (3) Middle East and Africa, and (4) Asia and Oceania.

The third cut is divided into five broad subjects: (1) Politics and Power, (2) Geography and Environment, (3) Culture and Religion, (4) Science and Technology, and (5) People and Society. As a naturalist, I am pleased to see that environment is given its rightful place in history after centuries of neglect.

Finally, single events are cataloged with increasing frequency as time moves toward the present. I learn that I share the year of my birth,

1906, with the incarceration of Typhoid Mary; the great San Francisco earthquake and fire; the introduction of modern dance to America by Ruth St. Denis; the enactment of the Pure Food and Drug Act; the publication of Upton Sinclair’s book, *The Jungle*, a patent issued to the Wright Brothers for a flying machine; and the first voice and music broadcast in America. Twelve pages at the back of the book give “The World at a Glance,” summarizing the highlights of the main text.

Perhaps the greatest value of the book is that it identifies threads in the fabric of societal advance such as the push toward women’s rights, the evolution of electronic communication, the development of antibiotics, and the expansion of outer space. I marvel that this handsome book of 416 pages, richly illustrated in the Geographic tradition, and accompanied by a folded map, can be delivered to one’s home at a cost of only \$46.20.

Creationism

In a certain African jungle there lives a botfly that parasitizes a monkey by a cunning trick. First, it lays a tiny larva, still in the egg case, on the underbelly of a mosquito. If the mosquito finds a sleeping monkey and begins to suck its blood, the radiant heat from the monkey causes the egg case to crack open and drop the larva on the monkey’s skin. From here, it burrows into the flesh and begins to feed. After several weeks, it is a fat, white cylinder known as a warble. It falls to the ground, pupates, grows wings, mates, and starts the second generation.

But why doesn’t the fly lay its larva directly, instead of sending it by messenger? No doubt because the fly is active only during the day when the monkey is alert and likely to swat any fly near its body.

Fast forward to North America, where religious fundamentalists are promoting a theory called Creationism to explain the strategy of the botfly and, indeed, the strategies of all living things. The Creationists argue that because every effect has a cause, all life must have been created by a Creator of one kind or another. Creationism contradicts Darwin’s secular theory of evolution by natural selection, a never-ending drama but one that has no parts for supernatural players.

Ever since 1925, when John Scopes was found guilty in the Tennessee “Monkey Trial,” many legislators and school boards have either outlawed the teaching of evolution or have mandated that Creationism be taught as an alternative. In 1968 and again in 1987, the Supreme Court of the United States ruled against the required teaching of Creationism on the grounds that it is a religious

belief and thus is in violation of the Constitutional separation of church and state.

The latest ploy of the Creationists is to rename their theory Creation Science or Intelligent Design. (But you can't make a dog a cat by calling it a cat!)

Creationists think too small. Their theory is a cop-out, a shying away from a much wider vision of the universe as a singular presence—eternal, infinite in all dimensions, silent, dark, and bitterly cold. It seems to be continually reinventing itself by shuffling its matter and energy. Somewhere in this great domain, on a tiny ball of rock, a planetary drama has been running over four billion years. Its plot unfolds in trial and error coupled with survival of the fittest.

We humans, dimly understanding the play, applaud it for stirring our sense of wonder. The idea of a boundless, mindless universe is no less fanciful than Creationism, though it is more persuasive in its simplicity.

Darwin Updates the Book of Genesis

In his 1859 book, *The Origin of Species*, Charles Darwin offered a novel explanation for the Earth's diversity of plants and animals. All the myriad forms, he wrote, came into being through natural selection much as new varieties of dogs and pigeons are brought into being by artificial selection. Natural selection, at first called a theory, eventually won a place in world thought as an established principle. The transformation of genetic lines through time by means of natural selection came to be known as evolution.

Darwin's idea emerged in a century when leading scientists were beginning to doubt contemporary estimates of the Earth's youthfulness (a few thousand years). They were also learning that certain faunas and floras, which had been fossilized long ago, differ greatly from those still alive. They were beginning to recognize the what of changes in life's patterns, but the how and why were unclear. They could only imagine hidden forces that caused some species to vanish from the fossil record while others survived.

Darwin based his explanation on three known qualities of living organisms. First, no two individuals are identical. Today, we know the main reasons for variation: genetic mistakes and genetic drift, the random shuffling of genes during reproduction, and hybridizing in the wild. Second, every organism produces more offspring than it needs to replace itself. Witness the male rabbit, successfully fertilizing forty females in one day, and the oyster, shedding 60 million eggs in a season. Third, every organism is constantly engaged in what Darwin called the struggle for life—the struggle to find

food and shelter; the struggle against pathogens and predators; and the struggle against environmental hazards such as drought, storm, flood, wildfire, and frost.

Darwin (1859) reasoned that the interplay among these forces produces “the preservation of favoured races” or (in later editions of *The Origin*) “survival of the fittest.” In this context, the fittest are simply the ones that contributed most to the gene pools of later generations. Fitness can thus be judged only in hindsight, by tracing the success or failure of the individual genetic line through geological time. Darwin's conclusion “was essentially statistical and based on population dynamics” (Medawar, 1973).

Natural selection has been proved, and its pace has been measured in at least a hundred studies of plants and animals in the wild and in studies of microbes in cultures. For example, English sparrows were brought to North America around 1850. In the next 150 years, their descendants spread over the entire continent from Canada to Central America, meanwhile evolving into three distinct varieties which are now fully equivalent to wild zoological subspecies. And, in test-tube studies (where bacteria can clock up a new generation every 3.5 hours), scientists recently ran natural selection “fast-forward.” The bacteria, which had been randomly divided into three populations, evolved after ten years into three genetically distinct strains.

In the intellectual backwaters of America, however, Darwin's idea is still rejected by millions who insist that only Almighty God could have created the splendid Circus of Life in which *Homo sapiens* is the star performer. These millions—the “Creationists”—argue that, because a clear explanation of life's rich diversity was written in the Book of Genesis nearly two thousand years ago, all secular revisions should be ignored or even opposed.

Harvard University's Stephen Jay Gould (1999) pointed to “the embarrassing paradox of a technological nation (America) entering a new millennium with nearly half its people actively denying the greatest biological discovery ever made” (p. 2087). He is referring to a recent survey of more than 1,200 college freshmen, indicating that 45% were skeptical of the “theory” of evolution.

Should we condemn those who reject Darwin's grand idea or, rather, should we pity them in their ignorance? Should we fault American elementary and middle schools for failing to stimulate intellectual curiosity? Answers to these questions will vary with one's cultural background.

Natural selection, while deceptively simple at first glance, still poses many questions about the working of its finer machinery. The evolutionary

biologists, historians, and philosophers who are searching for answers are surely reaching levels of spiritual exhilaration that others reach in probing the mysteries of religion.

*The orca whale in black and white
I love thee with all my heart,
Though evolutionary lines have
kept us far apart.*

Earth Day

Conservation as a national ethic came into everyday language a century ago when Teddy Roosevelt was in the White House. His friend, Gifford Pinchot, a professional forester, had put a new



As ranger naturalist in 1934 (Courtesy of the Scheffer family)

spin on an old word. *Conservation* would now mean not only the preservation but also the wise use of America's natural resources: her forests and fisheries, mineral deposits and fertile soils. But who would define its wise use?

Early on, the U.S. Forest Service decided that *wise use* is generally *multiple use* (something for everyone) and that our forests would be managed for maximum sustainable yield. The yield would include wood products, watershed values, public recreation, and diversity of habitats for wildlife.

