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The Philosophy & Psychology Project

Stephen J. Gislason MD



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Surviving Human Nature
Sound of Music



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Persona Digital Books

The Persona books in Psychology and Philosophy form an integrated collection.

Human Nature represents essential knowledge of human nature, a 21st century description of anthropology, neuroscience, sociology and psychology - disciplines that need to be integrated as they are in this book. The topics are essential to understanding human nature, its origins and its problems. You could treat each topic as module of a larger system that develops emergent properties as the modules interact. Each reader discovers the features of human nature in himself or herself and then discovers similar features in others. After you understand more about the dynamics of close relationships, you can look at larger groups. You can continue by applying your insights into human dynamics to governments, countries and international affairs. All the Persona Digital books describe the same dynamics but emphasize different vantage points, contributions from different disciplines and the needs of different readers. Taken together, the books provide a comprehensive understanding of human nature.

Human Nature

The book begins:

Existence means standing out from or emerging from. Life is continuous emergence. Life is continuous interaction with planet earth. Existence is transformation of non-living materials to living beings. Existence is unknowable without consciousnesses. Each human is the reincarnation of a long-lineage of ancestors. Species memory, perceptual skills, needs, drives, feelings, desires and behaviors are built in and begin operating in utero. Humans evolved from primate ancestors and retained features of mind and behavior that have been present in animals for hundreds of millions of years. Urges, desires, designs, feelings cry out from within and often surprise us, as if we were the hosts to wild animals and spirits within that refuse to be identified or tamed.

An infant is richly endowed with all of life's tendencies and resembles humans that have gone before. Humans all tend to do the same things and have the same kind of thoughts, but there is a range of mental abilities. The range of mental ability is sufficiently great that humans of limited mental ability live different lives with different understanding than humans with greater mental abilities. Since humans are social animals and live in groups that function best when there is a diversity of mental abilities and skills, the range of abilities in any given population may be stable over time and tolerance for differences has survival value.

Humans are competitive animals and relentless selection processes are constant features of human existence. The forces of natural selection are always at work and mold the shape and character of humans. Human selection of humans is another force that decides the fate of individuals and groups. The collection of large numbers of humans in cities concentrates both resources and competition. The modern urban human faces potential adversaries and harm every day.

As in natural selection, human selection of humans determines access to resources, status in the local group, mating privileges, and, ultimately, survival. Human minds are manifestations of the processes alive in human brains. The innate nature of the body and brain determines human motivation, the way humans interpret their experiences and the way they share their experiences. The human brain is a wonder of computational ability that initiates its own training. An infant human is born into a world swarming with smells, sounds and events that can be experienced and understood. The prolific events in the vicinity of each individual are transduced into his or her brain that senses, decides, acts and remembers.

Animals must tune into what is going on around them in order to navigate through a world-space to find required materials such as water and food. An animal is more intelligent if he or she tunes accurately into what is going on and finds what is needed without injury or death. The foundation of intelligence lies in the tuning ability of the brain and tuning circuits appear in the first animals alive on earth. One task of mind study is to reveal the different abilities of the brain to tune into the features of the universe. Practical scientists and engineers are interested in how animals tune into, track and react to events in their environment. Some want to build "smart" machines with

similar abilities. Animal intelligence is in a different realm than machine intelligence, however, and fantasies of intelligent androids are good for movies but will have little validity in real life.

Despite living in a complex, manufactured world, humans continue to do what all other animals do. All humans who survive are capable of tuning into the events that are occurring out-there. With a little help from friends, family and community, humans who survive have passed the intelligence test of life. The earliest solutions to tuning into relevant information have been retained by the latest brains.

Planet Earth

Smart humans in the 20th century made astounding advances in earth sciences in the 20th century. The images of the earth from the moon moved and informed everyone who saw them. The earth as a small, bluish planet circling the sun offered a new understanding of the human predicament. Since the Apollo flights to the moon, satellites have proliferated, telescopes have become sophisticated monitors of the universe and god's view is available to all who are interested. The scientific exploration of the earth has probed every environment. The explosion of knowledge about planet earth and her creatures inspires those who know and care. The humans who do not know and do not care remain locked in their group identities and anachronistic beliefs.

Planet Earth is about 4.6 billion years old. Life probably appeared soon after conditions on earth had stabilized- in the order of 3.5 to 4 billion years ago. Multicellular life developed in the past one billion years. According to NASA: "Earth is the largest of the four inner rocky planets. It almost certainly began to organize in the earliest days of the Solar System, along with its sister planets, even as the Sun itself came into being as a ball of hydrogen-helium gas mixed with heavier elements. A gas and dust "cloud" comprised the protostar system that evolved into the present day Solar System. The best estimate of when this all began, based on meteorite age data is between 4.55 and 4.6 billion years ago. The Earth formed simultaneously with the other Solar System planets and the central Sun. Probably cool at the outset, this proto-Earth rapidly heated up, formed its metallic core within 100 million years, and was subjected to continuous impact bombardment by asteroids, comets, and meteorites. It may have had a molten exterior which cooled to a solid crust. Early in earth history, its Moon was produced from a glancing collision with another planet-like body. A second period of bombardment helped destroy the early crust. By about 3.8 billion years ago, rocks formed crusts of silica rocks embedded in a basaltic crustal layer that extended worldwide. Oceans were produced early; weathering attacked the crustal rocks to produce the first sedimentary rocks.

Protocontinents began to form and were moved about by processes akin to convection-driven plate tectonics. An early atmosphere consisted largely of nitrogen, with some carbon dioxide, ammonia, methane, and water. Those ingredients may have been converted to organic molecules which in turn organized into primitive one-celled bacteria about 3.85 billion years ago. In time, living plant organisms developed the capability to photosynthesize solar energy, releasing oxygen as an end product; a gas that gradually increased to present day levels, permitting the evolution of diverse organisms. " i

All living creatures are related, share genes and manifest the basic properties of life. A real understanding of human origins is required before the behavioral repertoire of modern humans makes sense. Our animal lineage goes back to single cell eukaryocytes that floated in the ocean and

used symbiotic bacteria to burn fuel and produce energy. This lineage shows up in the human genome. The bacteria have become mitochondria and some mitochondrial DNA continues to be separate from the nuclear DNA that operates the rest of the cell.

The growth and development of an individual (ontogeny) from a fertilized egg to a fully functional adult follows an abbreviated evolutionary sequence (phylogeny). The human embryo passes through odd shapes and features that all vertebrates share but rapidly moves toward a fully differentiated human form that is recognizable after a few weeks of growth and differentiation. The growing human brain also tracks an evolutionary path and retains old features in core structures and then grows new structures as add-on modules.

Form and Content

A distinction between form and content can be useful when we describe human behavior. The form of our behavior is its shape and movement. We tend to walk upright, to talk, to hunt and gather, to fight, to flee, to eat, to have sex. We also tend to cooperate at times, form families, nurture our children, acquire goods and create culture. The basis of our mental and behavioral forms is biological. We are “programmed” to follow the familiar forms. The inflection of these forms is molded by biological determinants, by the environment that surrounds us. The content is biographical – what each person experiences and learns specifically and uniquely.

Part of our formal nature is a fascination with content. We are story tellers. In attempting to explain our experience, we often favor content stories. A person might say, “I am sick because of stress” and then go on to tell a tale of woe about losing a job, fighting with his wife, and having a poor start in life because his mother was cold, his father was abusive and so-on.

At other times we favor the form. When we observe and analyze events without judgment or interpretation we tend to see the form.

Science is an exercise in revealing the formal basis for events. In every moment we have a choice between formal explanations or biographical stories. In an important respect, the content follows the form. If you are irritable because you ate the wrong food three hours ago, you will seek to explain your disturbance in terms of what is happening around you, or what happened before you were disturbed. If I am sitting in the room as your disturbance surfaces, it is obviously my fault and you can make up a good story about why it is my fault. If I disagree with you, you will be inclined to embellish your critical story about me and your disturbance grows into my disturbance. As I counter with a critical story about you, our conflict focuses increasingly on the content. We may end up believing our critical stories and leave, hating each other.

In a larger perspective, we can observe the form of innate human tendencies in whole populations of people moving among different states of arousal based on their brain chemistry, peaceful and content for a while, and then becoming irritable, angry and aggressive.

As formalists, let us claim, for the sake of argument that, as the concentrations of airborne car exhaust gases increase in association with the consumption of coffee, sweet foods, cheese, beef, beer or red wine, an entire population will become dysphoric, aggressive and more self-destructive. While I am not certain of the exact recipe for dysphoric dysfunction of a society, I am certain that, in general, this formal proposition is true. We need a better sense of human fragility. We need a better sense of how easily the human brain becomes unstable and fails to cope well with the challenges of the day.

Three Worlds

Every animal, every human views the universe from a unique vantage point. Since our perceptions vary with our own unique vantage, there is no single event that is identical to all observers. I was attracted to and continue to use a three-world distinction made popular in by Rollo May and other existential psychoanalysts in the nineteen sixties. Humans exist in three worlds simultaneously or alternately, dependent upon their vantage point and mode of perception.

1. Umwelt is the perceived natural world.
2. Eigenwelt is the world of the self-alone.
3. Mitwelt is the social world of people-among-people, complete with languages, customs, rules and artifacts.

As we consider the innate basis of the human experience, we first relate to Umwelt, the perception of the natural world. One step in assembling the pieces of the human puzzle is to understand how we have moved from the primordial existence of humans in nature, living in small groups to a social existence that involves living in enlarging cities that are part of larger political and economic organizations. The term "Umwelt" was introduced in 1930 by biologist, von Uexküll to describe the different "real worlds" that animals perceive with different sensory systems. He built mechanical devices to simulate their perceptual Weltanschauungen or worldview. The compound eye of insects saw the world in multiple images, for example.

The basis of Mitwelt is the interactions of people in small groups and the innate rules of association built into our brain pertain to small groups and tend to become dysfunctional when individuals try to relate as members of larger and anonymous groups. Culture has simple roots but builds in complexity as rules for conduct multiply and access to life's essentials involves increasingly complex interactions with others. Cities attempt to retain little experiences of Umwelt; you preserve a few trees and reserve a small amount of land for parks, but otherwise, the urban landscape obliterates nature. The urban landscape distorts the human in nature relationship and changes human behavior but not human nature. The concept of Eigenwelt, the self-alone, lies below, beside and above Umwelt and Mitwelt.

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Pieces of the Puzzle

Short Essays by Stephen Gislason

Humans and Other Animals

The human brain is a wonder of computational ability and the brain initiates and supervises its own training. The foundation of intelligence lies in the tuning ability of the brain. Tuning circuits appear in the first animals alive on earth. Animals must tune into what is going on around them in order to navigate through a world-space to find required materials such as water and food. An animal is more intelligent if he or she tunes accurately into what is going on and finds what is needed without injury or death.

Every educated person needs to know that the mind, spirit, soul, heart, personality, self, feelings, hopes, desires, values, preferences, personality all exist in the brain. We have old metaphors such as the "heart," "spirit" or the "soul" that suggest otherwise, but the liberating truth is that it is all in the mind and the mind is all in the brain. All humans who survive are capable of tuning into the basic events that are occurring out-there. With a little help from friends, family and community, humans who survive and thrive have passed the intelligence test of life.

