Book Synopsis

From Craig Weightman

The Social Conquest of Earth

by Edward O. Wilson - 2012

Why Does Advanced Social Life Exist?

Ch 1 – The Human Condition

- Where do we come from? What are we? Where are we going? Religion cannot answer these questions – only construct belief myths about them. This book is an attempt to communicate that information.
  - The creation myth is a Darwinian device for survival – believers on the inside and infidels on the outside
  - Science and religion are two world views that can never be truly reconciled
  - They are represented by a trust in empiricism vs a belief in the supernatural
  - The author argues that scientific advances, especially in the last two decades, are sufficient to answer where we came from and what we are.
- Most of the scientific observations revolve around the social nature of humans and the author uses the social structure of several kinds of insects as a comparison.

Where Do We Come From?

Ch 2 – The Two Paths to Conquest

- Human beings create cultures by means of malleable languages
- Human beings are not unique in our emotions
  - We evolved intelligence steered by the demands of animal instinct. This is why we are mindlessly dismantling the biosphere.
- All prehuman bands taken together made up a population of, at most, a few tens of thousands of individuals
  - The average lifespan of a mammalian species was only half a million years
  - This is the reason most of the prehuman collateral lines vanished
- Social insects mostly evolved into existence over 100 million years ago
  - Termites: 220 million years ago
  - Ants: 150 million years ago
  - Bees: 70-80 million years ago
- Social insects only acquired their spectacular dominance after they had been around a long time – millions of years
  - Plants and animals had a chance to evolve defenses against these insect depredations – there was time to develop a counterrevolution in the rest of life
- Homo sapiens, in sharp contrast, only emerged in the last several hundred thousand years and their spread around the world was only in the last 60,000 years.
  - Other species were not prepared for this onslaught.
  - Homo sapiens also swamped and erased all other human species encountered around the world.
- Agriculture was only invented 10,000 years ago, occurring independently at least eight times around the world.
  - This increase in food dramatically increased the density of people on the land.
  - Wherever humans saturated wild-lands, biodiversity was returned to the paucity of its earliest period, half a billion years previously.
- Homo sapiens are eusocial: group members containing multiple generations and prone to perform altruistic acts as part of their division of labor.
  - The most fundamental difference between humans and insects is that all normal members of human society are capable of reproducing and that most compete with each other to do so.
  - Human groups are formed of highly flexible alliances among and between families, genders, classes, and tribes and are capable of distributing ownership and status on a personal basis.
  - The pathway to eusociality was charted by a contest between selection based on the relative success of individuals within groups versus success among groups.

- Evolving populations acquired an ever higher degree of intelligence, had to feel empathy for others – friend and enemy alike – and plan a strategy for personal social interactions.
  - The human brain became simultaneously highly intelligent and intensely social
  - Thus the human condition of being selfish at one time and selfless at another was born – and often conflicted.
- Evolving insects had one major disadvantage in their social evolution – their muscles were encased by a skeleton and, therefore, severely limited as to their size.
  - This meant insects would have to rely on small brains and instinct to conquer their world
  - However, they had wings and could travel across the land much faster than mammals
- Mammals have bone on the inside and muscles on the outside, allowing them to grow much larger
  - This also means they have much larger territories to defend and are more likely to encounter rivals
  - Females are not impregnated once, but much be repregnated for each parturition.
- Insects could evolve eusociality by individual selection in the queen line, while prehumans evolved by the interplay of selection at the individual and at the group levels.

Ch 3 – The Approach

- The possible evolution of a species can be visualized as a journey through a constantly shifting maze, but it can never be predicted.
- Evolutionary steps (preadaptations) leading to the human condition
  - Large size capability of mammals
  - 70-80 million years ago early primates specialized to life in trees
    - Hands and feet built for grasping
    - Opposable thumbs
    - Flat nails on fingers and toes (for cutting things)
    - Pressure receptors on hands and toes – sense of touch
    - Carry food in hands while traveling
    - Larger brain
    - Relied on vision over smell
  - Evolved to live on the ground in African savanna forests – 2 + million years ago
    - Legs lengthened and straightened
    - Feet elongated to create a rocking motion during locomotion
    - Evolved into marathon runners to catch prey
    - Arms redesigned for flexibility – throwing spears
  - Control of fire
  - Gathering of small groups at campsites
    - Campsites are essentially human nests – nests are necessary for eusociality development
  - Ability to create tools