Eventually, the managers of public lands realized that one important use of public lands was simply to let them be—to protect them more or less in status quo as the last great places. Wallace Stegner, a lobbyist for the Wilderness Act of 1964, explained this option in a letter to Congress. He wrote, “We simply need that wild country to use, even if we drive only to its edge and look in, for it can be a means of reassuring ourselves of our sanity as creatures, a part of the geography of hope.”

These words speak not of maximum sustainable yield but of optimum sustainable good.

As the disciples of conservation advanced their cause, they picked up an old scientific term, *ecology*, and added it to their catechism. While its technical meaning is the study of interactions among organisms within communities, it also resembles a philosophy whose credo is expressed in Barry Commoner's (1971) Four Laws of Ecology:

*Everything is connected to everything else.
Everything must go someplace.
Nature knows best.
There is no such thing as a free lunch.*

Conservation was soon to be supplanted by the more holistic term, *environmentalism*, defined as the art and science of studying humankind's earthly bases of support while steadily applying what is learned toward perpetuating those bases.

The environmental movement began stirring in 1962 after the publication of Rachel Carson's *Silent Spring*, the book that challenged the chemical poisoners to take heed of the damage they were doing to the health and beauty of the biosphere. A revelation was about to become a revolution.

During that same year, the word *environmental* first appeared in the yellow pages of the phone book—the term had become part of the American vernacular. The number of organizations (per decade) that were dedicated to conservation and environmental issues in the United States more than quadrupled in the 1960s.

On April 22, 1970, nearly 20 million men, women, and children all across America celebrated the first Earth Day, welcoming the newborn envi-

ronmental movement. The first Earth Day was described as the largest, cleanest, and most peaceful demonstration in America's history. Congress recessed for the day to join the public in exchanging ideas about ways to end the ongoing abuse of land, air, water, and wildlife.

One of the most effective strategies of Earth Day was the teach-in. A typical teach-in would be held at a university, high school, or community center. It might feature a convocation, songfest, dance, and smorgasbord, along with panel discussions, symposiums, and talks by environmental evangelists. The agenda might include the drafting of legislation, the reporting of pollution-law violators, the filing of environmental lawsuits, and active campaigning for elective candidates known to hold sound positions on environmental issues.

On the University of Washington campus, 22-year old naturalist Bob Pyle organized and directed a plant-in at the edge of Union Bay. In a mood both festive and ceremonial, Pyle and nearly 400 students, faculty members, housewives, and business people marched to the dump to plant pines, willows, firs, and native shrubs. By dinnertime, their job was finished.

The message of Earth Day is still with us, timeless and universal. If our civilization is to survive, we humans must control the growth of our population and stop wasting or poisoning vital elements of the biosphere. In the words of Joseph Cohen, "Putting together the first billion people on earth took from the beginning of time until 1830. Adding the last billion took about 12 years." And Peter Vitousek condemns the crushing impact of humans on the biosphere: "Nearly 40 percent of earth's primary biological activity is used directly, co-opted, or foregone because of human activities."

These are sobering facts and a challenge to all of us who are attached to Planet Earth and its living envelope by a bond equivalent to religion.

E. B. White (1962) speaks on behalf of all environmentalists: "I would feel more optimistic about a bright future for man if he spent less time trying to outwit Nature and more time tasting her sweetness and respecting her seniority."

On a chilling note, we hear repeatedly that George W. Bush and his advisers are determined to tap the Arctic National Wildlife Refuge for oil and to invade ancient evergreen forests at the expense of endangered species. They seem to have forgotten—if they ever knew—that environmentalism represents a vital part of our national conscience.

Economics 101

I was born in 1906 and am increasingly troubled by the efforts of President Bush to reduce the national budget for welfare.

He speaks of getting the government off our backs. He refunds our taxes. He extols the virtues of privatization and deregulation. But he seems not to understand a basic law of economics, which is that the cost of governing a growing population increases faster than does the population itself. Why? Because growth and crowding bring new problems which only new layers of government can solve.

The Business Library at the University of Washington and the Population Reference Bureau in Washington, DC, provide the following real-life numbers: from 1906 to 2005 the budget increased by a factor of 8.0, while the population increased by a factor of only 3.4. (Footnote: Budget numbers are given in constant dollars since the cost-of-living index increased 20-fold during the century.) The budget outran the population at an average annual rate of 2.35%.

The President calls for a leaner government at a time when vital services such as education, low-cost housing, public health, and protection of the environment are suffering from neglect. Yet it seems that his leaner government policy does not apply to ever-escalating military budgets, nor do his speeches call for curbing the runaway rise in national debt.

I will feel a rush of optimism if ever he decides to quit invading other nations and turns to shaping the United States into a model of a people truly dedicated to the preservation of life, liberty, and the pursuit of happiness.

*In the White House, in his nightie,
Sleeps the Leader, mean and mighty,
Evil dreams disturb his rest:
Lesbian ladies, eyes-a-glistened;
Stem cells never to be christened;
A third-term fetus, unaware of its doom,
Ultimately snatched from its
place in the womb;
The commandments of Moses,
restored to our view
By the secular folks at the A.C.L.U.
Now our Leader is up with a smile on his lips.
He has seen Lady Venus with
a robe on her hips.
Now decently dressed, she
reclines in her purity
No longer a threat to our national security.*

Education

I define *education* as teaching truth in order to enrich individual lives and to promote civilization. Education is a silver cord leading from the Old Stone Age through Gilgamesh and Shakespeare to the latest program from an orbiting satellite. It ensures the continuity of intellectual and cultural (as distinct from organic) evolution.

Folklore notwithstanding, nonhuman animals do not teach one another. They learn by instinct, imitation, and trial and error. "A kitten watches at a mouse-hole though it has never seen a mouse," wrote Edward Blyth (as cited in Eiseley & Grote, 1959). To be sure, the higher primates behave on occasion as if they were teaching. A chimpanzee mother, watching her infant try to crack a nut with a stone that is too small, will offer a larger one. Call this education if you wish.

I strongly believe that we must extend education from the few to the many. Moreover, it must explain where we came from, who we really are, and how we fit into the universal pattern of matter, both living and nonliving. It must interpret how human behavior is driven by forces both inborn and learned, genetic and cultural, animal and human.

Education deserves to be ranked nearly equal in importance with food, clothing, shelter, and transportation. Yet, in the city where I live, the citizens continue to vote for sports arenas at the expense of schools. The producers of public TV and radio programs have to beg for support. The national government spends billions in faraway lands while short-changing social services at home. According to the Friends Committee on National Legislation, a Quaker organization, 42% of the budget for the year 2006 was earmarked for military purposes. Only 2.1% of the remainder is earmarked for education.

The 2004 national election, which pitted faith against reason, should have served as a warning that education was losing ground to ignorance. Education may now be entering a feedback loop in which ill-informed voters are continually creating administrations that blindly deny the value of education.

I wish that we Americans would respect, value, and compensate our teachers—caretakers of the mind—as we now do our physicians—caretakers of the body. At least, we might raise more statues of great educators like John Dewey to stand beside the sword-raising generals in our public parks. After all, it was not a primordial gene for homicide but one for compassion that put our ancestors on the path to humanity.

I close with a thought from H. G. Wells (1920/1949): "Human history becomes more and more a race between education and catastrophe."

Emotional Needs

Today, the airwaves are full of advice on how to live longer and more happily. Let us listen for a moment to an earlier voice: that of Herbert Spencer, born in 1820. A philosopher and a dabbler in biology, Spencer (1891) championed Darwinian evolution. "People are beginning to see," he wrote, "that the first requisite to having a success in life is to be a good animal" (p. 103). He classified our emotional needs in four categories:

The first is need for security, including its corollary values of comfort, peace of mind, routine, and the feeling of being at home. This need is most urgent in the very young, the very old, and the handicapped.