The evolution of intelligence has been gradual and conservative. The earliest solutions to tuning into relevant information have been retained by the latest brains. Humans, despite their pretensions to be better than other animals, are intimately related to all other creatures on the planet and use similar strategies to survive. Humans are more complex and more destructive than other animals, but otherwise are in the same business of getting food and surviving in a challenging, ever changing world. Human intelligence and animal intelligence are made of the same stuff. There is every reason to believe that the conscious experiences of humans are continuous with and similar to, if not identical with the conscious experience of other animals. The best assumption is that the fundamental and pristine consciousness that lies at the core of humans experience is the same consciousness experienced by other animals.

There is no method of deciding how far back in time consciousness extends, but there is no reason to limit consciousness to primates or mammals, when birds and many other animals appear to be conscious. The degree of mindfulness ascends the evolutionary scale with insects and worms at the low end and primates at the high end. If you imagine visiting the mind of another animal, you could ask how familiar would this mind be and how comfortable would I feel? There is little doubt that the mind of apes would be very similar to our own and you would be familiar with most of the experiences. Visiting a whale's mind might be different, more like visiting an alien space ship in science fiction stories. You would recognize the same depth and complexity of consciousness and many of the same feelings but all the detailed information about the underwater world obtained by sonar and kinesthetic senses would not be familiar. Humans who live intimately with dogs will have little difficulty understanding that the dog's mind has many common features with the human mind. Dogs adapt remarkably to human life and enjoy many of the same experiences the humans do.

My first dog friend, Pablo, a German Sheppard of impeccable breeding, sat in the passenger seat of my 1967 car as we traveled across Canada looking for a new home on the west coast. He enjoyed every moment of traveling and invented a repertoire of amusements and responsibilities which included singing, snapping at passing trucks, watching for girl dogs and wind riding. Wind riding consisted of sticking your head out the passenger window and mostly looking ahead with your ears back. For thrills, you would move your head up, down and sideways to feel the different pressures of the wind on your head.

For the rest of his life, Pablo would sit every day in that car, parked in the driveway waiting for the next ride. He would be inconsolable if I drove away without him. My current canine companion, Sonny is a good friend. Like Pablo, Sonny is a big dog with a wolf body and mind. I admire his athletic prowess, his enthusiasm and his skills navigating on planet earth. We are both survivors, but he would do better than I would if the supermarkets disappeared. I enjoy participating in his wolf ways more than I enjoy teaching him how to become human.

Experiments designed to test animal “self-awareness” as a feature of consciousness are based on the wrong premises. Animals are conscious, but there is no test. Just as humans are conscious, but no combination of human tests will ever prove that. I watched a documentary on animal intelligence; the commentary was surprisingly ignorant. Film clips of baboons interested in mirrors were shown. Baboons are remarkably similar to us in their social habits and get quite excited when they find mirror pieces in human garbage dump. They look at their reflections with great interest. One baboon was shown holding the mirror in different ways at different angles and passing his hand behind the mirror trying to locate the image. The commentator claimed that baboon did not recognize his own image and he was looking for another baboon and therefore was not conscious, a claim that should receive a dumb award (the human was dumb, not the baboon!) The baboon was displaying all the intelligence of a conscious, smart animal and should receive a science award. He was trying to figure out where the image was located. To a curious scientist, the puzzles of mirror images continue to intrigue and perplex. When I pass a mirror, I am not sure who or what I am seeing there. I do not always relate to the image as myself and whenever I do, I am still not sure who “myself” is. For example, the guy in the mirror is much older than I am.

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Language and Thinking

This book focuses on the innate features of language and identifies the uses and abuses of language in the creation of social truths and lies.

Preface

Interesting challenges emerge when language is used to describe itself. Spoken language is an innate ability of humans that emerges in all human groups. Spoken language is the key to interaction among humans. There are several thousand languages in human groups that enhance group cohesion and at the same time separate groups that cannot communicate. I trace the evolution of sound communication from animals who have lived on earth for hundreds of millions of years to computer programming that uses condensed forms of cryptic languages that are received and expressed by electronic circuits.

Speech has evolved from ancient animal skills of social interaction that have been concentrated in the temporal and frontal lobes of primates. Humans have enlarged cerebral hemispheres in general and expanded frontal lobes in particular. Distinctively human attributes rely on growing interactive circuits between frontal lobes and every other part of the brain.

Writing is a recent invention that is added to innate life skills and borrows abilities from many brain processes. Learning to read and write takes years of practice and is mastered only by a small number of humans.

This book has no pretensions to be a definitive treatise on linguistics and does not engage in arguments that are abundant in academic discourse. In this brief reflection, I describe some basic truths about languages that are aspects of human nature most likely to endure. I feature storytelling and selftalk as the two most important features of the human use of language. I consider how languages fit in the larger scheme of intelligence and human interactions.

What is Language?

Language is communication. Humans resemble other animals in their ability to communicate. Communications involve chemical senses, sounds, body language, and visual signals. Communication is all about community, sharing information, sending warning signals and fulfilling the needs of the local group. Human languages combine many different forms of communication in a complex manner. Ideas about written language tend to dominate scholarly investigations, but sounds and gestures have been more important in the evolution of communication systems.

Humans speak naturally and spontaneously and learn the language spoken around them. Babies start to say words about 12 months. In the second year, a child develops vocabulary of about 250 words and makes simple statements. Children use correct sentence structures by the age of three. Vocabulary increases to about 2600 words at the age of six. Learning language is a variable and creative process.

Babies spontaneously make non-verbal sounds that with brain maturation and practice gradually form some sounds into recognizable words. Speaking is a spontaneous feature of the brain, and all normal children will speak if they hear a language spoken; any language will do.

Older infants imitate words they hear spoken and if adults engage them in conversation, will expand their vocabularies and start to make meaningful statements. Adults spontaneously speak “baby talk” to infants using high pitched, somewhat melodic and non-verbal sounds, exaggerated facial expressions and hand gestures. Babies like the entertainment and babble and coo in response. This mimetic exchange marks the beginning of human conversation. Human conversations retain an infrastructure of nonverbal sound communication.

Words go with gestures Young children point with a pudgy index finger and say the name their pointer indicates. Pointing and naming remains an endearing characteristic for the rest of a human life. Babies follow the path of language evolution. Their progress is from the description of the immediate and concrete objects to making abstract statements about events. The first thing you do when you are learning a language is point and name. You invent nouns. Little tykes can get a lot accomplished with their pointing finger, a few nouns and gestures. Tourists in a foreign country revert to the two-year-old strategy of pointing, naming, using pantomime to replace the verbs they do not know.

Most words are arbitrary. A sound is connected to a thing and repeated. There are no rules for names, but there are rules about how names relate to each other. Grammatical forms are both implicit in the brain and explicit in the syntax of each language. Words are connected to meanings by association. You still have to point and name to give new words meaning, but as you get older and more sophisticated, you can translate directly from a word in your known language to a word in the new language you are learning. New words are invented continually as old words are forgotten.

The motive for mature speech is to influence the behavior of and share information with other humans. The desired effect of speaking to others is to modify their behavior in ways that benefit you. Speech is used to review what has happened, to plan what should happen next and to sequence events. Speech has evolved from ancient animal skills of social interaction that have been concentrated in the temporal and frontal lobes of primates. Spoken language is the key to interaction with other humans.

Pinker and Bloom described language this way: “All human societies have language. As far as we know they always did; language was not invented by some groups and spread to others like agriculture or the alphabet. All languages are complex computational systems employing the same basic kinds of rules and representations, with no notable correlation with technological progress: the grammars of industrial societies are no more complex than the grammars of hunter-gatherers; Modern English is not an advance over Old English. Normal humans are proficient language users regardless of intelligence, social status, or level of education. Children are fluent speakers of complex grammatical sentences by the age of three, without benefit of formal instruction. They are capable of inventing “languages that are more systematic than those they hear, showing resemblances to languages that they have never heard, and they obey subtle grammatical principles for which there is no evidence in their environments.”

They summarized the functions of language:

1. reference to individuals and classes, that distinguish among basic ontological categories (things, events, places, times, manners)
2. to talk about events and states, distinguishing the participants in the event or state according to role (agents, patients, goals), and to talk about the intentional states of ourselves and others.
3. to express distinctions of truth value, modality (necessity, possibility, probability, factivity).
4. to comment on the time of an event or state including both its distribution over time (continuous, iterative, punctate) and its overall time of occurrence.
5. to encode an unlimited number of predicates, arguments, and propositions.
6. to use the same propositional content with different speech acts such as a statement, or a command.

See topics at [Language and Thinking](#)



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Intelligence and Learning

Intelligence and Learning focuses how human innate features of intelligence interact with learning opportunities to produce a great variety of modern humans.

Preface

The challenge is to become intelligent about intelligence. Humans have a great interest and ability to create nonsense. You could argue that many of the features of intelligence are deployed in the cause of nonsense but nonsense is not intelligent.

Intelligence is really about survival in a threatening world. Humans survive because of the genius abilities such as vision, hearing, skilled movement and speech; abilities that are built into their brain, innate gifts from nature. Humans do not learn how to see or how to hear what is going on out there, but they do have to learn what it means to them today. This is an interactive process. Speech is a form of sound interaction. Although modern humans tend to emphasize individual thought and expression, most “thinking” is talking in groups. The value of speech is to connect individuals in “thinking” groups. Books and other publications link large numbers of humans in common patterns of language-dependent thinking.

The newest human abilities are more dependent on learning and are the least reliable. Reasoning, planning and learning to tolerate other humans in a friendly constructive manner require the most sustained practice. The term, “nice,” refers to these characteristics and therefore nice people require sustained learning to remain reasonable, to tolerate others and to behave in a friendly, constructive manner. To become nice and to remain rational and skilled, a human must belong to and work within a supportive group that shares these characteristics. Human groups often have the opposite effect, supporting intolerant and irrational thinking and behavior.

In the recent past new knowledge and abilities have proliferated in every human population with only a few humans doing well at cultivating the new abilities. In higher education and other life contests, general ability has been traditionally desirable. The “well-rounded” individual was a generalist, good at everything but perhaps not outstanding in one skill.

The key to human survival is group cooperation and individual specialization. The group tends to smooth out the negative effects of individual limitations and irrationality. In an affluent urban society, a small subpopulation cause most of the trouble and consume most of the social and medical resources available. Often the understanding and solution of “social problems” involves the interaction of elite and educated group with a sick, aberrant, dysfunctional group. Their interaction involves a persistent, inevitable misunderstanding arising from incongruent needs, values, information and capabilities. Human societies involve increasing specialization of individuals who are skillful at performing single tasks. The income of an individual often depends on this specialization and does not depend on a general or comprehensive understanding of how their society works and his or her place in it.

A similar description applies to individuals in many animal groups, beginning with the social insects. Humans and ants have much in common; the most compelling similarity is that individuals achieve viability on the planet, not by solitary activities, but by participating in a meta-order that involves the entire group.

This is not to argue that humans fail to live acceptable lives in modern societies. It is to argue that most humans live at a minimum level of overall comprehension and, even if they become more or less civilized, they will tend to regress to old and innate patterns of intolerance, hostility, aggression and conflict if the supportive infrastructure is inadequate to sustain external controls over competitive and hostile behaviors. It is to argue that many to most humans can remain misinformed and unreasonable as long as a small number of more intelligent and skillful humans build and maintain infrastructures that support the others.