Ch 4 – The Arrival

- Two million years ago a variety of hominid primates strode upon elongated hind legs across African soil.
  - These primates were diverse, but existence was precarious
  - The Homo species ate both vegetable and meat products
- The unique aspect the Homo species evolved was larger brains, facilitating the need for innovation and adaptation.
  - This was facilitated by a greater reliance on meat as a source of protein
  - The protected-nest principle surrounding the control of fire and campsite evolution drove this species in the direction of eusocial behavior.
    - Members of the group are forced to gather there
    - Labor must be divided
    - Food must be shared
- Group members inevitably competed with each other and the ability to read the intentions of others, social intelligence, was at a high premium.
  - The cohesion forced by the concentration of groups was the event that launched the drive to homo sapiens.

Ch 5 – Threading the Evolutionary Maze

- Homo sapiens is the only species of large mammals to have made every one of the required lucky turns in the evolutionary maze – thus the human condition is a singularity in our world.
- Preadaptations required...
  - Existence on land: fire is not available in water
  - A large body size: to accommodate a large brain size
  - Grasping hands: hold and manipulate detached objects
  - Shift to a diet with substantial meat: higher energy/gram
  - Controlled use of fire: about one million years ago
  - More permanent campsites and division of labor

Ch 6 – The Creative Forces

- The origin of modern humanity was a stroke of luck – good for our species for a while, bad for most of the rest of life forever.
- The theory of eusocial evolution provides separate accounts for the origin of eusocial insects on one hand and the origin of human societies on the other.
- How well a group performs depends on how well its members work together, regardless of the degree by which each is individually favored or disfavored within the group.
  - Genetic fitness of a human being is a consequence of both individual selection and group selection
  - Because all normal members have at least the capacity to reproduce, there is an inherent and irremediable conflict in human societies between natural selection at the individual level and natural selection at the group level
    - Selfishness vs altruism; self survival vs group survival
- Eusocial insects evolved extreme plasticity of certain genes – allowing for specialized individuals – but selection remained at the queen-to-queen individual level.
  - Insect females can be mated, then carry the sperm long distances to start a new colony.
- This extreme plasticity was not possible in mammals because their life cycle is fundamentally different and the female is rooted to her territory of origin.
- The worst in our nature coexists with the best – this is the human condition
  - Intense competition occurs between groups
  - Group composition is unstable due to both internal and external competition
    - War between group selection (honor/virtue/duty) and individual selection (selfishness/cowardice/hypocrisy)
  - Quick expert reading of intention is paramount for both individual and group survival
  - Much of culture, including creative arts, has arisen from the inevitable clash between group and individual selection

Ch 7 – Tribalism Is a Fundamental Human Trait

- Among the absolute universals of human nature, and hence of culture, is the instinct to form groups and to defend the group enthusiastically against rival groups.
- People must have a tribe – it gives them a name in addition to their own and social meaning in a chaotic world.
  - In the absence of war people turn to team sports

Ch 8 – War as Humanity's Hereditary Curse

- Wars and genocide have been universal and eternal, respecting no particular time or culture
- Populations of homo sapiens began to spread out of Africa approximately 60,000 years ago. Descendants of the pioneers in New Guinea, Australia, and elsewhere all have exhibited aggressive territorial behavior.
- Tribal aggressiveness goes back beyond Neolithic times
  - Chimpanzees live in groups and exhibit gang behavior, so the pattern may go back before the two species split apart
- Principles of population ecology allow us to explore the roots of the origin of mankind's tribal instinct – population growth is exponential, but slows down after a few generations.
  - The original limiting factor was available food
    - Territorial behavior evolved as a device to sequester the food supply.
    - For hundreds of millennia, the territorial imperative gave stability to small, scattered communities.
    - 10,000 years ago the Neolithic revolution began to yield vastly larger amounts of food from cultivated crops and cities began to emerge.
- People are still the same as their hunter-gatherer ancestors, but with more food and larger territories.
  - Limits are set by the amount of food and water available
  - We take what is given us and continue to multiply and consume in blind obedience to instincts inherited from our Paleolithic ancestors.