The second need is for adventure, for breaking out of routine, for novelty and excitement.

The third need is for recognition, for individuality or personhood. It is the urge to make a difference in the world and to be remembered after death. A two-year-old child will jump from a curb to the street and cry out to its mother, "Look at me!" An unloved child who feels isolated may try to compensate, drawing attention to his needs by behaving badly.

The fourth need is for love, a word that we use for emotions ranging from a fondness for raw oysters to reverence for Almighty God. Love is most commonly used, however, to identify the powerful bond between male and female and between parents and offspring. Its power derives from Mother Nature's directive to perpetuate the bloodline (and thus the species). By a stretch of imagination we can see a caricature of love in the behavior of lower animals. If, by accident, we break open an anthill, its dwellers will rush out in wild confusion. Remarkably, though, many will be clutching a tiny white ball—an egg, with its promise of posterity. So, in the mind of an ant, personal safety takes second place to responsibility for others, blind though it may be.

I turn from Spencer to Elizabeth Barrett Browning (1850): "How do I love thee? Let me count the ways" (Sonnet 43). We are still counting.

The Evolution of Love

At some stage coeval with the enlarging of the human brain, mankind began to develop a novel lifestyle, one that was unprecedented in the four-billion-year history of life on Earth. This novelty, facilitated by the power of speech, was reasoned



Photographing Murres in 1945 (Courtesy of the Scheffer family)

cooperation. Not the instinctive cooperation of beavers, building together their dams, canals, and lodges, nor the cooperation of termites, constructing in total darkness their million-member apartments. Reasoned cooperation calls upon the individual, voluntarily and thoughtfully, to give up certain rights, desires, and demands for the benefit of the common good.

Reasoned cooperation evolved in tandem with kindness, that is, our recognition that we are all of one kind. We are all caught up together in a sort of sensitive and sensual biomass. The Latin word for kind is *genus*—also the root of genial and generosity. Among the synonyms for *kindness* are caring and sharing. The ultimate expression of voluntary sharing is love, and at some late stage in the development of voluntary sharing, love emerged.

Jane Goodall, who knows a great deal about the emotions of chimpanzees, says that, while they may show tenderness and compassion, grief and distress, they never behave like humans in love.

Thoughtful men and women of all generations, reflecting on the evolution of humankind, have wondered whether life has a grand, overarching purpose that extends beyond the life span of the individual. Any answers must be framed in philosophical or religious terms. Granted that

any purpose of life must be invented, a logical choice would be to continue on the path of reasoned cooperation, which long ago led us away from the company of apes. The purpose of life then becomes the collective will of the people to make human life less beastly and more human. To be sure, we face challenges unimaginable to primitive men and women. Chief among them are these two:

First, to make abiding peace with the planet that gave birth to our kind and which has supported us until now. Our single most important task will be to reduce our teeming numbers to match the carrying capacity of the planet's resources in soils, waters, and clean air.

Second, to make abiding peace among ourselves: the challenge is to share with ethnic, religious, and national groups, wherever they may exist, measures of sympathy approaching those we share daily with members of our own families. How short a distance we have moved toward meeting this challenge is woefully manifest in our stubborn insistence that waging war is a necessary step toward achieving peace. War brings deceit, destruction, and death, the antitheses of love.

Looking back over the long and erratic path that *Homo sapiens* has traveled, the very survival of the species may well depend on our recognition

that the most important factor in our future evolution will be learning to love.

Goodness

Webster's dictionary defines *goodness* as the most homely term for moral excellence: "an excellence so deeply established that it is often thought of as inherent." I believe it to be both inherent and a genetic novelty in life as we know it.

It developed by Darwinian selection during 10,000 human generations. It steadily proved its survival value to our species. Its evolution was shaped by cultural as well as natural agencies.

In our own time, the selection of heritable features in animals can be accomplished by artificial breeding. I offer two examples. Biologists have developed a laboratory rat that has lost its native ferocity and will allow itself to be handled. And livestock breeders have developed a dog—the border collie—that is born with a desire to drive sheep.

By the end of the present century (when my great-grandson will be 95), we may know whether or not goodness has helped to cure our ailing society. Will we have learned to live more responsibly and respectfully with Mother Earth? Will we have weaned ourselves from dependence on sources of energy that are in short supply or are toxic or both? Will we have learned that legalized killing is not an effective way to end international disputes?

Poet Richmond Lattimore is doubtful. He is watching us all from an observation post on a planet far away. He writes,

*These people can do anything
Difficult, but nothing easy;
catch and tame sight
And sound out of space; stroll in it;
fly tons of steel
And come down on a handkerchief,
Yet cannot realize a simple covenant.
Hundreds of wise men are united by subtle
Communication, to form one mind
And talk like a single idiot.
(cited in Scheffer, 1991, p. 53)*

Today, we are living longer, faster, and more stressfully in surroundings ever more crowded, dirty, and noisy. At the same time, we are gaining greater understanding of our place in Nature—that is, of the human condition. We share in common the hope that our wisdom will save the inherent goodness without which we will not be human.

Humanism

In a time when fanatics all over the world are blowing themselves apart in the name of religion, I offer a few thoughts on Humanism, an alternative set of beliefs. *Humanism* is a secular religion, founded on amazement at the journey through geologic time of *Homo sapiens*, on pride in the status of mankind as the most thoughtful and imaginative of all species, and on concern for its future.

"The people I respect most," says E. M. Forster (1951), "are those who behave as if they were immortal and as if society were immortal." Humanists look at reality insofar as it can be identified in the visible universe. They have only passing interest in images of gods and goddesses. Their system of belief is founded on evidence that can be perceived by direct observation and does not include belief in miracles and salvation. Humanists believe that their religion is a step forward in cultural evolution, supplanting 50,000 years of superstition.

Humanists bear witness to their beliefs by their behavior. They place high priority on social bonding, a tradition that has long proved its survival value to humankind. And they are environmentalists. They are convinced that the human adventure is now in its most perilous stage in all history because Planet Earth is being degraded by its overload of people. (The population of the United States alone has more than tripled in my lifetime.) The broad concept of Humanism resembles that of altruism and the Golden Rule. It has been around for a long time. Early in the 20th century, William James and F. C. Schiller proposed that Humanism formally be made a part of the vocabulary of philosophy. James confessed, however, that the word might be too "whole-hearted" to be accepted for use by philosophers, who are a cold-blooded band.

In conclusion, I doubt that Humanism will ever attain the popularity of the world's great organized religions. There is no magic in its plan for improving the human race. Theology will continue to trump biology.

Imagination

Imagination is defined as the action and the result of forming a mental image of what is not actually present to the senses.

Was it sparked long ago in a subhuman primate by a mutation for inquiry? If so, the habit of thinking in terms of "Why?" and "What if?" would have led to innovations in behavior having survival value to the bloodline.

Whatever its origin, imagination is now a diagnostic feature of *Homo sapiens*. This said, I submit that certain so-called “intelligent” animals behave as if they are imagining. They see into the near future, they play, and they dream. A dog, seeing its master put on heavy shoes, will visualize a trip to the park and will show excitement. A sleeping dog will whimper and move its feet in pursuit of who knows what. Jane Goodall (1971/1988), studying the behavior of chimpanzees in the wild, often saw them at play. In her book, *In the Shadow of Man*, she tells of “romping” and “rough and tumbling” of the young males and of their “panting chuckles.” While “their playing may be a type of schooling for the young males,” she observes, “it is obviously very enjoyable.”