Intelligence Introduction

The central feature of intelligence is the ability to understand what is really going on out there and to respond to events with successful and adaptive behavior. Intelligence is built from subsystems that sense, decide, remember and act. It is fashionable to speak in terms of "mental abilities" and to list a number of different mental abilities in terms of educational concerns, such as reading, writing, math and music. The brain is modular with a host of different functions contributing to intelligence. We expect and do find different arrangements of mental abilities in different people. If you consider the intelligence test of life overall, then you recognize that there is a range of abilities in any human population.

The brain is the organ of the mind. Anatomists have described the brain in terms of our evolutionary path. We have old-age, middle-age and new-age parts, each with different properties. A neuroscientist, Paul McLean, suggested that the human brain could be viewed as three systems of different ages - an old reptilian brain, a middle (early mammalian) brain, topped off with a new, advanced brain, the neocortex. The neocortex allows us to learn, adapt and create new modes of behavior. The neocortex has the computer equivalent of random access memory (RAM), allowing the input of new information. This new information is used to interpret and adjust the operation of read-only memory (ROM) which is built into old and middle brain modules and cannot be modified. New babies are not born with the new brain programs. Old programs are built into us and need not be learned. Old programs include some of the most negative qualities - predatory and territorial aggression, anger and fighting, for example. Some of our most positive qualities are also innate such as the tendencies to mate, bond and form social units with altruistic features. The old brain remains in control of our bodies and our minds.

Whatever we value about civilized human existence - culture, knowledge, social justice, respect for human rights, and dignity must be learned anew and stored in each person's neocortex. Information always comes with noise, that extra, confusing, unnecessary stuff which burdens our brain not with the task of remembering but of forgetting. There is so much we do not want to remember that it is a wonder that a modern citizen manages to cope with information overload. Information noise interacts with molecular noise, useless or bad chemicals that flow through the brain from food, water and air.

Neuroscience views minds as manifestations of the living processes found in brains. Brain science does not "explain" mind, or consciousness, but does give us strategies for understanding the

properties of mind. Neuroscientists have made rapid progress in the past few decades and some of them are asking the same sorts of questions that only philosophers used to ask. The difference is that neuroscientists are sometimes able to ask more specific questions that may lead to more insight into the basic principles of the human experience. Neuroscientists are motivated and equipped to find real and practical answers to philosophical questions, leaving philosophers behind in an anachronistic philological niche, repeating discussions of what philosophers said hundreds to thousands of years ago. This is not to argue that all neuroscientists are philosophers or that all neuroscientists understand the human mind, since many are focused on highly specialized tasks that reveal little or nothing about how the whole system works.

Humans are born with a somewhat defined intelligence potential. The spread of IQ scores in any population represents a combination of genetic determinants that cannot be changed and environmental determinant that operate in a sequential manner and can be changed.

Environmental determinants can be separated into two groups:

1. determinants that are sequence critical and
2. determinants that operate all the time.

Key nutrients must be supplied as the brain forms in utero on a daily basis. Deficiency may cause irreversible damage. If the same nutrients are deficient in an older child or an adult temporary and relatively milder functional impairment occurs that can be reversed by correcting the nutrient deficiency. The most common cause, in third world terms, of low intelligence is iodine deficiency during pregnancy and infancy. Iodine deficiency has profound implications in terms of economics, politics, human rights and dignity. Low intelligence populations will not do as well as smarter populations and will not be capable of fully participating in a technological 21st century. In affluent populations children may still be malnourished and suffer from neglected problems such food excess, nutrient disproportion and food allergy. We can equate normal intelligence with normal brain function. Not all brains are created equally and some brains are not constructed properly or are damaged before and during birth. The world offers abundant opportunities to interfere with normal brain function. The overwhelming task is to avoid foods, drugs, and environmental chemicals that make people less smart and even demented. Alcohol intoxication for example is a temporary dementia that becomes permanent if it is repeated too often. Brain injury adds to the negative effects of using alcohol and other psychoactive chemicals.

Leda Cosmides and John Tooby suggest: "The brain is a naturally constructed computational system whose function is to solve adaptive information-processing problems (such as face recognition, threat interpretation, language acquisition, or navigation). Over evolutionary time, its circuits were cumulatively added because they "reasoned" or "processed information" in a way that enhanced survival....our minds consist of a large number of circuits that are specialized. For example, we have some neural circuits whose design is specialized for vision. All they do is allow you to see. Other neural circuits are specialized for hearing -- they detect changes in air pressure, and extract information from it. Still other neural circuits are specialized for sexual attraction -- i.e., they govern what you find sexually arousing, what you regard as beautiful, who you'd like to date, and so on.... you can view the brain as a collection of dedicated mini-computers -- a collection of modules... whose operations are functionally integrated to produce behavior...So it is with your conscious experience. The only things you become aware of are a few high level conclusions passed on by thousands of specialized mechanisms: some that are gathering sensory information from the

world, others that are analyzing and evaluating that information, checking for inconsistencies, filling in the blanks, figuring out what it all means.” Smart people learn faster and learn more than not so smart people. Smart people also are more curious, seek more diverse experiences and absorb more information. Intelligence is manifest in the ability to acquire complicated skills and excel in performance by practice and progressive improvement. Competent people are smart people who have the discipline to practice and improve their performance. There is a relationship between being nice person and being a competent person. In demanding, professional environments the nicest people tend to be the smartest and most competent. There are exceptions.

The Big Picture

Human intelligence, in the best case, produces remarkable insights into the cosmos. As we view the history of life on earth, we recognize the continuous interaction of brainevents with worldevents – noumena with phenomena. We infer a slow, continuous convergence of brainevents with worldevents. If we look closely at the interface between worldevents and brainevents, we find the transduction of energy patterns in the world mesh into energy patterns in brains. The transducers are the sense organs and the brain patterns resonating with worldevents are the perceptions and sensations of sentient beings.

The out flowing energy patterns of brains are expressed as movement in the mesh. Animals move toward plants and other animals to ingest the energy others have captured. Animals are restless, needful creatures. Humans are animals. The sun energizes worldevents. The great heat engine drives life. The sun's photons stream through the biosphere and energize the chloroplasts in plant cells. The chloroplasts make sugar that becomes the fuel for life.

Every animal requires four features of sentience -- sensing, deciding, acting and remembering -- to navigate through the world to find food, water and avoid danger. Some animal cells become specialized in sentient activity, tuning into worldevents and comparing worldevents with body events. Mind and body mesh with world events. The brain is the organ of the mind. We will build new descriptions that portray the inseparability of body, brain, mind and universe.

The intellectual feats of astronomers and astrophysicists are impressive creations of the human mind that have God-like omniscience. Astronomers describe large numbers of large galaxies traveling at high speeds in a very large space. The numbers that describe the spacetime dimensions of the universe are too large to have practical meaning for humans. Humans have long looked to the skies and believed that another or greater intelligence lived out there. The God idea, in the best case, is about a grand intelligence in the heavens that invented and oversees the universe. As the new understanding of the cosmos emerged in the 20th century, older ideas of human-like gods living in a heaven nearby became obsolete.

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Emotions and Feelings

Everyone has some idea what emotions and feelings are but their exact nature is elusive. We can begin by noting that emotions and feelings are not the same. The first issues to be discussed are semantic, not trivial by any means. There are many words that refer to emotions and feelings. There is no standard use of terms. We recognize that brains bring information about the outside world together with information from inside the body. Images of the outside tend to be detailed and explicit in consciousness. Monitor images from inside the body tend to be vague and variable. Generally, humans are ignorant of internal processes and invent all manner of imaginary and irrelevant explanations to explain feelings.

The term “emotion” is best used to point to animal and human behavior. There are a small number of primary emotions and variations that involve mixtures of emotional displays with other behaviors. Joy, anger, fear and pain are pure emotions. Other, more complex and derivative experiences act as interfaces to emotions. Love, jealousy and hate are not emotions. These are descriptions of complex interactions and evaluations that involve a range of feelings and interface to true emotions some of the time. For example, lovers experience a range of feelings and display different emotions at different times. Euphoria is the benefit of being in love. Sadness and anger are the cost of being in love. Jealousy, like love, is another complex of cognitions, feelings and emotions that exist to monitor and regulate close relationships.

The best way to understand emotions to appreciate that your brain acts as an interface between the outside and your body needs. Different incoming signals are combined and produce a variety of responses that indicate needs, intentions, social status and your inner states. Signals that indicate social status are important for humans and all other social animals. The emotional components of behaviors indicate degrees of dominance or submission. Abject submission is indicated by crouching, kneeling, cowering, covering the face with arms and hands, making high pitched noises, heavy breathing, laughing and crying. Dominance is indicated by standing tall, staring, leaning forward, raising arms, speaking boldly or shouting with aggressive gestures such as foot stomping and hand clapping. Subtle emotions such as shy behavior indicate degrees of submission in otherwise emotionally neutral circumstances.

The absence of emotional display is highly valued in polite society. Humans have advanced toward civil and productive social environments that are emotionally neutral. Emotional neutrality is a requirement for acceptable behavior in school and work environments.

While our descriptive terms suggest that there are a large number of discrete feelings, there are only a small number of primary feelings flavors that can be mixed in a variety of ways. You can imagine several tracks in the brain mixer that converge as feeling monitor images in consciousness. What are the primary flavors? The range of feelings is from euphoria, a pervasive feeling of well-being to dysphoria a pervasive feeling that all is not well.

The term “affect” is used as a category that includes emotions, feelings, mood and cognitive-emotive complexes that are seldom properly described. In psychiatry, “affective disorders” is a diagnostic category. I do not find “affect” to be a useful word; it tends to conceal rather than reveal what is really going on. I suggest retiring the term “affect.”

Who Am I?

Each human discovers who she or he is in an ongoing series of revelations. Humans often have the illusion of inventing themselves from nothing. They often claim to be the authors of their own destiny, but they are passengers in an ancient vehicle on a journey that they have difficulty comprehending. As humans journey through life, they continue to discover who they are and what it means. If they have choices in the direction of their journey, reasonable decisions are achieved by diligent effort, learning and practice. The process of individuation depends on the opportunities provided by the local environment and by practicing innate abilities and following innate tendencies. The journey through life is expressed and understood by telling stories. Human stories have inner and outer forms. The inner story is a continuous narrative in the mind. This private monologue can be referred to as selftalk. Manifest stories are the daily conversations that dominate human social life. If you had to choose a feature of humans that separate them from all other animals it would be speaking. Story-telling is the most prevalent form of speaking.

The aspiration to live a happy, productive life is common. Happiness is not a discrete state, nor a sustainable state, but humans have the idea of happiness as they do about beauty, justice and goodness. To enjoy life humans need to feel appreciated, safe and secure. Basic happiness is achieved by securing access to adequate food, water and shelter and by winning the approval of the local group and gaining entitlement to whatever safety and security the local group can achieve. The most enduring happiness is achieved by becoming a good person who enjoys the world as it is and by doing no harm. Unhappiness is inevitable because humans are critical and competitive.

Pure Emotions

The words that describe emotions and feeling are numerous, confused and confusing. I want to emphasize the distinctions that clarify the differences among innate (pure) emotions, feelings, sensations and the all important emotion-cognition complexes that are mislabelled emotions. The term "emotion" points to animal and human social behaviors. There are a small number of primary emotions and variations that involve mixtures of emotional displays with other behaviors. Anger, fear and pain are pure emotions. Other, more complex and derivative experiences act as interfaces to emotions. Love, jealousy and hate are not emotions. These are descriptions of complex interactions and evaluations that involve a range of feelings and interface to true emotions some of the time.