Ch 9 – The Breakout

- Two million years ago the australopithecines of Africa, their genes spreading among multiple species, still roamed the savanna forests and grasslands. Within another half million years all were gone, except one.
  - This line became the larger brained Homo erectus, able to shape crude tools and use controlled fire.
  - This species was very adaptable and spread out throughout much of the world – Australia, the Pacific islands, and the New World excepted.
- Homo sapiens are the successful descendant of Homo erectus.
- Some of our traits are unique among all animals
  - Productive language
  - Music
  - Prolonged childhood, allowing extended learning periods
  - Anatomical concealment of female genitalia and abandonment of the advertisement of ovulation – supporting long term female-male bonding needed for child rearing
  - Uniquely fast and substantial growth in brain size, increasing 3.3 times from birth to maturity.
  - Slender body form, small teeth, and weakened jaw muscles indicative of an omnivorous diet
  - A digestive system optimized to eat cooked foods
- Homo sapiens broke out of Africa 60,000 years ago
  - Africans south of the Sahara are far more genetically diverse than are the differences between an average European and an average Asian
    - Great genetic diversity of present-day southern Africa suggests only a small part of the African population participated in the breakout.
    - Analysis and mathematical models suggest the pioneers created a "serial founder effect" with a few individuals
  - Between 135,00-90,000 years ago a period of aridity gripped tropical Africa, reducing and consolidating the Homo sapien population.
  - When the drought ended, 90,000-70,000 years ago, the human population expanded
    - Other parts of the continent and the Middle East became more arid and created a window along the Nile River and eastward across the Babb el Mandab Strait into the Southern Arabian Peninsula, followed by migration into Europe no later than 42,000 years ago – by 30,000 years ago Homo sapiens had eliminated the Neanderthals.
    - Around 60,000 years ago Homo sapiens settled along the Indian Ocean coastline – by 50,000 years ago Australia was settled and by 45,000 years ago Indonesia was settled.
    - A single Siberian population reached the Bering land bridge between 30,000-22,000 years ago, beginning settlement of the New World.
      → Around 16,500 years ago the retreat of the ice sheets allowed migration south to the Americas
      → By 15,000 years ago both North and South America had been settled
    - Approximately 3000 years ago the Polynesian people began colonizing the Pacific archipelagos – completing the conquest of Earth.

Ch 10 – The Creative Explosion

- At multiple locations the hunter-gathers invented agriculture – the greatest of all advances
  - Villages, then states, and finally empires were born because of the availability of food
- In the heartland of the Eurasian super continent the creative explosion of culture rose to a climax that would change the world.
  - Three hypotheses have been offered to explain this
    1. A major and transformation genetic mutation appeared about the time of the breakout into Eurasia
    2. The creative explosion was a culmination of a gradual process that began as far back as 160,000 years ago
    3. Changes began early, some were lost during the severe African climate changes that reduced human population size and growth and then flowered again when the breakout period arose.
  - The three hypotheses are not mutually exclusive and all three may have contributed to the rapid cultural explosion.
- Key mental concepts taking hold between 10,000-7,000 years ago
  - Mastery of stone
  - The concept of a hollow structure was refined
  - Assembling small objects into larger ones was developed, i.e. weaving
  - The concept of control of the environment was refined and remains a mental fixation to this day
- Agriculture probably followed recognition that fires in the savannas were followed by growth of increased amounts of fresh, edible vegetation.
- Intermarriage among people from different parts of the world in the present day has resulted in an unprecedented increase in the genetic variation within local populations around the world.

Ch 11 – The Sprint to Civilization

- Anthropologists recognize three levels of complexity among human societies
  1. Hunter-gatherer bands and small agricultural villages are egalitarian
  2. Chiefdoms, also called rank societies, are ruled by an elite stratum with tight local control
  3. States have a centralized authority where power is delegated and bureaucratic, while responsibility Is divided among specialists.
- The ascent to civilization has occurred through cultural evolution, not through changes in genes

How Social Insects Conquered the Invertebrate World

Ch 12 – The Invention of Eusociality

- The key to the origin of the human condition is not to be found in our species exclusively, because the story did not start and end with humanity. The key is to be found in the evolution of social life in animals as a whole.
  - Animals of the land environment are dominated by species with the most complex social systems
  - The most complex social systems have evolved only rarely in evolution.
- The most complex systems are those possessing eusociality
  - Members of a eusocial animal group belong to multiple generations.
  - Members divide labor in what appears to be an altruistic manner.
- Only 2% of the known species of insects are eusocial, but they dominate the others in numbers, weight, and impact on the environment.