Imagination is now a catalyst in every human enterprise, be it commerce or industry, science or technology, the arts or education. Leaders in highly competitive fields urge their executives to “think outside the box.” Imagination plays a prominent role in religion, where men and women speak to unseen gods. The faithful nourish their faith by telling and retelling miracles. Willa Cather (1927) tells us, “Miracles . . . seem to rest . . . upon our perception being made finer, so that for a moment we can see what there is about us always.” Pablo Picasso puts it more crudely, “Everything is miraculous. It is miraculous that one does not melt in one’s bath.”

In Bertrand Russell’s (1926) philosophy, “it is only through imagination that man becomes aware of what the world might be” (p. 23). Nelson Mandela knew this as he suffered in prison for more than twenty years. There he planned a new South Africa. Rosa Parks knew it before she boarded the bus in Montgomery. She was ready; she had seen a new world. Albert Einstein knew it as he brokered a marriage between energy and mass. Later he would write, “Imagination is more important than knowledge.”

Imagination roams freely over the map of the mind, recalling the past and foreseeing future possibilities. It recalls the fragrance of gardenia at one’s wedding, and later, the smoothness of babies. It is the planning of cathedrals and pleasure-domes. It is dreaming of the day when military deceit, death, and destruction will no longer be the answer to global disputes.

Imagination is keenest in children, where tears and laughter are near the surface, and in the elderly, where feelings are beginning to outnumber rational thoughts.

I have good news for weight-watchers: imagining burns calories. So forget the exercise, lean back in your easy chair, and wonder whether Eve had a belly button or whether microbes are happy.

To Librarians

I speak to you lovers of learning who preserve facts and figures, ideas and opinions, and then dispense them for the good of society. You uphold a tradition of service that was old before the destruction of the great library of Alexandria in 200 AD. Many of your kind would have died in the burning flames of 492,000 rolls of papyrus.

You are fortunate to be among the first to see new books and to be, vicariously, on the frontiers of science, technology, and the arts.

How pleased you are to help the child who asks for a picture-book on “ami-nals.” How pleased to help the student who asks why the value of a dollar always falls through time. But you are distressed when you find, in a book, passages highlighted in ink; or in another book, you remove a curious bookmark: a piece of bacon!

More and more often you are confronted by ethical issues. Do you ban *Huckleberry Finn* because it contains the N word? Do you give the FBI a list of your borrowers?

Aware that there is no progress without change, you meet the challenges of the Internet Age. Goodbye the catalog card; hello the monitor screen.

The elders among you will have gained the sort of intuitive wisdom best known to mothers and cats, and personified by that shining example of your profession, Archibald MacLeish (1978), late Librarian of Congress. As he studied the first ever photographs of the whole Planet Earth, he wrote, “To see the earth as now we see it, small and round and beautiful in the eternal silence where it floats, is to see ourselves as riders on the earth together, brothers on that bright loveliness in the unending night—brothers who see now they are truly brothers.”

It is no accident that a librarian should have conceived this thought. Listening, we common folk are encouraged to go on.

Life, with a Capital L

Life is an electrochemical system in which simple molecules, driven by energy from the sun or from chemical reactions in their environment, combine and cooperate to create organisms which feed, grow, reproduce, and evolve by natural selection.

All large, multicellular organisms die. Many small, unicellular ones divide and move apart in a never-ending parade. In the world of the amoeba, there are few goodbyes but many *au revoirs*.

Life is also an exuberance of shapes, sizes, colors, and levels of organization. The pygmy shrew of Africa weighs less than the dry tea in a teabag; the largest whale outweighs it by a factor

of 90 million. Yet both have similar tissues and organs and both (we presume) nurse their young with tenderness.

Although we can never hope to know the primal source of life, we can accumulate facts about its machinery, as for example, through the decoding of DNA, the molecule that governs growth and reproduction in all forms of life.

The discovery of extremophiles offers another clue to the mystery. These primitive microbes, which thrive in ocean deeps in total blackness at temperatures above the boiling point, may now be replaying the roles of the first living things on the hot, young Earth four billion years ago. (If so, they are the world's oldest conservatives.)

The viruses and prions (pree-ons), like those that cause AIDS and mad-cow disease, exist in limbo between the living and the nonliving, for they cannot reproduce unless they can attach to a living form such as a red blood cell.

This said, analyzing the machinery of life adds nothing to our pleasure as we listen to the even-

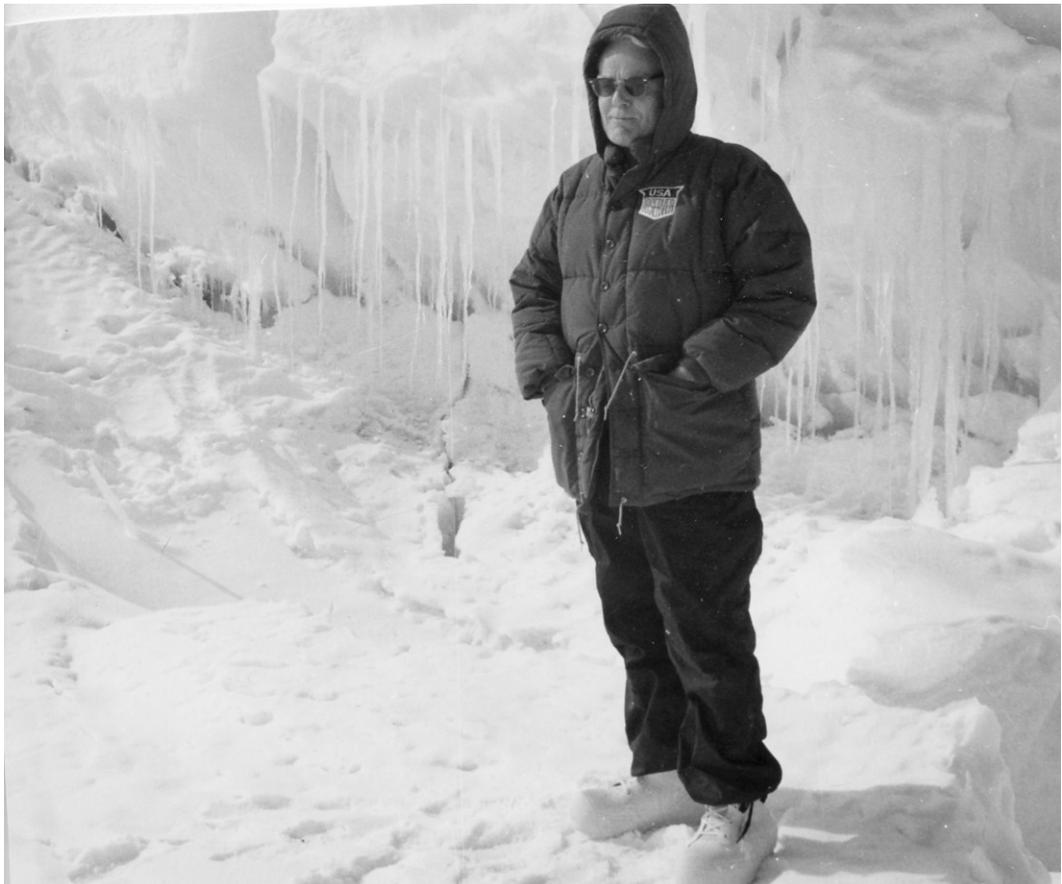
song of a wood thrush or watch a baby's fingers explore its mother's face.

When we were young, we gave little thought to cosmic life because we were busy living. Now that we are old, we give little thought because we are busy at staying alive.

The late Albert Schweitzer, a missionary/doctor, adhered to a philosophy which he called reverence for life. There can be no better attitude toward the greatest of all mysteries.