Anger

Anger is the dominant animal and human emotion. Anger is disruptive and can be dangerous. Anger is expressed by noisy displays and attacks. All human interactions are influenced by the threat of anger and much brain power is devoted to anger management. Anger is an old animal program that emerges from the reptilian brain - the lizard rises up hisses and attacks. The human rises, threatens with gestures and then, optionally, attacks. Anger energizes aggressive behavior and is both protective and destructive at the same time.

Anger, viewed as a program, has several stages expressed at different levels of intensity. Often anger intensity escalates from threatening behavior to all-out attack. The victor in a dispute intimidates his opponent who either submits with conspicuous supplication behavior or is attacked. Anger progresses to fighting. Combatants are injured or killed in a fight.

Fights leave body scars, accounts to be settled and long-lasting memories that facilitate future fighting. Anger is a pure and fundamental emotion that is preprogrammed in the amygdala.

Human children get angry as infants when they are hungry or uncomfortable and do not achieve immediate satisfaction. The term “frustration” refers to an angry outburst that arises when seeking behaviors are blocked short of achieving the desired goal. Infants and young children demand instant gratification of their needs and are easily frustrated. An essential part of social maturation is learning to tolerate delays in gratification of basic drives. Children get angry often during the day and sometimes display alarmingly violent thoughts and behaviors. Anger is a daily feature of sibling interaction and is common in unsupervised children's play. Anger is a daily experience in the lives of most adult humans. In the USA, psychologists report that the average person gets angry 10-14 times a day.

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The Good Person - Ethics and Morality

Ethics is about the interface between selfish interests and actions and the common good. Both the good and the bad tendencies of mindbodybrain are innate properties that have useful functions, were not invented by modern society and are not going to change until the construction of brain changes. The dialogue between good and bad in human affairs is constant, predictable and universal. When a baby is born, the family and local community begin to teach the emerging being what is going on here and now. They provide the local language, costumes, customs beliefs and the local science and technology. All adult humans have an ethical standard and a technology to teach. While the local culture has an obvious impact on the appearance and behavior of emerging adults, the constant innate features of the human mind are pervasive and persistent. The variance in mental abilities within a local group will often be as great as inter-group variance.

Ethics are about standards and rules of conduct or, more precisely, modern ethicists attempt to decide what good and reasonable behavior is. All humans make decisions and evaluate the behavior of others. A scale of evaluations from right to wrong is typical of ethical judgments. Each group develops norms to guide actions and judgments about behavior. The presence of ethical standards requires individuals who can anticipate the consequences of actions; evaluate consequences in terms of selfish and of group interests; and who have the ability to choose between alternative courses of action

In practice, professional ethicists are employed by governments, universities, hospitals and other organizations; they do best by examining specific situations and engaging the people involved in conversations about specific interactions. When behavior and/or decisions are questionable but laws have not been broken, Ethics committees substitute for judges or juries and deliver advice or judgments. The value of ethics decreases as issues become of more general importance or are issues of law. Professional ethics can be appreciated as an abstract exercise in description and reasoning that may fail to appreciate the deep determinants of human feelings, beliefs and conduct. This inquiry is about human nature, complete with descriptions of imbedded social regulation and morality. An understanding of all these discussions is required for meaningful ethical discourse.

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I and Thou

I and Thou focuses on close relationships. Innate tendencies are hard at work when people meet, become friends, lovers and spouses who end their relationships with arguments and fighting. The same tendencies determine how family members interact and explain why so many families are “dysfunctional.” When lovers form an enduring pair bond, they often become parents and everything changes.

Close Relationships

There are constant features of human interaction that emerge from deep tendencies. These deep tendencies are expressed by other animals, especially by our closest relatives, fellow primates. The path to understanding these tendencies involves an eclectic search through all human disciplines and a common sense that emerges from experiences with a variety of humans.

One challenge is to recognize tendencies that all humans share in one’s own behavior and covert mental activities. Another challenge is to modify and control negative tendencies. A human tendency is to treat only a few other humans well, members of your immediate select group, and to be suspicious of and hostile towards everyone else. Humans can learn to override this tendency and succeed to varying degrees at opening their minds to other sentient beings but this is a difficult task. An average “normal” human supports a small number of close relationships that have strategic significance in his or her life. These close relationships have different values and represent different investments of time, energy, loyalty and devotion.

Bonding

Humans seek bonding with others are distressed when they become isolated. Humans bond to each other in several ways. The most enduring bonds are kin-related, based on closely shared genes. The deepest bonding occurs when mother and infant are together continuously from birth and mother breast-feeds the infant. Bonds among family members are the most enduring. Bonds to friends, lovers and spouses are the next most significant. Bonds to colleagues, neighbors and even strangers that are admired from a distance are next.

Friendships are often temporary bonds, based on the need to affiliate with others for protection, social status, feeding, sex and fun. Success in business and professions is dependent on affiliations with others. Success depends on what you know, on who you know and how well you are regarded. Affiliations are ephemeral and must be maintained by regular contact, grooming, food sharing, expressions of conformity and concern, and exchange of gifts and favors.

Trust is established over time by regular and reliable maintenance of affiliation. The strongest connections are maintained by grooming, eating and sleeping together. Social conventions rely on bonding. Descriptions such as “love, affection, friendship, loyalty, duty, faith, and obligation” refer to affiliation and bonding. Humans groups employ bonding strategies intentionally – initiating new members into the group with rituals, secrets, symbols, costumes and codes that distinguish members from non-members. Groups emphasize special privileges given to members and resist attempts of outsiders to enjoy these privileges.

The most celebrated bonding is described as "falling in love" and occurs between individuals who are not related. The experience of falling in love is a complex of feelings, emotions, perceptions and cognitions designed to bring to two people together in a tight, exclusive bond that supports reproduction. The essential feature of falling in love is a fascination with another person coupled with a drive to be with them and to protect them. Men often idealize their loved one and suspend business as usual in favor of serving the needs of their potential spouses. Women are overwhelmed with maternal feelings and fantasies of home, the family, and enduring devotion and support of the male. The female task to choose the right male, motivate and train him to devote all his resources to her and her children.

Because human mates often cannot live up to the deep expectations for a soul mate, people imagine a friend or join a support group that reduces loneliness. Artifacts are often used to support the belief in a divine and omni-present friend. Objects are often used as substitutes for actual companionship. Humans have a remarkable tendency to bond to inanimate objects and treat them as if they were alive. A picture, letter, book, jewelry, or article of clothing can act as a substitute for a real person.

Children infuse toys with meaning and young females treat dolls as if they were real babies. Christopher Robin had Winnie the Pooh, his teddy bear. Pooh, of little brain, has become a sage, a cultural icon; his image is adored and sold world-wide and he is quoted in this book. Toys have progressed toward simulations of living creatures that have wide appeal. Doll eyes that open, mouths that receive water and urethral openings that pee delight children and increase their bonding to the doll. For some, toy robots that move and respond to voice commands are virtually alive.

Books contain the voices and stories of other humans and can be relied upon to provide companionship when humans in the flesh are unavailable or too disagreeable to engage. For many humans, television and movies replaced books in the latter part of the 20th century and introduced virtual families and virtual friendships. The viewer develops a friendship, even a sense of intimacy with actors who appear regularly on screen in the living room or bedroom. The actors, of course, do not develop a reciprocal sense of friendship with audience members and can be overwhelmed by strangers approaching them in public places, as if they were close friends.

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Children and Family

Children and Family examines the intense interactions of parents and children.

Preface

Parents receive a lot of advice from many people. Popular magazines and books offer a continuous stream of conflicting advice. Professionals have a variety of opinions about child-rearing that range from helpful suggestions to misleading and even bizarre ideas. Child psychology is an eclectic assembly of ideas, miscellaneous observation, opinions, fears and irrational beliefs. Confusion prevails in education about what children should learn, when and how they should learn it.

If psychologists, physicians and educators are confused, what about parents? The best parents are pragmatic and not theorists. They stay involved with their children, follow some basic guidelines they learned and tend to do whatever works. Good parents improvise childcare with a combination of innate generosity, common sense, love and concessions to the demands of modern life.

In this book, I develop a perspective based on understanding human nature. The deep lineage for every human lies in the interaction of many layers of biological determinants. The culture of parents, schools and community impose a second lineage on a child that sets limits on the form and content of learning. A family is any combination of adults and children that creates a home. The essence of family is caring and nurturing. We are social creatures. Children are innately social, but need to learn what we are doing these days. The learning requirement is greater than ever before, because we now depend on complicated technologies and must learn to interact with a great number of other humans who will be different from us in many ways.

To include more humans in the family of man as constructive peaceful contributors, each child must receive loving care, the right food, sophisticated education, opportunities for employment and the freedom to express his or her version of humanity. Thoughtful, well-educated and affluent parents have the opportunity to understand their responsibilities, to plan and allocate resources for an unborn child. A good parent faces a continuous series of challenges and problems that need solution. Parenting is not an easy job. A realistic understanding of human nature will help parents to guide their children toward a successful adult life.

Introduction

An infant is richly endowed with all of life's tendencies and resembles humans that have gone before. Humans all tend to do similar things and have similar thoughts, but there is a range of mental abilities. The range of mental ability is sufficiently great that humans of limited mental ability live different lives with different understanding than humans with greater mental abilities. Since humans are social animals and live in groups that function best when there is a diversity of mental abilities and skills, the range of abilities in any given population may be stable over time and tolerance for differences has survival value.

The newborn human brain is ready to function in specific ways with a set of innate programs. These innate programs come on-line sequentially, controlled by a master program in DNA that establishes the blueprint for the hardware growth in the brain and probably directs modifications to brain structure and function through the entire life of the individual. Dawkins stated: "No one factor, genetic, or environmental, can be considered as the single 'cause' of any part of a baby...But a difference between one baby and another, for example a difference in length of a leg, might easily be traced to one or a few simple antecedent differences, either in environment or in genes. It is differences that matter in the competitive struggle to survive; and it is genetically-controlled differences that matter."

The infrastructure for the child's future personality, intelligence and ability to interact with other humans is determined by the construction of the brain in utero. The DNA determined growth is most conspicuous in early life as the functions of major brain modules emerge in sequence and distinct developmental episodes dominate the learning experience. Brain development in utero involves prodigious proliferation and growth of neurons complete with lottery-like variations in growth and connectivity. Identical twins have the same genes but do not develop identical minds. They are more similar to each other than to other siblings, but differences are inevitable. While the genes specify the overall deck of brain cards, environmental conditions, nutrition, random events and learning all shuffle the deck as the brain grows.

A newborn baby is a primitive creature with basic body functions but minimal cognition. A newborn is dependent on crying for communication. The diet of the mother and child is a strong determinant of brain growth. Deficiencies of folic acid in utero sometimes cause a midline defect in the neural tube. A deficiency of iodine will impair brain growth and lead to mental retardation. Iodine is one of the major nutritional deficiencies in the modern world.

Mother's breast milk is the best food for an infant but the quality of her milk depends on what the mother ingests. Alcoholic beverages are damaging to the fetus. If mother smokes, the infant is flooded with toxic molecules and its brain is stimulated inappropriately with nicotine that acts as a neurotransmitter at acetylcholine synapses.

When a baby is born, the family and local community begin to teach the emerging being what is going on here and now. They provide the local language, costumes, customs beliefs and the local science and technology. All adult humans have a technology to teach. While the local culture has an obvious impact on the appearance and behavior of emerging adults, the constant features of the human mind are pervasive and persistent. Both good and bad tendencies are innate properties that have useful functions, were not invented by modern society and are not going to change until the design of the brain changes. The dialogue between good and bad in human affairs is constant, predictable and universal.