Ch 13 – Inventions that Advanced the Social Insects

- Ants originated 150 million years ago.
- Termites evolved tens of millions of years before ants, but ants became more dominant because many species became specialized to feed on termites.
- Until 130-100 million years ago trees and shrubs consisted primarily of gymnosperms (conifers, ferns, etc), but during this time they were largely replaced by angiosperms (flowering plants, grasses, etc.).
  - Endosperm in the seeds made possible survival in unfavorable times and long-distance dispersal
  - Flowers, with their colors and scents, allowed the evolution of specialized creatures that transport pollen.
- Angiosperm forests were richer in substance and more complicated in architecture – favorable to small animals and insects living in them.
  - Species of ants multiplied as more and more niches opened
  - Ants formed a symbiosis with insects that live on the sap of plants (insects provide food through excrement and ants provide protection from predators)
    - This has evolved into the ants maintaining herds of insects for food
- Rule of social insects: The more elaborate and expensive the nest is in energy and time, the greater the fierceness of the insects that defend it – connected to the origination of eusociality itself.
- Ants also evolved to add seed to their diet, along with prey and carrion, allowing them to expand into grasslands and deserts – ants harvest and store seeds for later use.

The Forces of Social Evolution

Ch 14 – The Scientific Dilemma of Rarity

- Eusociality was a major innovation in the history of life because it created super organisms – the next level of complexity above organisms.
- The first eusocial insects only appeared on earth about 175 million years ago – termites
  - Today there are about 2600 families of insects and only 15 are known to contain eusocial species – 6 of which are termites descended from a single eusocial ancestor.
- Eusociality is both rarer and more recent in vertebrates (~3 million years ago)
  - Twice in mole rats of Africa
  - Once in the line leading to humans

Ch 15 – Insect Altruism and Eusociality Explained

- How and why eusociality came into existence had two steps
  1. All animal species had altruistic cooperation to protect a defensible nest from enemies
  2. The stage is set for members of groups to belong to more than one generation and divide labor in a way that sacrifices at least some of their interests to those of the group.
- When a group so structured prevails over competing individuals, natural selection is free to create more complex forms of social organization
- When evaluating evolutionary rules concerning insects, we should consider the queen to be a super organism and the members of her colony to be extensions of her, rather than individuals in their own right – unlike our views of a human family, wherein each member is considered an equal individual.

Ch 16 – Insects Take the Giant Leap

- Initial traits that predispose toward eusociality
  1. All the species that have attained eusociality live in fortified nest sites
  2. Protection is against predators, parasites, and competitors
  3. Even a little society does better than a solitary individual, belonging to a closely related species, in longevity and extracting resources from the immediate area.
- A second trait that predisposes a species to eusociality: when coerced, insects tend to divide labor
- From the above predispositions, species can be "spring loaded" for a rapid evolutionary shift when conditions warrant
  1. The right pre-eusocial traits are in place
  2. Eusocial alleles exist in the chromosomes
  3. Environmental pressures exist that favor group activity, i.e. the solitary species will move across the threshold into eusociality
- A species in the earliest stage of eusociality is a genetic chimera.
  - Traits newly emerged in eusociality favor the group
  - The rest of the genome favors personal dispersal and reproduction
  - In order for the binding effects of group selection to outweigh the dissolutive effects of individual direct selection, the species must have only a very short evolutionary distance to travel. The reduction of that distance is achieved by preadaptations, to include a nest where offspring are reared.
- The relative rarity of these preadaptations, added to the high bar to eusociality, may be enough to explain the rarity of eusociability.
- The origin of an anatomically distinct worker caste appears to mark the "point of no return" in insect evolution.