Morality

Morality has demonstrated its survival value to the human race for at least 100,000 years. Among its many definitions in the *Oxford English Dictionary* is this one: "The branch of knowledge concerned with right and wrong conduct, duty, responsibility, etc." I think of morality in its evolutionary context as the sense of balance between concern for one's self and concern for others. This sense is gained by per-



In Antarctica in 1964 (Courtesy of the Scheffer family)

sonal trial-and-error and by conforming to accepted standards of behavior within the community.

Morality germinates in early childhood and grows in the light of experience. While it holds fast to core principles, such as compassion for the young and the aged, it changes with time and place. The past fifty years have been a time of turmoil in public thought with respect to capital punishment, gun control, abortion, and assisted dying for the terminally ill.

Morality is uniquely human. It evolved in pace with self-awareness and the powers of reason and speech. It is foreshadowed in the behavior of chimpanzees—our closest living relatives—in their practice of reciprocal altruism. *Altruism* is defined as acting for the benefit of others at some cost to one's self. In its noblest form, it is acting in good faith without knowing that the favor will be returned. It is not much of a leap from reciprocal altruism to feeling good because one has acted rightly.

Zoologist Franz de Waal (as cited in Domning & Hellwig, 2006) concludes, "Morality is neither a recent innovation nor a thin layer that covers a beastly and selfish makeup. It takes up space in our heads. It reaches out to fellow human beings. And it is as much a part of what we are as the tendencies that it holds in check" (p. 106).

Nothing

The word *nothing* is an abstraction that can neither be seen nor measured. It does not really exist, for everywhere in the visible universe there's something. The most rarified artificial vacuum and all the regions of outer space are flooded with radiation. A poet might say that the cosmos is abuzz with silent sound.

Conceivably, there may be nothing between the smallest of all things—the particles that theoretical physicists are calling *strings*. Depending on the frequency at which they vibrate, they create either energy or matter.

Let's face it—we will never comprehend the cosmic absolutes: the largest, smallest, and oldest forms of matter and energy. We will never fully understand the forces driving organic evolution (the origin of species) and inorganic evolution (the transmutation of elements). Such absolutes are beyond human understanding. Not to despair—we can still enjoy the thrill of reaching.

Theory aside, *nothing* is still a useful word—but only in the context of the thing that it ain't.

*A teacher tells her class
about the birdies and the bees
A sailor trims his canvas to
accommodate the breeze*

*While an unrepentant sinner
rises slowly from her knees
While a solitary onion rises through
the melted cheese
These images come into mind
(however ill-begotten)
They have no use so now they
may as quickly be forgotten.*

Organic Foods

Organic is a wholesome word. It tells of orderly growth and structure. It is nearly equivalent to natural. It came into common use in the early 1940s through the lectures and writings of I. J. Rodale, a Pennsylvania farmer. Organic agriculture, he explained, is the raising of crops unsullied by any of the synthetic chemicals in conventional use. No man-made fertilizers, biocides, or ripeners. No artificial colors, sweeteners, or taste-enhancers. No growth-promoting hormones. No preservatives such as saltpeter, sulfur dioxide, or benzoate of soda.

Rodale was the messianic leader of the organic gardeners up to his death at age 73. Some of his notions, such as sitting each day under a short-wave radio to recharge his body's electricity, were simply nutty. Others, such as eating 70 food supplement pills, were probably useless, if not mildly harmful. By 1983, the family-owned Rodale Press grossed more than 100 million dollars a year from the sale of numerous publications on organic gardening, nutrition, and doctorless medicine.

Some of the champions of organic food were members of the 15 families who created a food-buying club in Seattle in 1953. Although their primary goal was to save money, they also endorsed the goal of the organic folk, expressed in the slogan, "Foods that taste better and are better for you." In 1960, the club incorporated as Puget Consumers Cooperative, and in 1969, as today's PCC Natural Markets. With 40,000 members and seven stores (soon to be eight) in the Puget Sound region, PCC is the largest natural food market in the United States. It showed a gross profit in the year 2004 of 39 million dollars.

Notably, PCC's meat and produce carry the label Certified Organic, qualified under U.S. Department of Agriculture standards and implemented in 2002. Moreover, the USDA and the organic industry are currently developing certification standards for fabrics, health supplements, beauty products, household cleaners, and pet foods. Congress is beginning to pay more attention to the values and less to the costs of the products that keep us healthy.

The following quotations reflect the philosophy behind the organic foods movement:

From Job in the Bible:
Speak to the earth it shall teach thee.

From Eleanor Roosevelt:
*Perhaps Nature is our best assurance of
immortality.*

From Henry Van Dyke
(in appreciation of the wild strawberry):
*Doubtless God could have made a better
strawberry, but doubtless God never did.*

The Origins of Music

Although dating the origins of music in prehistory is largely a guess, we can assume that it developed in pace with cultural and other advances such as ritual burials (about 100,000 years ago) and cave art (35,000 years ago).

Recent archeological excavations in central China show that Neolithic people were crafting flutes 9,000 years ago, in the dawn of agriculture and village life. These remarkable instruments were made by hollowing out the wing bones of the Red-Crowned Crane, a bird with a wingspan of eight feet. Each bone was then drilled with from five to 10 precisely spaced holes. A modern-day musician who tested one of the 10-hole models found that the intervals between adjacent pitches closely approximate a half-stop, the interval between a white key and an adjacent black key on a piano.

We can assume that music evolved in three stages: simple rhythm, like the sound of a child beating a table with a spoon; melody, or several tones created in sequence; and harmony, the sound produced by music-makers as a group, and later, by progressively more sophisticated instruments capable of producing several tones at the same time.

But why music? The behavior of living primates, our cousins in the wild, suggests that music rose out of the individual's need to advertise sexual superiority and the group's need to mark its territorial boundaries. The distinct calls of the Simang gibbon, for example, have either sexual or territorial content.

Another possibility is that early music was purely a response to excitement—an emotion too strong to be expressed by protolanguage. A story told by Jane Goodall does suggest that chimpanzees may vocalize just for the fun of it. She had been watching the movements of seven male chimps during a jungle storm. She writes: "One of the big males (startled by a clap of thunder) stood upright and, as he swayed and staggered rhythmically from foot to foot, I could just hear the rising crescendo of his pant-hoots above the beating of

the storm. [A pant-hoot is a series of hoo sounds connected by audible intake of breath and usually ending with a waa!] One of the big males stood upright and rhythmically waved the branches of a tree before seizing a large branch and dragging it behind him."

Music historians agree that Western (i.e., European) music is rooted in the culture of Ancient Greece. Pythagoras, around 500 BCE, determined the ratio of musical intervals. The word itself comes from the Muses, the nine daughters of Zeus who inspired music and art. Creating poetry sung to music was one of their specialties.

Let me share with you three quotations that appear under *music* in the *Oxford English Dictionary*:

*Unless you understand that . . .
Shakespeare was . . . writing music with
words you will never understand anything
about Shakespeare at all.*

*Music historians . . . have failed or refused
to see the composer (Bach) against the back-
ground of his religion.*

And from Shelley's "Prometheus," verse dripping with syrup:

*(a Nightingale) Sick with sweet love drops
dying away on its mate's music-panting
bosom.*

On this note I end.

Particles of Life

In the 1930s, I spent two years studying the plankton of Lake Washington. *Plankton* is a collective word for a community of tiny plants, animals, and microorganisms—none larger than a grain of rice—that drift or swim feebly in a lake or a salt-water body. From the deck of the research vessel *Catalyst*, I collected plankton in a net of tightly woven silk and then examined my catch through a microscope.