To enjoy life humans need to feel appreciated, safe and secure. Basic happiness is achieved by securing access to adequate food, water and shelter; by winning the approval of the local group and gaining entitlement to whatever safety and security the local group can achieve. The most enduring happiness is achieved by becoming a good person who enjoys the world as it is and by doing no harm. Unhappiness is inevitable because humans are critical, competitive and are often unsuccessful in achieving their basic goals.

Humans have a sense of destiny, predetermination or fate. Karma refers to a continuous mesh of causes and effects. Karma may be viewed as a natural law that causes each person to accumulate bundles of tendencies and deeds, good and bad that influence their status after birth. The best of modern scientific thinking appreciates karma as the great network of cause and effect without giving it a proper name – often called the “laws of physics” and the “laws of nature.”

An infant is born with Karma – a set of antecedent conditions and innate tendencies that will help to determine the experience, identity and behavior of the child. We now attribute about half of the child’s karma to his or her genes and the innate tendencies programmed by the genes into brain structure and function. Another large chunk of karma comes from the physical environment in which a child develops. Genes and the physical environment interact to produce individuals who share common properties and who have unique differences.

Social karma is learned from the behavior and teaching of parents, siblings, schools, peer groups and the social environment that surrounds child. Young humans copy the speech and behavior of those they live and play with.

Young humans learn how the local group does things today. All groups follow ancient tendencies but inflect these tendencies with their own costumes, rules, customs, language and technology.

The term “culture” describes the local beliefs and expressions of social life which are inflections of ancient tendencies. Local expressions are often so distinctive that underlying common human tendencies may be obscured. Differences in language, costumes and customs create distinctive societies that appear to the casual observer to be unrelated. Constant features of the human experiences underlie the apparent differences and are considered to be innate.

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Religion for the 21st Century

Religion for the 21st Century examines how innate tendencies are expressed as religions and consider how religions in the past have created conflicts that hinder progress towards the real and true. The book examines paths for religious renewal in the 21st century.

Preface

Any discussion of religion invites misunderstanding and conflict. No discussion of religion will make sense until the importance of group identity is understood. Humans may sometimes look like individuals, but the truth is that all humans are members of local groups that determine what they know, how they communicate and how they treat other humans. Each local group develops stories, beliefs and rules. Collections of local groups with special beliefs into larger organizations are often described as “religion.” Members of local groups are described as “religious” if they recite group slogans, attend meetings and celebrations. Religions often claim special privileges for their members so that the term “religious” is used to claim advantages and superior moral authority where none actually exists.

The idea of large multinational organizations called “religions” is misleading. At best, the idea of religion is a fuzzy category that implies more coherence than can be found in the real world. Religion is a convenient fiction.

Humans have convened in small groups for thousands of years to celebrate, to appease evil spirits and to encourage good spirits to offer more privileges and benefits. Humans continue to dress up in costumes, beat drums, chant, sing, and dance and make offerings to innumerable gods. These celebrations help to maintain group unity and often induce euphoric feelings in the participants. While there has always been an archetypal form to these group activities, each local group develops its own version of myths, rituals and celebrations.

The belief in spirits is the universal form. The names, number and idiosyncratic expressions of the spirits is the local content. If you consider “religious” expressions around the world and throughout, history, you would notice that there a number of basic themes with thousands of imaginative variations. You also notice that in every tribe, village or city, people believe they have special relationships with gods and spirits not enjoyed elsewhere.

The aptitude and skills required for affiliations and bonding originated with interactions in small groups of less than a hundred individuals. Human tendencies developed in small hunter-gather groups with humans who knew each other and depended on each other to find food, protect the young and defend the group from predators.

The character of the 21st century will be dominated by unsustainable population growth and migration, conflict, climate change, accompanied by shifts in wealth, power and influence. Recurrent human conflicts appear to be inevitable and challenge the most intelligent humans who imagine relief from a long history of the human abuse of humans. If you describe local group boundaries as “religious” then religion becomes one of the reasons (or excuses) for fighting among different groups.

You can argue that human rights and lawful conduct are obvious and desirable goals, but in practice, humans are critical, argumentative, and competitive. Humans are separated by different beliefs and cannot agree on a universal standard of human rights and lawful conduct.

Progress requires a more realistic understanding of what religions actually are and not what they pretend to be. The 21st century philosopher's task is to update our descriptions of ourselves to accommodate burgeoning scientific knowledge and an increasingly sophisticated understanding of human behavior, the brain and complex systems in general. We have new and revolutionary knowledge about human beings, their languages, arts and culture; about information gathering, storage and retrieval; about computation, communication; about the transformation of energy and materials; about molecular biology, genetics and the evolution of life on earth. We have to re-examine what we care about and advance new vocabularies that allow us to proceed into new domains of thought and understanding. There seems a critical lag in the assimilation of new knowledge into the culture and a rapidly widening schism separates the few who know how things work and the majority who do not. One of the more pathetic features of organized religion is the dependence on a few anachronistic books that are given high status. Libraries full of information, erudition, insights into human nature and the human condition are ignored.

Religion is Group Membership.

The tendency for selective, even exclusive, group membership is deeply embedded in the human mind and shows up everywhere and at all times. The key elements of group identity are recognizable appearance enhanced by costumes, common language, common beliefs and common behaviors, especially ritualistic behaviors. As visiting anthropologists, we are going to assume that membership in a political or religious organization is a social commitment that has little to do with truth or understanding how humans and the universe work. Human knowledge exploded in the 20th century, so much so that only a few of the smartest people could understand the big picture. Most smart people specialized in one area or another. Knowledge does empower some humans who have access to advanced education and who have the discipline to learn and the flexibility to shed old ways and seek new understanding. The sad aspect of the 20th century experience is that human belligerence prevailed and serious threats to human survival proliferated. Groups, referred to as religions, continue to generate conflict rather than agreement. If there is progress toward a sustainable and agreeable life for expanding populations of humans, then religions have to become what they are not -- expressions of unity and cooperation.

Michael Wood has presented human history in a series of excellent films. He has a world view, past and present. He wrote: "Over the years I have climbed the Chinese sacred mountains, slept at Kumbh melas by the Ganges, been to Imam Hussein at Karbala, and climbed the glacier to Quoyllur Riti in Peru, among other unforgettable experiences; so I have to say I am fascinated by the world's spiritual traditions — as part of the collective memory of humankind: the 'givenness' of the past handed down by our ancestors, encoded memories built up over sometimes thousands of years. I love their richness and difference, and their unfailing capacity to respond to something inside us: however I am deeply sceptical of religions that claim a monopoly on the ultimate truth, whatever that may be.

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Surviving Human Nature

Preface

Aging brings some wisdom and some acquiescence to the world of Samara – the swarming of humans in ephemeral groups, driven by needs and desires that can never be satisfied. I am convinced that human nature involves a collection of tendencies and contradictions that have prevailed for hundreds of thousands of years and will not change in the foreseeable future. The huge increase in population and the spread of new global ideas and methods of wealth creation should moderate and sometimes overwhelm human nature but only the names and places change – the behaviors remain the same. I am impressed by optimistic humans who work to solve the world's problems even when successes are modest. Problems recur. Success turns to failure. In this 21st century, a more realistic philosophy of human life is required as we recognize that it is impossible to permanently change human nature by social and political means - by education, persuasion, coercion and law. While news reporting is focused on current events, there are underlying scripts that repeat with many variations. The news is not new. The scripts are built into human nature and will not change in any foreseeable future

Leaning and Guha-Sapir summarized the threats to humans in the 21st century:” The effects of armed conflict and natural disasters on global public health are widespread. In the years ahead, the international community must address the root causes of these crises. Natural disasters, particularly floods and storms, will become more frequent and severe because of climate change. Organized deadly onslaughts against civilian populations will continue, fueled by the availability of small arms, persistent social and political inequities, and, increasingly, by a struggle for natural resources. These events affect the mortality, morbidity, and well-being of large populations. Humanitarian relief will always be required, and there is a demonstrable need, as in other areas of global health, to place greater emphasis on prevention and mitigation... armed conflicts persist, with entrenched internal violence lasting for years, in countries such as Sudan, The eastern Democratic Republic of Congo and Kenya.) Advances in small-arms technology and struggles over natural resources of international value (oil, natural gas and rare minerals) make conflict resolution challenging. Civilians bear the burden. Families are forced to move from their homes to escape internecine violence. Refugees cross national borders and are legally entitled to assistance in United Nations (UN)–managed camps. But increasingly since the mid-1980s, people have been unable to cross international frontiers and so remain internally displaced. They are often at higher risk for malnutrition and disease than residents or legally admitted refugees.”

There is little doubt that everything changes and the future cannot be foretold. History will unfold as the play of innate tendencies that will remain the same with new possibilities gained through creativity, invention, innovation and changes in the planet that are beyond our control. The enlightenment tendency of mind is to open up, to expand beyond limiting local conditions. If any enlightenment tendency survives the rigors of traffic jams, shopping malls and TV news, then there will be tension between the limiting needs of daily existence and a deep and recurrent call to expand beyond local conditions, to open up to the universal properties of mind.

Stephen Gislason

"Every Civilization, born like an animal body has just so much energy to expend...space and time widen to weariness. In the midst of triumph, disenchantment sets in among the young. It is as though with the growth of cities an implosion took place, a final unseen structure, a spore-bearing structure towering upward toward its final release. I am one of the world-eaters in the time that my species has despoiled the earth and are about to loose its spores into space. When the swarming phase of our existence commences, we struggle both against the remembered enchantment of childhood and the desire to extinguish it under layers of concrete and giant stones. Like some few persons in the days of the final urban concentrations, I am an anachronism, a child of the dying light." Loren Eisely. The Invisible Pyramid. 1970

Emerging from the 20th Century

The 20th Century was the century of domination of planet earth by a single species. Human activities have become all pervasive and clusters of human constructions have replaced the natural world in all habitable regions of the planet. Human events are deeply troubling overall but at the same time, much has been accomplished in reaching for a sustainable, good life for some but not all humans. At least one billion humans live in poverty, vulnerable to disease, famine, natural disasters, injury and death inflicted by other humans. The 20th century will be remembered as the century of waking up to the universe as it is. We woke up to our own nature and responsibility and can no longer plead ignorance. Humans changed the face of planet, driven animals and plants into extinction, invented hydrogen bombs and other sophisticated killing machinery.

Humans fought wars, experimented with different social, political and economic models of society. We survived two world wars and the threat of nuclear annihilation. Some of us now enjoy unprecedented security and prosperity. Of all human folly, the American-Russian military competition was the winner in the insane game category, mutually assured destruction with hydrogen bombs. A reprieve was achieved with the collapse of the Soviet Union; however, the bombs have not gone away and the threat of destruction will recur unless a new international government is successful in creating a more rational and compassionate world with enforceable laws against killing and habitat destruction. We have experimented with international coalitions and dreamed of a benevolent world government but the negative features of human nature prohibit the realization of the dream. We understood that persistent and unreasonable conflict is characteristic of humans. Humans have proliferated beyond reasonable numbers and despite amazing advances in science and technology; we have not achieved sustainable levels of population. Climate, breathable air, food, water and energy are finite resources that will limit the success of expanding populations .