Ch 17 – How Natural Selection Creates Social Instincts

- Darwin: Instinct evolves by natural selection
  - Behavioral traits arose and exist today because in the past they aided survival and reproduction
  - Mutations are constantly occurring in all traits of a species, including behavior – those that help survival remain.
  - If changes favorable to survival and reproduction occur, they can spread rapidly.
- Overarching principles for understanding the genetic basis of instinct and social behavior
  - Note the distinction between unit of heredity, *a gene or arrangement of genes that form part of the heredity code,* and the target of selection, *the trait or combination of traits encoded by the units of heredity and favored or disfavored by the environment*.
    - Natural selection is usually multilevel: it acts on genes that prescribe targets at more than one level of biological organization, *cell and organism or organism and colony.*
    - Traits (targets) that are acted upon exclusively by selection between groups generally favor virtue, duty, and honor – *encouraging group survival*
    - Traits that focus on individual survival generally favor selfishness, cowardice, and hypocrisy – *encouraging individual survival.*
    - Individual vs group selection results in a mix of altruism/selfishness, virtue/sin among members of a society – where the individual may survive, but the society may not.
  - A biological phenomenon essential to understanding the evolution of advanced social behavior is phenotypic plasticity – the alleles on the chromosome may react differently, based on the environment.
  - A crucial distinction needs to be made between proximate causation – *how a structure/process works* – and ultimate causation – *why the structure works in the first place.*

Ch 18 – The Forces of Social Evolution

- Hereditary altruists form groups so cooperative and well organized as to out-compete non-altruist groups – i.e. group selection
- Inclusive-fitness theory: Kinship plays a central role in the origin of social behavior. This theory has proven more cumbersome and less inclusive than simple group selection.

Ch 19 – The Emergence of a New Theory of Eusociality

- The five phases of the Theory of Eusociality
  1. The formation of groups of otherwise solitary individuals
     - Grouping by family can accelerate the spread of social alleles, but does not, of itself, lead to advanced social behavior.
     - The causative agent is a defensible nest within reach of a sustainable supply of food. Colony formation is the consequence, not cause, of eusocial behavior.
  2. The happenstance accumulation of other traits that make eusociality more likely, i.e. care of the brood in the nest
     - These preadaptations arise by individual-level selection and are products of adaptive radiation.
  3. The origin of eusocial alleles, by mutation or mutant individuals from the outside
     - Mutation is not required to prescribe a novel behavior, but may simply cancel an old one – leading to "spring-loaded" preadaptations.
       → As soon as parent and subordinate offspring remain in the nest, group selection proceeds.
       → If the colony has the same genes that prescribe caste and division of labor, it can be viewed as an individual super organism – i.e. comparisons would be queen-to-queen.
  4. Identification of the environmental forces driving group selection
     - This area has had very little directed research
  5. Group selection (between colony) shapes the life-cycles and caste system of the more advanced eusocial species.
- If the last two steps only occur in insects, how did the human species achieve its own unique, culture-based social condition?

What Are We?

Ch 20 – What is Human Nature?

- Human nature is not the genes underlying it – the genes prescribe the developmental rules of the brain, sensory system, and behavior that produce human nature
  - Cultural universals are too dependent on our environment.
- Human nature is the inherited regularities of mental development common to our species – the epigenetic rules.
  - These rules are the genetic biases in the way our senses perceive the world, the options we automatically open to ourselves, and the responses we find easiest and most rewarding to make.
  - The epigenetic rules are hardwired and compose the true core of human nature.
    - The behaviors created by these rules are not hardwired like reflexes, but prepared learning
    - The rules of physiological development are also not genetically hardwired or beyond conscious control.
- Three examples of epigenetic biases – gene-culture coevolution
  1. The development of lactose tolerance in adults
     - When herding was developed, 9000-3000 years ago, the survival advantage in using milk and milk products as a year-round source of food was enormous.
     - Four independent mutations that prolong lactose production beyond the infant have been discovered.
  2. Incest taboos are a cultural universal throughout nature
     - In humans exogamy is practiced – young adults are exchanged between tribes
     - Minor marriage – the practice of adopting unrelated infant girls for later marriage to a son, has proven to have an unsuccessful result when the girl adopted is under thirty months of age.
  3. Color vocabulary is remarkably consistent across all human cultures
     - Color does not exist in nature, but visible light consists of continuously varying wavelengths.
     - Societies vary from simple to complicated classifications, but color terms grow in a strict hierarchical fashion.
       → First black and white
       → Then red
       → Then either green or yellow
       → Followed by blue
       → Then brown
       → The remaining four basic colors are added in no particular precedence: purple, pink, orange, gray

Ch 21 – How Culture Evolved

- The common ancestors of chimpanzees and prehumans invented culture and we have simply elaborated on it.
  - Culture is the combination of traits that distinguishes one group from another
  - Dolphins engage in true cultural transmission, but have not progressed further because 1) they have no nests, 2) they have flippers instead of forelimbs, and 3) fire is not available to them.
- The elaboration of culture depends on long-term memory and, in this capacity, humans rank far above all animals.
- The great gift of the conscious human brain is the capacity to build scenarios.
- Abstract thought and syntactical language emerged no later than 70,000 years ago.
- Neanderthals saw virtually no progress in their technology or culture during their 200 millennia of existence.
- What was the driving force that led to the threshold of complex culture? It appears to have been group selection.
  - A group with members who could read intentions and cooperate among themselves while predicting actions of competing groups, would have huge advantages.