I tried to identify the roles, within the community, of 107 different species. This number is about the same as that of the ethnic groups in Cleveland, Ohio, or Houston, Texas. Is this simply a coincidence or is some mysterious natural law at work here?

Some species of plankton were predators and prey; others were competitors; many were solitary one-celled plants near the bottom of the food chain. The largest predators were mini-crustaceans encased in transparent shells through which I could see their most recent meal and clusters of developing eggs. And everywhere diatoms: one-

celled plants catching the sunlight through their protective jackets of glass.

The creatures of the plankton, though small, are complete and self-renewing. They navigate in a medium that, to a human in a swimming pool, would seem as resistant as liquid Jell-O.

Much smaller than the plankton creatures are the bacteria. They are called the invisible majority, for none can be seen with the naked eye and, in total, they far outnumber all larger organisms. In a recent article summarizing data from 91 published sources, three scientists estimated the world total number of bacteria at $4\text{--}6 \times 10^{30}$ (4 to 6 times 10 to the 30th power). Let me restate this in fanciful terms. If all material objects in our present surroundings except the bacteria were suddenly to vanish, we could still identify the ghosts of the objects by the bacterial vestments in which they had originally been clothed.

Bacteria multiply by simply splitting in two, producing a new generation as rapidly as one per day or even more often. Therefore they have an enormous potential to produce mutations.

Below the bacteria in order of size are strange noncellular particles that exist in a limbo of the nearly-but-not-quite-living and the living. Here are the viruses and the prions (pree-ons), all of which can multiply only after invading a living cell. The simplest ones have been called “mere genetic recipes.” A few are agents of diseases such as influenza, AIDS, and mad-cow disease.

Energy rules the universe. Its output and input are always and everywhere in play. For this reason, small forms of life are more numerous than large ones. The small ones are cheaper to make.

Patriotism

Patriotism is loyalty to, and affection for, one’s homeland. It is rooted in our animal heritage, and exemplified in the homing instincts of migratory birds and of animals such as the Alaska fur seal. Born on an island in the Bering Sea, the young seal roams over the wide Pacific Ocean for two or three years before it returns to the island and to the very same beach where it was born. It feels a certain rightness about its homeland.

In the human species, patriotism is a noble virtue, more or less—more when it is thoughtful and inquiring, and less when it is based on raw, uncritical emotion. At its worst, it is displayed by the war-whoop of a savage combatant, steeling himself to meet an uncertain future in battle.

The strategies for survival displayed by other animals can give us clues to human behavior. Recently, I was a war correspondent at a battle between two colonies of carpenter ants. They were surely blood-related, but differed in one or more

specific features—probably body odor. To each population, the other would have smelled foreign and, hence, would be assumed to be an enemy. Soon after sunrise, a northern army came out of its nest in a rotten log while a southern army left a similar nest about 30 feet away. The two forces locked in furious combat. By mid-day, only a few ants were still alive on a field strewn with decapitated and dismembered bodies. I had seen a battle for territory, prompted, no doubt, by overcrowding in both colonies. While there was no clear winner, I presume that both colonies, through the reduction of their numbers, would have returned to “living within their means.”

In the ant kingdom, a strategy that employs both cooperation and combat has proved its survival value over many millions of years. This strategy is automatic, for in the tiny mind of an ant there is no room for morality. We humans pursue strategies of both cooperation and combat, although today we seem to be placing greater trust in combat. In America, we are listening more closely to the Pentagon than to the State Department. Living on an overpopulated planet, we are turning more and more often to violence.

Does a homeland that has the largest stockpile of military weapons in the world deserve the highest level of patriotism? Should not a homeland earn loyalty and affection in proportion to its worthiness? A worthy nation is one that provides opportunities for its people to live long, healthful, and useful lives without jeopardizing the nation’s sustainable future. How appropriate is the old saying, “My country right or wrong, but my country?”

“The tree of liberty,” said Thomas Jefferson (1787), “must be refreshed from time to time with the blood of patriots and tyrants. It is a natural manure.” In a more enlightened age, however, George Bernard Shaw said, “You will never have a quiet world till you knock the patriotism out of the human race.”

Patriotic voices are loudest when the men and women of one nation are trying to kill or cripple the men and women of another. At such times, national flags proliferate on coat lapels, in windows, at recruiting centers, and on coffins returning to the homeland.

A side effect of every war is the distortion of language. In the 1800s, during the so-called Indian Wars, soldiers of the United States referred to Native American patriots as *hostiles*. Today, in Iraq, patriots defending their country are called *insurgents*.

I was once asked by the Navy to review a job application from a civilian who had formerly worked for me. How, for example, would I rate him on Americanism? I decided not to rebuke the



In Alaska with seal pup in 1968 (Courtesy of the Scheffer family)

Navy for asking a question that can have no meaningful answer.

In 1913, on the eve of her execution by the Germans, Edith Cavell, a British war nurse, said, "I must have no bitterness or hatred toward anyone." She believed that love of one's homeland and love of humanity come from the same place in the heart.

Perpetual Motion

At the vanishing point of thought, there's a final message: Everything is moving; everything is changing through time, the fourth dimension.

PERMANENT and STEADY STATE are only road signs along the track to infinity.

The crystal in the rock on the mountain moves down by slow erosion to the floor of the sea, where it beds with companions to create new rock, only to be lifted by tectonic force to form a new mountain.

Molecules from the dead *Titanic* move clockwise in the Gulf Stream and rise in vapor on the coast of Ireland.

Every atom in the universe contains particles that are moving at near the speed of light. Special microscopes capture on film the fuzzy outlines of atoms but not of particles. These are too small. We

know the dances but not the dancers. In theory, all dancing must stop at the temperature of Absolute Zero, or -460° F. What then? No one has ever chilled an atom to that awful state.

A curious feature of every element, such as iron or oxygen, is that it exists in two or more varieties known as isotopes. Discovered in 1913, isotopes affect the physical structure but not the chemical properties of the atom. But why should a nitrogen atom, for example, need nine isotopes? Only poets have the right to ask.

In the Darwinian struggle for existence, animals wage a never-ending campaign. They move and countermove on fields teeming with enemies, allies, and neutrals. Rarely is a campaign so simple that its maneuvers can be clearly seen and its outcome predicted.

But naturalists continue to study these campaigns for the wonders they generate and for the delightful surprises that, time and again, they offer.

All is change. Heraclitus (1976) said it first: "You cannot step twice in the same river." Robert Burns (1794) said it more plainly: "Nature's mighty law is change."

Change
The leaf of wild parsley is eaten
by the butterfly's
grub, which is
Stung by the parasitic wasp whose
offspring emerges
through the skin of the grub . . . only to be
Snatched from the sky by the
meadowlark which dies
the next day from accumulated
ills and sorrows,
Falls to the grass and between
midnight and dawn,
by a spotted skunk
Is untimely torn.

All of the greatest ideas of humankind are old; they are pre-owned. The challenge for the young writer is to find the words.

Philosophy

Long ago, a science teacher advised me not to enroll in Philosophy 101. "You will find yourself," he said, "in a dark room trying to hit a black cat that isn't there." I was later to learn that philosophers over the centuries left us a heritage of stimulating, though abstract ideas.

One definition of *philosophy* is, "a search for understanding of values and reality, chiefly by speculative rather than by objective means." Wittgenstein (1921) wrote, "Philosophy is not

a body of doctrine but an exercise that begins in wonder and at the end, when philosophic thought has done its best, the wonder remains." In 1912, Bertrand Russell wrote, "philosophy, though unable to tell us with certainty what is the true answer to the doubts which it raises, is able to suggest many possibilities which can change our thoughts and free them from the tyranny of custom."