Our infrastructures are temporary and vulnerable. Most reasonable people now know that we can no longer rely on our instincts and let nature take its course. Nor can we carry on with outdated social, religious and economic ideologies based on misunderstandings of human nature and planet ecology. We have to become better informed and more deliberate. We have to think ourselves out of some dangerous predicaments and we need new ideas of social organization.

We need to teach each new human that arrives on the planet how to transcend innate behaviors that are self-destructive and harmful to our species. Some humans have become better informed, more realistic and more deliberate in their analysis of human affairs. Others, including leaders of important countries, appear to remain ignorant of human nature and repeat old strategies of intervention that have failed before and will fail again. You can argue that human rights and lawful conduct are obvious and desirable goals, but in practice, humans are critical, argumentative, and competitive; they cannot agree on a universal definition of rights and lawful conduct.

21st century

The character of the 21st century will be dominated by unsustainable population growth and migration, conflict, climate change, accompanied by shifts in wealth, power and influence. Recurrent human conflicts appear to be inevitable and challenge the most intelligent humans who imagine relief from a long history of the human abuse of humans.

The 21st century philosopher's task is to update our descriptions of ourselves to accommodate burgeoning scientific knowledge and an increasingly sophisticated understanding of human behavior, the brain and complex systems in general. We suddenly have new and revolutionary knowledge about human beings, their languages, arts and culture; about information gathering, storage and retrieval; about computation, communication; about the transformation of energy and materials; about molecular biology, genetics and the evolution of life on earth. We have to re-examine what we care about and advance new vocabularies that allow us to proceed into new domains of thought and understanding.

There is a lag in the assimilation of new knowledge into the culture and a rapidly widening schism separates the few who know how things really work and the majority who do not. In this 21st century the rapid development of science, communications and culture exchange is unprecedented in the history of the planet. The smart, kind-hearted subtype of humans has flourished despite the persistent presence of crude-thinkers and killers. The smart kind-hearts have powerful tools to shape the future in a constructive manner.

The notion of a "World Order" had a semblance of credibility in the latter half of the 20th Century. Gorbachev supervised the dissolution of the Soviet Union generating some hope for a more coherent and peaceful world order. International Institutions proliferated and meetings of "global leaders" were common news items. But little was accomplished in resolving conflicts and environmental degradation. Sanders wrote: "Gorbachev's new world order became, simply, the existing world order: a world built on a broad agreement among most major countries that democracy and liberal economy were desirable goals; a world with only one superpower; a world where international institutions could govern trade, monetary and financial affairs and military conflicts; a world in which poorer countries gradually adopted the values and institutions first popularized in the West; and a world dominated by the United States, its military and its dollar. As the UN once again convened its General Assembly (Sept 2014) surprising words emerge from the speeches of Iranian, Chinese, Russian and American leaders – there is a profound sense, among many observers, that the world is once again reordering itself. The old certainties have collapsed or faded, and new threats challenge them... Old-style nationalism, from China to Scotland, has become a force once again. And international institutions have failed to solve some of the world's most damning problems, notably fossil- fuel-driven atmospheric change. " Toward the end of 2014, World Order was replaced with World Disorder as conflicts flourished in many regions, diseases

evolved and spread, air pollution and its progeny, climate change, threatened large populations with dislocation, disease, famine and increased conflict over shrinking resources.

Horodelski writes a morning business newsletter, full of data, insights from the perspective of an experienced observer. She stated: "The World Economic Forum released yesterday their five global risks in terms of likelihood (interstate conflict, extreme weather events, failure of national governance, state collapse or crisis, high structural unemployment) and in terms of impact (water crisis, rapid spread of infectious diseases, weapons of mass destruction, interstate conflict with regional consequences and failure of climate-change adaptation). In terms of what is the most likely to happen – interstate conflict with regional consequences is the number one global risk. So build your bunker. "

Idealists and Pragmatists

Idealist are good at generating codes of conduct, rules of engagement and visions of the future when the good and true will prevail. The problem, of course, is that ideal human conduct is rare and when it does occur, it is temporary. Pragmatists focus on what actually happens and develop strategies to fix what is broken. As of 2008, world problems proliferated with a feverish pitch. Everywhere you look, there are big problems that promise to get worse rather than better. A list of these problems discouraged even the most optimistic of citizens.

If you take a God's eye view of the planet, you have to notice one basic fact – that most humans generate problems on a daily basis and a smaller number try to catch up with solutions. You can supply AIDs drugs to the sick and poor in Africa, but the recovering patients suffer from malnutrition, water shortages and other diseases. Their social infrastructures are gone. If they survive their immediate adversities, warriors from neighboring tribes may arrive one day and kill them with machetes or automatic rifles, bought from US or Chinese weapon suppliers.

Even polite societies that have enjoyed periods of affluence and stability, a series of increasingly severe problems accumulate and undermine social order. In the US, a incompetent congress an ineffective administration, a failing economy, an aging infrastructure that needs reconstruction, destructive weather events and many layers of conflict within the society are serious problems with no obvious remedy. We have briefly considered the cumulative effects of resource depletion, habitat destruction, climate change and changing patterns of disease; these descriptions point to problems that do not have easy solutions.

A pragmatic approach to an overwhelming set of problems is to establish priorities and focus on achievable goals. Within every effective pragmatist is the hope that incremental problem solving will in the end produce a rational, enduring social order. There is also the hope that young, smart, well-informed people will join an enlarging group of problem solvers, hard at work every day in every country on the planet.

Smart people can break through old paradigms and recognize patterns in human nature. This is happening all the time. Good, new ideas always impress me and I always ask -why didn't I think of that? A new, good idea can spread from person to person and can make people smarter and more effective in the world. A good idea may seem obvious once you understand and accept it, but before someone comes up with the idea, you are ignorant. Humans who do not have access to new ideas and learn only a few of the old, worn-out and bad ideas are stuck with being ignorant.

The natural and spontaneous level of human thought is crude and superstitious, often based on false beliefs and errors in judgment and attribution. Humans do well, even with marked cognitive limitations, because most transactions of life are carried out by innate, expert systems in their brain that do not require educated and rational thinking. Even though crude thinking dominates human society and will probably dominate for a long time to come, a small percentage of humans with especially clever minds will keep evolving toward some ultimate encounter with the really real. We can hope that smart and nice come together, since smart and evil is an undesirable combination.

Jared Diamond suggested that we can learn from societies that collapsed quickly and unexpectedly and others endured for centuries. He asked: "Do we have cause for hope? Many of my friends are pessimistic when they contemplate the world's growing population and human demands colliding with shrinking resources. But I draw hope from the knowledge that humanity's biggest problems today are entirely of our own making. ...I draw hope from a unique advantage that we enjoy... we have the opportunity to learn from the mistakes of societies remote from us in space and in time. When the Maya and Mangarevans were cutting down their trees, there were no historians or archaeologists, no newspapers or television, to warn them of the consequences of their actions. We, on the other hand, have a detailed chronicle of human successes and failures at our disposal. Will we choose to use it? "

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The Sound of Music

Explorations of Music Theory, Aesthetics, Psychoacoustic and Digital Technologies for creating and recording music. Available in a Print edition and as an eBook for download.

Preface

This book emerged from notes I have kept for several decades. Over many years, I have learned more about music theory, electronics applied to sound reproduction and to performance skills. Music descriptions often are often complicated and the use of terms can be inconsistent and confusing. As with other subjects I have tackled, I assumed that with a little extra effort more precise descriptions would be welcomed by readers seeking a practical understanding of music.

We begin with a consideration of what sound is and how animals use sounds to communicate. Music is not a human invention, but we do elaborate sound communication more than other animals in our production of both speech and musical performances. The discussion continues with noise, an important topic that is poorly understood. A well informed musician will refrain from making noise and understand Ambrose Bierce when he stated: "Of all noise, music is the least offensive."

I include both acoustic and electronic instruments in my discussions of music creation. In my world, electronics dominate every aspect of work and play and most music I create and listen to was created, stored and distributed electronically. The art and science of recording is an important study for all 21st century musicians. Increased sophistication about the nature of sound, the art of combining musical sounds, and the effect on the listener's brain are all required for music to advance beyond noise toward a more effective means of human communication.

Music

Music describes a remarkable variety of human activities that involve making sounds. The best music should have some of the qualities of bird and other animal songs. Bird songs are most easily identified with musical melodies and composers have copied bird songs as themes for musical compositions. The main distinction in the world of sound is between music which is intelligent and pleasing and noise which is neither.



Musical sounds convey meaning without the decoding required for language sounds. Some musical phrases are copies or facsimiles of alarm cries, bird songs or human shouts and cries that attract attention, signal danger and express emotion. I hold beautiful music to be the greatest creation of humans. The sense of musical beauty is elusive and does not require complexity or even great skill, although beautiful music is more likely to occur when the composer and performers are accomplished and devoted to their art. While classical music written in Europe is appreciated as high art and performed by skilled musicians, musical styles and forms in the 20th century proliferated and incorporated sounds from all over the planet.

At the same time, electronics advanced so that recorded music became the most popular way to experience music. The science and technology of sound physics and the neuroscience of sound perception advanced remarkably. I have enjoyed many different expressions of this technology and continue to learn about sound synthesis, instrument modeling, recording and editing sound. All these activities inform about the way our brain processes sound. Music comes in all shapes and sizes. Some music is spontaneous and easy to make. A folk singer may be quite charming, strumming simple chords on a guitar, singing a plain song in a spontaneous and undisciplined manner. Other music requires years of disciplined study and practice and involves complex concepts and notation systems.

Musical expression begins with and is usually associated with body movement. Music begins with rhythm, repeated vocal sounds and stylized body movements. Dance is an elaboration of gestures and body movements associated with both performing and enjoying music. Children will spontaneously dance and sing and raise their arms above their head and sway from side to side creating a momentary ecstasy that is repeated at all ages and many different contexts from temples to discotheques.

Music Unites Humans

Music is a powerful ingredient in human societies that facilitates group bonding and conveys feelings more poignantly than other forms of communication. Shrock suggested: "As a college student, my eyes would often well up with tears during my twice-a-week choir rehearsals. I would feel relaxed and at peace yet excited and joyful, and I occasionally experienced a thrill so powerful that it sent shivers down my spine. I also felt connected with fellow musicians in a way I did not with friends who did not sing with me. I have often wondered what it is about music that elicits such emotions. Philosophers and biologists have asked the question for centuries, noting that humans are universally drawn to music. It consoles us when we are sad, pumps us up in happier times and bonds us to others."

Pinker suggested that music offers a system of communication rooted in emotions rather than in meaning. Oliver Sacks in his book *Musicophilia* suggested that music is as important communication as language and gesture. I prefer to recognize that music is language and gesture, not really a separate form of communication. Music is feeling is meaning.

Scholarly investigations of music will emphasize the efforts of highly skilled professional musicians and forget that music begins with full participation of all members of local groups. Singing, dancing, chanting are aspects of group identity and group cohesion. An ideal human group is coordinated by rhythmic expressions; they play instruments, sing and dance often. Music, as a performance by skilled musician who play to silent audiences sitting in chairs is a recent innovation that does not represent the deeper meaning of musical communication.

Schrock suggested that music "is almost always a communal event: everyone gets together to sing, dance, and play instruments. Even in societies which differentiate musical performers from listeners, people enjoy music together in a wide variety of settings: dancing at a wedding or a nightclub, singing hymns in church, crooning with their kids, Christmas caroling and singing "Happy Birthday" at a party. The popularity of such rituals suggests that music confers social cohesiveness, perhaps by creating empathetic connections among members of a group., music's power stems from its tendency to synchronize our activities."