Ch 22 – The Origins of Language

- The primary and critical difference between human cognition and that of other animals is the ability to collaborate for the purpose of achieving shared goals and intentions.
  - We express our intentions as appropriate to the moment and read those of others brilliantly.
  - Human beings are enmeshed in social networks
    - Children display more advanced skills then chimpanzees in a variety of social tests.
- Early Homo sapiens acquired three particular attributes
  1. Shared attention – the tendency to pay attention to the same object at ongoing events as others
  2. High level of the awareness needed to act together in achieving a common goal
  3. A "theory of mind" - recognition that their own mental states would be shared with others
- Language followed before the African breakout 60,000 years ago – it is the grail of human social evolution.
- Language is not basic, but derived from cognitive and social skills
  - The multiplicity of pathways in the evolution of elementary syntax suggests that few, if any, genetic rules guide the learning of language.
  - The rapidly changing environment of speech does not provide a stable environment for natural selection.
  - The genetic basis of human language acquisition predates the emergence of language – language has evolved to fit the human brain, not the reverse.
- The failure of natural selection to create an independent grammar has played a major role in the diversification of culture and the flowering of human genius.

Ch 23 – The Evolution of Cultural Variation

- The expression of genes may be plastic, allowing a society to choose one or more traits from a multiplicity of choices, or it may not be plastic, allowing only one trait, i.e. incest avoidance.
- The degree of plasticity in the expression of genes, like the presence or absence of the genes themselves, is subject to evolution by natural selection
  - Mutations in regulatory genes are less likely to be deleterious than mutations in protein-coding genes.
- Cultural variation in humans is determined mostly by two properties of social behavior, both of which are subject to evolution by natural selection.
  1. The degree of bias in the epigenetic rule – very low in dress fashion, very high in incest avoidance
  2. The likelihood that group members imitate others in the same society who have adopted the trait.
- The intricacies of gene-culture coevolution are fundamental to understanding the human condition.

Ch 24 – The Origins of Morality and Honor

- The dilemma of good and evil was created by multilevel selection within the same individual – largely in opposition to each other.
  - Individual selection is the result of competition for survival and reproduction among members of the same group.
  - Group selection is competition between societies through both direct conflict and differential competence in exploiting the environment.
- Genetic social evolution rule: Selfish individuals beat altruistic individuals, while groups of altruists beat groups of selfish individuals.
  - If individual selection were to dominate, societies would dissolve and if group selection were to dominate, human groups would come to resemble ant colonies.
- The concept of group has evolved from a small tribe of tightly bound people (probably around 30) to an informal mass of connections (Facebook friends).
  - Our instincts still desire the tiny bands and remain unprepared for civilization.

- People are compulsive group-seekers
  - Extended family, organized religion, ethnic groups, sports clubs
  - Empathy is a group selection trait that allows individuals to imagine another's pain.
  - Fundamental rule to all moral reasoning: “Do not do unto others that which is repugnant to you. All else is commentary.”
  - Human beings are prone to be moral because natural selection has favored those interactions of group members benefiting the group as a whole.
- The tangle of impulses created in the conscious brain
  - Other-condemning emotions – contempt, anger, disgust
  - Other-praising emotions – gratitude, moral awe, being moved
  - Other-suffering emotions – sympathy, compassion, empathy
  - Self-conscious emotions – guilt, shame, embarrassment
- Authentic altruism exists and it enhances the strength and competitiveness of groups
- Leveling – the art/wit of bringing down those who appear to receive more than they have earned – is beneficial even for the most advanced societies.
  - Countries (Japan and the Nordic countries) and states (New Hampshire) with the highest average quality of life also have the narrowest wealth differential.
  - People gain visceral pleasure both in leveling and in seeing punishment meted out to those who do not cooperate or contribute at levels commensurate with their status.
- Honor, a feeling of innate empathy and cooperativeness, is a two-edged sword of altruism
  - One side is devotion and sacrifice in war (defending the group against other groups)
  - The other side is the honor of the individual
- The naturalistic understanding of morality does not lead to absolute precepts and sure judgments, but instead warns against basing them blindly on religions and ideological dogma.
- Ethical philosophy will benefit from a reconstruction of its precepts based both on science and culture.