Philosophy was widely held to be the best approach to general understanding until the Renaissance, when skeptics began to challenge the value of handed-down ideas. They proposed a more pragmatic approach based on observation, experimentation, and analysis. The Scientific Revolution had begun. Philosophy, however, would continue to serve as an intellectual exercise.

The poet Keats (1819) seems to have regarded science as no more useful than the old philosophy. He asked, "Do not all charms fly at the mere thought of cold philosophy?" And, "philosophy will clip an Angel's wings."

History names many of the early skeptics, the heroes of science. Galileo, Copernicus, Francis Bacon, Johannes Kepler, René Descartes, and Isaac Newton. Was it celestial intervention or merely the ferment of the time that produced the births of both Shakespeare and Galileo in the same year?

What have the great philosophers had to say about their passion? From Plato: "Philosophers are lovers of the vision of truth," and, "to philosophize is to doubt" (as cited in Loos, 1899, p. 248). From Whitehead (1929/1979): "The safest generalization of [philosophy] is that it consists of a series of footnotes to Plato." And from Russell: "To teach how to live without certainty, and yet not be paralyzed by hesitation, is perhaps the chief thing that philosophy can do for those who study it" (as cited in Greenspan & Anderson, 1999, p. 51).

So what good is philosophy in the Age of Science? It is a game that offers intellectual refreshment to amateur as well as academic players. It is time-out for introspection, for putting the economics of life on hold while one thinks of life's wonder and beauty. . . . Time to rearrange the furniture of the mind: the aimless thoughts and the unspoken words. . . . Time to consider the robin who builds her nest to fit precisely the family she has yet to see. . . . Time to toy with the notion that thoughts can move faster than light. . . . Time to realize that what separates us most widely from the apes is not our cleverness, but our unique ability to love.

Finally, it is time to wonder whether humankind, after a 12,000 year effort to civilize itself, can change its present course toward self-destruction.

tion, and through wisdom, kindness, and courage, begin to chart a new path.

To Poets

The air is full of sound unheard until we let it in—the collective voice of our poets. Poetry has the power to move a million minds. Listen to verse that we learned when we were young.

From Genesis:

*God made man in his own image;
In the image of God made He him.*

From William Herbert Carruth (1909):

*A fire mist and a planet,
A crystal and a cell,
A jellyfish and a saurian,
And caves where the cave-men dwell;
Then a sense of law and beauty
And a face turned form the clod,—
Some call it Evolution,
And others call it God.*

From Ralph Waldo Emerson (1836):

*A subtle chain of countless rings
The next into the farthest brings
And, striving to be man, the worm
Mounts through all the spires of form.*

From Thomas Gray (1751):

*Full many a gem of purest ray serene
The dark, unfathomed caves of ocean bear:
Full many a flower is born to blush unseen
And waste its sweetness on the desert air.*

From Robert Frost (1916):

*Something there is that doesn't love a wall
That sends the frozen groundswell under it,
And spills the upper boulders in the sun;
And makes gaps where even two can pass abreast.*

From Henry Wadsworth Longfellow (1855):

*Lives of great men all remind us
We can make our lives sublime
And departing, leave behind us
Footprints in the sands of time.*

From Stephen Vincent Benet (1933):

*When Daniel Boone goes by, at night,
The phantom deer arise
And all lost, wild America
Is burning in their eyes.*

From Shakespeare (1600, 1601):

*The quality of mercy is not strained;
It droppeth as the gentle rain from heaven
upon the place beneath.*

and

*Imperial Caesar, dead and turned to clay,
May stop a chink to keep the wind away.*

From Alfred, Lord Tennyson (1889):

*Sunset and the evening star
And one clear call for me!
And may there be no moaning on the bar
When I put out to sea.
But such a tide as moving seems asleep,
Too full for sound or foam,
When that which drew from out the boundless
deep
Turns home again.*

From Edward R. Sill (1915):

*The ill-timed truth we might have kept—
Who knows how sharp it pierced and stung?
The word we had not sense to say—
Who knows how grandly it had rung?*

From Bayard Taylor (1853):

*Till the sun grows old,
And the stars are cold,
And the leaves of the Judgment Book unfold.*

Listen to the poets, for they know the meaning of yesteryear, now and forever. They feel—as does Milan Kundera—the unbearable lightness of being.

Spirit

We delight in Shelley's joyful greeting to the lark on the wing. We appreciate his metaphor, giving no thought to the meaning of spirit. Yet spirit is a slippery word: What might have been its origin? *Roget's Thesaurus* lists 28 synonyms.

Early humans would have known that the heart stops beating near the time of death as though its energizing force had left the body. In the course of time, this vital impulse came to be seen as a shadow-self. And, if death had been untimely, this self might materialize as a ghost or spirit who would carry out the unfinished task of the late departed. Or the ghost might linger near the grave. When I worked with the Aleuts of Alaska, I was told that the elders used to talk with their ancestors, now mummified and resting in dry volcanic caves.

The spirit idea broadened to encompass non-living entities. In the first century BCE, Virgil (2002) had Aeneas pray to "the Spirit of the place and to Earth, the first gods and to the Nymphs and as yet unknown rivers" (p. 182). Christianity introduced a great many spiritual ideas: spiritual grace, the Holy Ghost, and "Blessed are the poor in spirit."

Now, in the Age of Reason, spirit is shedding its superstitious garments to serve as a useful word for lively feeling or attitude. George Washington (1796) warned against “the baneful effect on the spirit of party” (whatever “party” meant in 1796). Samuel Smiles (1859) wrote, “Cheerfulness gives elasticity to the spirit.”

In a passage from Conan Doyle’s (1903) *The Adventures of Sherlock Holmes*, as Holmes studies the face of an attractive visitor to his room, he comments to Watson, “There is a spirituality about her face . . . which the typewriter does not generate. This lady is a musician.”

Territory

The modern world is beset by struggles over control of territory on the map and territory in the mind. I see parallels in the animal kingdom.

An animal’s territory, commonly called its range, is characteristic of the species. The range of a grizzly bear is about 50 square miles while that of a field mouse is less than an acre. A barnacle stays put. After gluing its head to a rock, it begins to kick food into its mouth with its feet.

Witness the amazing behavior of the pocket gopher, a rat-size rodent that lives underground on open grasslands. Where the native topsoil is thin, generations of gophers pile additional layers on top of their nesting chambers, gradually creating huge mounds up to six feet high that contain as much as 30 cubic yards of soil. Gophers are fiercely antisocial. Each mound is the territory of only one individual. The spacing of about 10 mounds per acre, as seen from an airplane, resembles a honeycomb packed with hexagonal cells. Any gopher trying to expand its territory must deal with six others possessed of the same ambition.

Some years ago, John Calhoun, at the National Institute of Mental Health, carried out an experiment on the effects of psychological territory. He released four pairs of white mice in a small utopia—a room about eight-feet square provided with ample food, water, and nesting material. The mice began enthusiastically to breed. At Day 560 from the start of the experiment, the population peaked at 2,200 mice. All “founding mothers” still alive had entered menopause. By Day 681, many mice were huddling together, psychologically withdrawn. They fought sporadically. By Day 920, all mating was presumed to have ceased. By Day 1,588, the population had fallen to 27 adult mice. Hoping to rejuvenate the colony, Calhoun introduced eight new males, but by now the social order was in ruins. No young mice resulted. And on Day 1,644, after 4.5 years, the last mouse died.