Music Theory

Musical information consists of pitch, loudness, timbre, location, and movement of the sound source. A combination of sounds of different pitches produces harmony and a sequence of pitches becomes melody. Timbre describes the harmonics in a sound that give it recognizable qualities. A range of timbres in human voices provides for the sound identification of individuals. You can identify who is talking from voice timbre and intonation, just as you can identify a trumpet, an oboe or a violin. Formal music is assembled into language-equivalent structures, suggesting phonemes, syntax and semantics.

Music performance involves many agreements about instrument design, pitch assignment, the meaning of notation so that groups of people can produce harmonious sounds with compatible rhythms. One musical agreement is about the pitch interpretation of notes. The standard concert pitch, A, for example denotes a sound with the principle frequency of 440 cycles per second. When an orchestra assembles, each instrument is tuned to the standard pitch. Other agreements determine the pitch meaning of other notes. The piano is the reference instrument; its keyboard represents a standard for the pitch definition of each note.

Scales are standard sequences of intervals that are used in orchestral and popular music. If you invent an instrument with Pythagorean tuning, fixed intervals in the high and low range do not sound the same because the brain follows a logarithmic progression rather than an arithmetic progression. Since we hear intervals differently as the pitch increases, an "equal tempered" tuning has been adopted from the piano that makes the intervals sound the same in all octaves.

While classical music written in Europe is appreciated as high art and performed by skilled musicians, musical styles and forms in the 20th century proliferated and incorporated sounds from all over the planet. At the same time electronics advanced so that recorded music became the most popular way to experience music. The science and technology of sound physics and the neuroscience of sound perception advanced remarkably. I have enjoyed many different expressions of this technology and continue to learn about sound synthesis, instrument modeling, recording and editing sound. All these activities inform about the way our brain processes sound.

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Neuroscience Notes

Neuroscience Notes places the human brain at the center of the universe. Since the brain is the organ of the mind, consciousness and all knowledge is contained within the brain.

Preface

I can recall my earliest interest in neuroscience when I was 14 years old. There were several influences that converge and changed me from a student who was mostly interested in physics and chemistry to a budding scientist interested in life and especially in the relationship of brain to mind. While science is the right path for exoteric studies, scientists can be naïve about the nature of mind. I became aware of Tibetan Buddhism after reading Heinrich Harrier's book, *Seven Years in Tibet*. Later, I met Tibetan Lamas and undertook the study of the Buddhist esoteric view of the mind. In practical terms, anyone who is committed to understanding what the mind is and how it works must examine the brain in great detail and at the same time examine his or her experience through daily self-observation, meditation and interaction with others.

Humans are complex, unstable creatures who are always changing. At the source of prolific variations in group and individual expressions is a collection of abilities and tendencies that we can call Human Nature. There are too many collections of knowledge and too many disciplines that claim ownership of human nature for one person to master, so that anyone who aspires to understand human nature will need to be selective, finding the best that each collection has to offer. Humans can make sense of things going on out there, but humans are also expert at generating nonsense. The study of human nonsense may turn out to be more important to human survival than the study of best case cognitive abilities. My medical school friend, Rich Austin, introduced me to paleontology and the study of human evolution. He worked with Jim Anderson, a professor of anatomy at the University of Toronto who knew all about the African discoveries of hominid fossils. I had considered continuing studies in neurology and neurosurgery, but instead left city life after graduation and internship and moved to British Columbia to live close to the ocean, practicing medicine in a rural community. Many years later I undertook a study of brain-mind and recorded my discoveries in notebooks that evolved into this collection of notes. The ocean today continues to manifest the evolution of life from cyanobacteria to the magnificent Orcas who always thrill me when I encounter them. The birds are also marvelous creatures who are constant companions. I have enough sense and knowledge to also appreciate the exceptional abilities of insect, fish and bird brains. All these creatures are my friends.

In this book, I have selected topics that are representative of neuroscience inquiry, retaining brief references to a larger context that includes the study of neurology, anthropology, paleontology, computer science and philosophy. There have been several attempts to develop a "theory" of brain function that incorporates a large collection of observations, experimental results and a growing understanding of the innate features of human nature. I doubt that a single theory is feasible and suggest that the goal is integration of knowledge from diverse disciplines into a comprehensive understanding of who we are and why we are the way we are. I encourage the reader to join me and continue his or her inquiry into the human mind by reading other books in this series.

Brains

Neuroscience views minds as manifestations of the living processes found in brains. Brain science does not "explain" mind, or consciousness, but does give us strategies for understanding the properties of mind. Neuroscientists have made rapid progress in the past few decades and some of them are asking the same sorts of questions that only philosophers used to ask. The difference is that neuroscientists are sometimes able to ask more specific questions that may lead to more insight into the basic principles of the human experience. Neuroscientists are motivated and equipped to find real and practical answers to philosophical questions, leaving philosophers behind in an anachronistic philological niche, repeating discussions of what philosophers said hundreds to thousands of years ago. This is not to argue that all neuroscientists are philosophers or that all neuroscientists understand the human mind, since many are focused on highly specialized tasks that reveal little or nothing about how the whole system works.

Neuroscience is the broad inquiry into the structure and function of animal nervous systems. Neuroscience begins with the consideration of how the simplest animals on the planet interact with their environments. The deep sense that develops in humans who study and understand life is that every creature that lives on planet earth shares common properties. Nervous systems allow organisms to sense, decide, act and remember. These properties begin as simple devices and evolve into sensing strategies that are increasingly complicated, more accurate and more effective. A complex device such as the human eye is easier to understand if you already understand a simple device such as light detecting pigment spot in a snail. Thus, it makes sense for a neuroscientist to study all animals and to assume that principles learned about older, simpler animals can be applied to newer, more complex animals such as humans. Bodybrainmind is an open-ended, self-regulating system, highly responsive to the molecular determinants impinging on it through food and the environment. Life is an expression of cells, tiny containers of molecular codes and metabolic processes. In system terms, a living cell is a self-regenerating, recursive system that can reproduce itself through cell division.

A human is a community of several trillion cells that cooperate more or less to sustain a life of finite duration. Many cells in the human body are programmed to die. Growth is achieved by the proliferation of cells and tissues are formed by cell assemblies that maintain structure and function as long as oxygen and nutrients are provided, wastes removed, and temperature is maintained within a narrow range. Infection by other organisms and injury must be avoided or repaired.

Modern ideas in science describe the complexity of the natural world in terms of networks, systems, information and control, turbulence, chaos, fractals, attractors and self-organizing systems. The first insight is that the human body is not a simple, linear machine. Humans are unstable, rhythmic, pulsing creatures with different body-mind states that do not always respond the same way to the same stimulus when repeated.

Anatomists have described the brain in terms of our evolutionary path. We have old-age, middle-age and new-age parts, each with different properties. A neuroscientist, Paul McLean, suggested that the human brain could be viewed as three systems of different ages - an old reptilian brain, a middle (early mammalian) brain, topped off with a new, advanced brain, the neocortex. The brain has about 85 billion neurons: 20% are in the cerebral cortex; 80% are in the cerebellar cortex, the remaining 10% are widely distributed in old brain structures.

The neocortex allows us to learn, adapt and create new modes of behavior. New babies are not born with the new brain programs. Old programs are built into us and need not be learned. Old programs include some of the most negative qualities – predatory and territorial aggression, anger and fighting, for example. Some of our most positive qualities are also innate such as the tendencies to mate, bond and form social units with altruistic features. The old brain remains in control of our bodies and our minds.

Progress has been made understanding brain function as a complex of interacting networks in constant flux. The infant cerebral cortex is folded in an adult pattern but has one third the total surface area. Hiila et al compared cerebral cortices of 12 healthy infants born at term with 12 healthy young adults and demonstrated regions of lateral temporal, parietal, and frontal cortex expand nearly twice as much from infancy as other regions in the insular and medial occipital cortex. They suggested: " This differential postnatal expansion may reflect regional differences in the maturity of dendritic and synaptic architecture at birth and/or in the complexity of dendritic and synaptic architecture in adults. This expression may also be associated with differential sensitivity of cortical circuits to childhood experience and insults. By comparing human and macaque monkey cerebral cortex, we infer that the pattern of human evolutionary expansion is remarkably similar to the pattern of human postnatal expansion. We hypothesize that it is beneficial for regions of recent evolutionary expansion to remain less mature at birth, perhaps to increase the influence of postnatal experience on the development of these regions or to focus prenatal resources on regions most important for early survival.

Whatever we value about civilized human existence - culture, knowledge, social justice, respect for human rights, and dignity must be learned anew and stored in each person's neocortex. Information always comes with noise, that extra, confusing, unnecessary stuff which burdens our brain not with the task of remembering but of forgetting. There is so much we do not want to remember that it is a wonder that a modern citizen manages to cope with information overload. Information noise interacts with molecular noise, useless or bad chemicals that flow through the brain from food, water and air.

Neuroscience would say that consciousness is produced by brains and can be destroyed by brain lesions and brain death. Consciousness is a property of the old, middle, and new brains working together, but if old brain structures are damaged, consciousness is obliterated. If the neocortex is damaged, consciousness remains, but specific memory content, sensations, and skills may drop-out.

Cognitive philosophers increasingly provide commentary on what neuroscientists are doing and saying. Tim Smith stated that: " A large number of articles and books have monitored the growth of Cognitive Neuroscience... motivated by a feeling that "things are about to be understood." As advances in imaging has added new potential to the neurosciences, so too neural networks and computational models have added new power to the cognitive approaches. Neural networks are tools that enable researchers to "probe how high-level functions such as perceiving, attending, learning, planning, and remembering emerge from the massively parallel neural architecture of the brain."

Michael Gazzaniga stated that "Psychology departments across the country have realized that they've got to get into brain science- in humans and not just rats.... universities should be looking for people who can liaison with clinicians working with brain-damaged patients, with people doing

brain imaging, with the computer jocks". Cohen remarked that research efforts have not been integrated. Integration requires uniquely trained individuals, people who can understand a number of disciplines. Since smart, humans with diverse knowledge and skills are not produced by university education, Schneider observed that finding staff with the right blend of cognitive psychology, neurophysiology, computational modeling, and brain imaging... is a tall order." Gazzaniga suggested that the work of figuring out the brain will take another 200 years and I believe he is underestimating the task. If you want to know exactly how the brain works, the investigation is likely to go on for thousands of years. Humans tend to be impatient. They overestimate their accomplishments and underestimate the extreme complexity of natural phenomena.

In their introduction to advances in neurotechniques, Gray and Chouard stated:" It is an exciting time to be a neuroscientist. The experimental landscape has changed markedly over the past few years with advances in molecular genetics, optogenetics and functional imaging. Neuroscience research was once dominated by anatomical techniques. But, with the advent of electrophysiology, and subsequently molecular biology, anatomical labeling techniques were eclipsed. Now, improved anatomical methods are experiencing a renaissance, thanks to the ability to deliver molecules in a cell-type-specific manner, with advances in imaging methods, together with electrophysiological technique, makes it feasible to study the relationships between specific neural circuits and particular behaviors in rodents. Neuroscientists are also poised to benefit from systems-based approaches to data collection and analysis but lag behind other researchers, such as tumor biologists, in implementing these strategies. Using the results from such approaches to direct hypothesis-driven work and improve the design of these experiments could , focus efforts on candidate genes in the genetic network associated with disease."