Ch 25 – The Origins of Religion

- The heart of the difference between religion and science-based secularism is: Was Man made in the image of God or was God made in the image of Man?
- The evidence that lies before us in great abundance points to organized religion as an expression of tribalism.
  - The power of organized religions is based upon their contribution to social order and personal security, not to the search for truth.
  - The illogic of religions is not a weakness, but their essential strength in binding members together.
  - The peculiar qualities of religious faith are the logical consequence of the dynamism of group selection.
- It has been relatively easy to take the step from human rulers to invisible divine beings.
  - God in all three Abrahamic religions is a patriarch much like those in the desert kingdoms in which these religions arose.
  - Religious visions were, most-likely, based upon hallucinogenic drugs or schizophrenia – there was general religious use of hallucinogenic drugs and mental illness was not at all understood, i.e. schizophrenia is characterized by unseen voices and images.
- At some point in Late Paleolithic times – appropriately 95,000 years ago – people began to reflect on their own mortality and construct burial sites.
  - Today, as then, the conscious mind leaves the body in sleep and enters the spirit world created by neuronal surges of the brain.
  - Shamans took charge of interpretations of these visions.
- As social complexity grew, so did the responsibility of the gods for maintaining social stability
- Religious believers today are concerned with religious faith and the benefits it provides, not particularly in the theology, and not at all in the evolutionary steps that led to present-day world religions.

Ch 26 – The Origins of the Creative Arts

- The creative arts are filtered through narrow biological channels of human cognition.
  - Our eyes and ears can only discern a narrow band of the light and sound spectrum
  - Over 99% of all living species rely on chemical senses to navigate the environment, but man is one of the rare life forms that is primarily audio visual
    - We have a pitifully limited sense of taste and smell
  - Only through science and technology has man come to understand just how limited his senses really are
  - By using this power and examining human history, we can gain insights into the origin and nature of aesthetic judgment.
- The brain is most aroused by patterns in which there is about a 20% redundancy of elements
  - This degree of complexity is shared with a great deal of our art

- Biophilia: The innate affiliation people seek with other organisms
  - People across cultures gravitate toward homes that…
    - Overlook something
    - Prefer seeing open savanna-like terrain with scattered trees and copses
    - Want to be close to a body of water
  - People prefer to live in those environments in which our species evolved over millions of years in Africa
- Human social behavior arose genetically by multilevel evolution
  - We can expect continuing conflict between components of behavior favored by individual selection and those favored by group selection
- Story telling, whether as literary authors or scientific papers revolves around the use of metaphor
  - In science metaphor is permitted as long as it serves the importance of the discovery
  - In literature what matters is the originality and power of the metaphor
- Picasso: "Art is the lie that helps us see the truth."
- The creative arts became possible when humans developed the capacity for abstract thought
  - The oldest art artifacts – cave art – flourished between 35,000-20,000 years ago
  - Musical instruments are found in this time-frame
    - music contains something not found in any other art – a beat

Where Are We Going?

Ch 27 – A New Enlightenment

- The more we learn about our physical existence, the more apparent it becomes that even the most complex forms of human behavior are ultimately biological
- We are free as independent beings, but our decisions are not free of all the organic processes that created our personal brains and minds – 'free will' appears to be ultimately biological
  - Humanity is life's greatest achievement
  - Our ancestors were one of only two dozen or so animal lines ever to evolve eusociality
- The apparent answer to why are we here is …multilevel natural selection
  - At the higher level, groups compete with groups, favoring cooperative social traits among members of the same group.
  - At the lower level, members compete with one another in a manner that leads to self-serving behavior
- The interpretation of human selection is in direct opposition with the inclusive fitness theory – based on kin selection.
- Confusion is compounded by a largely mythic, spirit-haunted world view put forth by organized religion
  - Organized religion was conceived in ignorance of the physical/biological world and was 'set in stone' in early history
  - Each religious vision, by definition, views itself as better and more accurate than any other view – doubt is dealt with as heresy.
- We must view all humanity as our tribe and respect the world as the only place we will be able to live