Calhoun explained that during the declining, or crowded, phase of the cycle, young mice were prematurely rejected by their mothers. They were thrown into a crowd where their every attempt to practice instinctive social behavior was interrupted. Young females never learned to be females. Young males never learned to be males but, instead, turned into creatures that Calhoun named “the beautiful ones,” who spent their time eating, drinking, sleeping, or grooming. Both sexes became “autistic-like creatures capable only of the most simple behaviors compatible with physiological survival.”

Let me end with a personal thought. Human life is an unrelenting search for equilibrium between concern for self and concern for others. Paradoxically, the greater the concern for others, the richer is the reward.

Thoughts on Religion

Religion, as a blend of ancient history, morality, faith, and superstition, is much in the news today. It originated in deep prehistory when humans first began to wonder about their visible surroundings—the earth beneath their feet and the starry sky above. Who made them? Who now directs the lightning strike and stirs the volcano into anger? Who choreographs the movements of the sun and the moon?

Finding no answers, and fearing the unknown, early humans created worlds of the mind in terms that they could understand—shadow societies peopled with creatures who loved, and quarreled, and took an interest in the affairs of people on Earth. Millennia later, those imaginary beings would become the gods and goddesses of mythology. And, by Judeo-Christian time, the alpha-male of primate society would have metamorphosed into the Supreme Being, or Ultimate Mind.

I believe that religion is here to stay. It will continue to be a diagnostic feature of our species. Why? Because a trait for curiosity or need to know evidently entered our genome long ago. Consider our power of imagination—light years beyond that of any other animal.

So, although I deplore the ethics of “faith-based” presidents, ignorant TV evangelists, and suicide bombers holding first class tickets to Heaven, I empathize with all the kind and decent people who find spiritual solace in one or another of the world’s 5,000 religions.

Does it really matter whether many believe in an “afterlife” in a place where the newly dead commune with friends long dead but now restored to eternal life?

It does matter that religion offers a unique opportunity, through church, mosque, and temple,

to join in the shared exercise of goodness as a means of conditioning for a better life.

It does matter that the Renaissance left us a rich heritage of art and music, the like of which the modern age of reason will never produce. How diminished would our civilization be without the frescos of the Vatican, the statue of David, and Handel's *Messiah*!

Our minds can accommodate in harmony the fictional as well as the factual elements of religion. Albert Einstein (1941) said it first: "Science without religion is lame; religion without science is blind."

Three Insights

In the span of a long lifetime, the scientific community has given us three fundamental insights into the nature of the universe and of our place within it.

The first insight is recognition that the Milky Way in which we ride through space is only one of many galaxies. When the Hubble orbiting telescope turned its eye on a small region of space equivalent to the area of a dime held at arm's length, it saw fuzzy blobs that proved to be galaxies eight billion light-years away. The myriad worlds within the universe will never be counted.

The second reveals that the atom—notwithstanding its root meaning "indivisible"—is not the smallest thing but has many parts. These are held together by an awesome force which was first measured in the Manhattan Project and first revealed to the world in 1945 at Hiroshima. There it set a record for killing the most men, women, and children in the least fraction of time. Today, about a hundred nuclear power plants are operating in the United States, although where to safely dispose of their poisonous byproducts remains an open question. Have we caught a tiger by the tail?

The third intuition pertains to the prehistoric journey of *Homo sapiens* from East Africa to all livable places on earth. Suddenly, we have new understanding of the roots of the human family and its so-called races.

This insight has come to us by sequencing, or decoding, the molecule DNA which is present in all organisms. It has three significant properties. It is unique to the individual, like a fingerprint; it changes with time, much as the English language has changed since Chaucer; and it has certain sections that are more likely to change than are others.

Imagine a village in which every woman is required to sew a personal flag. It must display the tribal logo but also an intricate pattern chosen by its maker. The daughter of the woman sews a

flag similar to her mother's but one that is influenced by the culture of the daughter's husband. A thousand years go by. An expert historian looks at a flag and visualizes the localities and the ethnic groups that would have influenced its pattern.

Substitute DNA sequence for flag and you see how molecular biologists are able to piece together the genealogy of humankind since the first anatomically modern people left Africa 50,000 years ago. At this, you may be led to recall the words of Kipling, that we are all (brothers and) "sisters under the skin."

Time

"What is time?" inquired St. Augustine (2002-2003). "What is its real nature." The *Oxford English Dictionary* gives 59 definitions; I venture to give another: time is the mental image of a continuum representing past, present, and future, along which we place markers such as noon and year. The word *time* has three principal meanings: the marker, the duration between two markers, and the continuum itself.

Time is real, though insubstantial. It has neither mass nor geometric dimensions. We don't measure its length as we would that of a sausage. Yet we find time and lose it; make it and take it. And, if we misbehave, we find ourselves behind bars doing it.

Confronted by the elusive nature of time, we coin special words to deal with it: now and never; sooner and later; beginning and end; starting and stopping; currently, frequently, seldom, and rarely; steadily, constantly, continually, and continuously. The list goes on.

Time as metaphor has been embraced by countless generations of poets and songwriters. The most popular theme is time as a moving body: "Time and tide wait for no man." The second most popular is time as a healer of ills and sorrows: "Time is the great physician." The third most popular is time as teacher: "Time is a great teacher, but unfortunately it kills all its pupils."

Then there's the notion that time can reverse itself. Richard II cries, "O! Call back yesterday, bid time return" (Shakespeare, 1595/1998). If time could flow backward, Hamlet might have agonized, "To be or not to have been."

Time is universal and ever-present. We humans will be happiest (I think) if we believe that time has always been and always will be. This faith has the beauty of simplicity and is therefore the most likely of all possibilities to be true.

My time is up. I end with a quote from Tagore (1995-2002): "The butterfly counts not months but minutes, and has time enough."

Utopias

In Chinese folklore, a traveler comes upon a strange and wonderful place where the plum trees bloom the year around and the rain falls only at night. He leaves to bring his family there, but he never finds it again.

And so it is forever with civilization's dream of a home in a perfect setting where men and women live and love, enjoying sweet conversation, the laughter of children, and the sweat of honest labor.

Sir Thomas More wrote the book *Utopia*. Edward Hicks painted *The Peaceable Kingdom*, where the lion and the lamb lie together. James Hilton's Shangri-la is known to millions.

But the more practical among us know that utopias have an underlying flaw: They are too static to survive in a changing universe. Who, for example, would wish to live in a place where there were no political debates or differences in taste for the Arts?

Yet visionary folk will always be experimenting with new utopias tailored to fit the times. Charles Pierce Lewarne, in his book *Utopias on Puget Sound, 1885-1915*, tells the stories of five colonies that failed because "they were anachronisms in a country that was well along the road to industrialization and urbanization."

Traces of these colonies can be seen at Port Angeles, Freeland, Burley, Hope, and Equality. (Two grandchildren of mine were married in the renovated Community House at Freeland.) The Directory of Intentional Communities lists more than 300 in the United States alone.

In 1947, I joined with friends to create Hilltop Community, a self-governing residential park near Bellevue, Washington. We bought 62 acres (for \$250 an acre) and platted them for 40 homesites, a greenbelt, and a central playground. During a half-century, the real estate value of Hilltop has increased by a factor of ten. The success of the experiment can be laid to its far-sighted, yet careful design, coupled with strict legal covenants, which ensured fair and democratic decision-making. Not to be overlooked is the continuing spirit of sharing that all new members feel as soon as they join the community.

Visions of utopia, though they never fully materialize, are a delightful exercise of imagination. "A man's reach," wrote Browning (1855), "should exceed his grasp, or what's a heaven for?"

Epilogue

*Property, potatoes, and a pulmonary vein
Are of very little use to one beheaded by a train.*

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