Mind

The term *mind* is the most inclusive word, embracing all human experience, thought, perceptions, knowledge, feelings and beliefs. Mind could be thought of as an all inclusive container which tends to expand and contract. Little mind is local and personal. I can refer to my mind as distinct from your mind. We have many terms and phrases that refer to the condition of a mind such as my mind is clear or unclear, decided or undecided. Many refer to the mind as if they were outside of it, using phrases such as "I made up my mind" and "I changed my mind."

A term that is sometimes interchangeable with "mind" is "psyche." We speak of psychology rather than mindology. The adjective "mental" derives from the Greek word "mens" or mind and suggests that there is a subcategory of events that is in the mind and there are other events outside the mind. On close inspection of the really real, the reader will discover that this is a mistake. Everything is in the mind and "mental" points to this all-inclusive container. Everything in the universe is "mental." The universe, however large it may be, is mental – in the mind. It is the mind that sometimes declares that the universe is larger than the mind. A deep question is: How do we know if other creatures have minds? The answer is not easy. Healthy humans may have a sense that other humans have minds, but there are distinct limitations. Most transactions that occur among humans can be understood in terms of specific behaviors and their responses, without any participant having a "theory of mind". The "theory of mind is an doubtful invention of scientists and philosophers who are interested in cognition.

You can argue that most humans assume that other humans have minds in a fuzzy imprecise way but there are exceptions. This “theory of mind” simply extends the experience of self to others. Humans are mostly interested in the behavior of others and often ignore or misunderstand the mind that lies behind these behaviors. Babies scan the faces of their mother to find out how she is responding to them and events around them. Babies will usually go with the mother’s visible facial expressions and tone of voice. The baby is responding to facial expressions and other behaviors with no concept of the mindfulness of others. Eye contact is a strong signal that may suggest the mindfulness of others, but it is often just a signaling behavior that elicits responses that are involuntary and more or less predictable. Tracking and copying the behavior of others sometimes involves the assumption of another mind, but again the behaviors are sufficient and no theory of mind is required. Ethical concepts and behavior assume only that others have experiences and give value to the experience of others. The root of ethical precepts is the golden rule to value and protect the experience of others as you would have others value and protect your own experiences. Responsibility is the ability to respond favorably to the needs of others. Empathy is the human ability to respond favorably to the feelings of others.

You could argue that humans are basically good and have an altruistic tendency that emerges from the most favorable recognition of the experiences of others. You could also argue that humans are mostly ignorant or heedless of the mind of others. Humans tend to be critical and disputatious and often treat others as objects to be manipulated. Humans are sometimes cruel and murderous, indifferent to the suffering of their victims or, in the worst case, humans take pleasure in witnessing and in causing suffering. Human males have survived on planet earth by killing animals and other humans. Killing is a specialized adaptation that utilizes innate programs in the brain. Killing is a manifestation of innate tendencies that will not disappear in the near future. The tendency to kill must be constrained by each community to achieve a peaceful and secure life for its residents.

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The Human Brain in Health and Disease

Preface

My goal in writing this book is to provide a guide to causes of disorders of brain function. The brain is the organ of the mind. Therefore, molecular influences that alter the function of brain are manifest as mental influences. Brains are delicate devices that need special care to work well. When brains do not function well, disorders of sensing, deciding, acting and remembering occur. Food is the major source of molecular influences on the brain and, therefore, on mind states. Finding and consuming food is the main business of all animal brains and remains the priority in the organization of human behavior.

An integrated view of body/mind does not draw artificial boundaries among different events. Psyche does not affect Soma or vice versa. Psyche and Soma are one interacting whole system. Behavioral adaptation to environment is intermeshed with molecular adaptation. This means that mind and body interact with environment as a single integrated unit. Molecular events determine mind/body events just as mental or behavioral events determine molecular events. There is little argument that diseased arteries that carry blood to the brain lead toward the most prevalent and often the most devastating loss of brain function. High blood pressure and plugged arteries work together to produce strokes. Other brain diseases are not so obvious.

The role of the environment and dietary problems in creating emotionally and mentally disturbed people has been underestimated or ignored. Bad environments and problems in the food supply can disturb brain function in entire populations. Bad chemicals are more powerful than good intentions and good ideas unless the good idea is to remove the bad chemicals from the environment. When a fish in an aquarium displays psychotic behavior, you do not call a fish psychiatrist; you check the oxygen concentration, temperature, and pH of the water. You have to clean the tank and change the fish diet.

I regret the increasing use of psychotropic drugs. The aggressive marketing of drugs that affect the brain has become a major determinant of what people believe and how people behave. I was once an advocate of drug therapy, but now I believe that we are on the wrong track and advise against taking drugs that affect the mind.

My work in philosophy takes the broadest view of the human experience and also focuses on the details of how our mind works. As a physician, I advocate practical solutions to brain dysfunction that are often ignored in medical practice. These are solutions that emphasize removing the causes of disease by improving the environment and the food supply.

In a world where no one understands what causes the major brain diseases, all clues should be considered. I continue to advocate improving environments and diet revision as the most desirable and least practiced methods of preventing and resolving common brain diseases. Negative food effects on brain function are often ignored in neurology and psychiatry. Major diseases originate from eating too much of the wrong food and damage many organs simultaneously.

I suggest that a prudent person suffering early brain-dysfunction symptoms would be wise to pursue vigorous, thorough diet revision at the earliest opportunity. Drugs bought on the street and in pharmacies that target the brain are used excessively and inappropriately adding to increasing numbers of disturbed and dysfunctional people. Because some brain dysfunction compromises judgment, learning and motivation, family members, friends and professional advisors often have to initiate diet revision and provide the right direction and support

Diet revision that removes problems and leads to correct nutrition is the most important and perhaps the least practical intervention because humans have difficulty changing their habitual patterns. If beneficial change were a matter of rational choice, then most human problems and most diseases would disappear.

Mechanisms of Brain Disturbances

The brain's main function is to track desirable molecules in the environment and cause them to flow through the body. Since the brain is the organ of the mind, molecular influences on the brain are manifested as mental influences. We can assume that if a person's brain gets the right signals from inhaled and ingested chemicals, then he or she will remain on a stable, adaptive course. If, on the other hand, the wrong signals are received from the ingested chemicals, then he or she follows a wobbly course, unstable and maladaptive. Mind-brain-body is one, interacting, whole-system. Disturbances in mental states have physical causes - cellular, biochemical dysfunctions. Food, as body-input, is the molecular substrate of body-mind, the foundation level, which permits or denies healthy function at higher levels of integration.

Without a healthy body-input, mental health is an impossible goal. People tend to be unrealistic about what substances they can safely ingest, inhale and inject into their bodies. Small amounts of alcohol and other chemicals easily and profoundly affect their mind. They believe that they are tougher than they really are.

One of the common causes of misunderstanding human behavior is ignorance of food and environmental chemicals that affect brain function. The bad chemicals come from many directions in the food, air, water, from a street vendor, from a pharmacy, from a pub, from a café, from a health food store, from a friend, from an enemy, from an unknown donor who lives thousands of miles away. Workplace exposures to neurotoxin chemicals are perhaps the most obvious and are somewhat regulated by government agencies in the US and Canada.

Bad chemicals can disturb brain function in entire populations. Bad chemicals are more powerful than good intentions and good ideas unless the good idea is to remove the bad chemicals from the environment. Behavioral adaptation to environment is intermeshed with molecular adaptation. This means that mind and body interact with environment as a single integrated unit. Molecular events are more likely to determine mind/body/brain events than mental or behavioral events are likely to determine molecular events.

The food supply is critically important to brain function. There are many ideas which link food ingestion and the environment to brain dysfunction and disease. We can ask some simple questions to inspire further inquiry, such as: Are mental and neurological diseases diet related? Are the victims deficient in critical nutrients, or poisoned by excesses of nutrients? Are some dementias caused by the toxicity of food additives, pesticides and/or food contaminants? Do these diseases combine food toxicity and food allergy and emerge slowly in complex combinations?

Do the most afflicted people drink more alcoholic beverages, tea, and coffee; eat more fast foods, cheese, bread, or meat? Where do they live? What environmental toxins are common in their food, water and air?

These and related questions about diet and disease have never been answered in terms of meaningful research; however, there are a thousand clues in the research literature which point to diverse problems and many potential solutions. My experience with food-related psychopathology suggests that modern diets are probably responsible for cerebrovascular disease, most strokes, all diabetic neuropathies, some learning and behavioral problems in children, some mental illness, some depressions, some dementias and some neurological disease of unknown origin. The mechanisms of these disorders are multiple and complex.

Patients with delayed pattern food allergy (as I define it) often present with neurological symptoms, especially memory loss, lack of concentration, emotional instability, motor and perceptual problems. Many of these people functioned in an adaptive dysfunctional state for many years. Some may hold responsible jobs. Their slowly increasing cognitive disability was concealed or overlooked by family, friends, co-workers, and by the patients themselves.

The following discussions are intended to expand the reader's ideas about what sort of explanations might be considered.

Here is a short check list for identifying food-related problems:

- Nutrient Deficiencies Nutrient Excesses
- Nutrient Disproportion Toxic Effects
- Metabolic Diseases Food Allergy
- Proteins, Peptides Food Additives
- Colon Metabolites Food Contaminants

Mental Illness

When someone's brain is not working properly others describe them as "mentally ill." Mental health and mental illness are poorly chosen terms that obscure the medical and social issues that arise whenever human dysfunction is examined. The hospital in my community has a separate building described on a sign as "Mental Health and Addiction Services." I suspect that the staff and the patients that use this building do not understand what "mental health" means. I am certain that the juxtaposition of the words "health" and "addiction" is a mistake.

Kurt Vonnegut described the cause of mental illness as "bad chemicals." Humans are unrealistic about what substances they can safely ingest, inhale and inject into their bodies. Humans are most unrealistic about how easily and how profoundly small amounts of external chemicals can affect their mind. They believe that they are tougher than they are. Modern psychiatric theory imagines bad chemicals or good chemicals in the wrong amounts manufactured by mistake inside the brain of each victim. Physicians often view the brain as a black box with no chemical input except the drugs they prescribe. A neurobiologist will recognize that numerous chemicals arrive from the

outside to interact with brain chemistry. Bad chemicals in the food supply can disturb brain function in entire populations with endemic brain dysfunction as the result.

The World Health Organization claimed that one-fourth of the world's population is affected at any time by depression, other mental disorders or substance abuse problems. According to the WHO report: "Women are more often affected than men. The higher prevalence of mood disorders in women may include the frustration of relying on the role of housewife for identity and self-esteem; lack of personal income; and for those who do work lower pay and more labor-intensive jobs than men." In addition, violence against women has been recognized as a growing problem. Some studies show that as many as half of all women living on planet earth have been physically abused at some time in their lives. Their abusers are mostly men and most of those men are boyfriends, spouses, family members or close "friends."

Kessel et al suggested that half of all Americans will have a mental illness during their lifetime, with symptoms beginning in the teen years for many. They favored diagnoses such as depression, anxiety, impulse control and substance abuse disorders. Rather than using fuzzy terms such as "anxiety, mood disorders or depression," we can recognize "mental illness" as a variety of interacting maladaptations caused by bad genes, bad chemicals, bad food, infections, malnutrition, poverty, oppression and abuse. Mental disturbances are the first symptoms of bad environments that substitute disease-causing conditions for healthy conditions. Mental illness is often self-inflicted by overeating the wrong foods, drinking alcohol to excess, using and abusing drugs obtained from both legal and illegal sources.

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