

The Evolution of Imagination Stephen Asma

A well-done book on a topic that has interested philosophers since Plato.

Stephen Asma has a rather eclectic background. He is a musician, and illustrator, and a philosopher with a number of books to his credit. Among his interests are Buddhism, a topic of a couple of those books. His illustrations are a delight – imagine an author being able to create precisely the desired graphic, without having to tell somebody else what he wants.

His topic is the imagination. How did human imagination evolve, and what are the theories as to how it operates? He says that the evolutionary psychologists tend to take a fairly mechanistic, domain oriented view of the way humans solve problems. A typical mine circuit to them would be avoiding poisonous plants. Asma says that our improvising skills and imaginative powers almost certainly grow out of general intelligence, not specific modules.

Asma writes: "Books about creativity have tended to fall into one of three genres. On the one hand, there have been the breathless and overreaching feel-good paeans to famous entrepreneurs and successful CEO creatives. This kind of book is crammed with amusing but shallow factoids and over-interpreted fMRI studies, all wrapped in a vaguely inspirational glaze. Next, we have the how-to books that give artists a series of exercises to unblock their creative flow. These books are either therapeutic or instructive, or both, and seek to nurture the joy of our inner prodigy. The third genre is the impenetrable academic baffler, chock-full of erudite and cryptic references to Foucault and the hegemonic phallogocentric horizon of being, but otherwise devoid of illumination." He wins me over right there, when he says he doesn't understand Foucault either.

He says in the introduction he will be leaning heavily on our primate ancestry to explain the way we are today. "Our intellect is a product and servant of our social life, and the improving imagination – our early intellect – gave us the behavioral/mental scaffolding to organize and manage our experiences long before words and concepts."

The book is organized around a jazz theme, as a jam session in six chapters. But what works in the jazz combo can just as easily be found among any other group dedicated to an activity such as diplomacy, hunting, or product development. Each chapter is divided between real-time, the event being discussed, and a discussion of the evolution of the abilities being discussed.

Here follow my reading notes on the first chapter. Others will be included as comments.

ONE : The Second Universe

-----Counting Off

Asma leads off with the description of a Pleistocene hunting party. First he notes the human evolution required to throw a spear – a strong wrist capable of twisting and the experience that tells the hunter where the animal is likely to go and how to throw the spear so that the animal and spear collide at the right moment.

Then, speaking of the group, he says that hunting party is by definition an improvisational activity. The hunters continually update their knowledge about the animals, weather and so on and make their best guess as to what will bring success.

-----Some Crucial Ingredients

Asma names some characteristics of improvisation, quickly adding that it is not a definition but merely characteristics. These are: spontaneity, intuitiveness, adaptivity, making do with deficient resources,

natural or self-imposed disciplines, emergency or high-stakes conditions, and it is simultaneously performative and compositional.

For all that it is a matter of making it up on the spot, it is usually woven from a number of clichés, well-known moves that have only to be modified. Asma calls this functionally promiscuous.

The list of characteristics goes on: improvisation is flexible practice, involves the mixing or hybridization of frames (separate disciplines, like genres of music), humor, and emotion or affect.

Asma says that improvisation requires prerequisite "imaginative faculties." These are the basic mammalian complement of short and long-term memory, representational systems and social learning.

-----The Captain or the Muse?

Asma introduces a useful metaphor – and says it is nothing more than that. "The captain" would be a part of the brain that has executive control over the creative process, consciously selecting what to do and what not. "The Muse" would be an abandoning of executive control to simply let creativity flow through your consciousness.

Asma cautions us that these metaphors are not useful by themselves, but taken together they do emphasize two phases of the imaginative process.

-----Metaphysical Imagination

A discourse on monsters, and belief in same. Conjuring them up is a feat of imagination.

-----A Second Universe

The cross-fertilization that takes place in imagination. Borrowing metaphors from other contexts. The "counterfactual:" things that might be or might have been; the perfect reposit that you did not come up with when needed.

Question: do animals possess an ability to handle counterfactuals? Our humanoid ancestors? How and when did we acquire our powers of imagination?

Our ancestors made hand axes of knapped flint for a million years, during which time the design changed little. Did they have the ability to conceive the finished product in advance, or did they merely learn to copy existing axes? Imagination or rote?

When and how did we start to imagine things that could not be real? Asma shows the full-bodied (viz, obese) Venus of Willendorf. One calls to mind the beautifully exaggerated animal drawings in the caves of southern France.

Language facilitates imagination. Asma asks what it was like before our ancestors developed language, which most agree was only a couple hundred thousand years ago.

-----Philosophical Missteps

Asma refers to the philosophers suggesting that imagination is a middle faculty between our essential perceptions and our mind (the realm of concepts and judgments). Asma raises the objection that it is not a dichotomy, conceptual forms on one side and sensual perception on the other being brought together and matched in the mind. There is more going on in the middle than philosophers imagined.

-----You Are an Expert Improviser

Asma describes jazz improvisation as watching and listening very attentively to the leader of the session, taking subtle clues that indicate when a solo riff is coming, the change in key signature, or the end of the piece.

He offers another example, speaking a foreign language. When speaking to local people (Chinese for him, Ukrainians for me) you often get the drift of a conversation but not the whole thing. Rather than stop and ask them to get you back on track every time, you have to wing it and try to steer the conversation to something you will understand. As time goes by – all too slowly – you gradually become more adept at improvisation and also learn a bit of vocabulary.

Asma goes into other examples from business negotiation to emergency medicine. The key elements of improvisation, given above under the heading "crucial ingredients," apply to all of them.

That's my review through Chapter One. The remaining chapters, covered as comments, are:

TWO : The Creative Body

THREE : Drawing, Dreaming, and Visual Improvisation

FOUR : Spinning the Yarn

FIVE : Blowing Away the Self

SIX : The Politics of Imagination

It is a well-done book on a topic that has interested philosophers since Plato. It is hard to conceive of a better person to address the topic.

TWO : The Creative Body

-----Give the Drummer Some

The metaphor in this chapter is the jazz drummer. "An entire room of people clapping on two and four in a gospel service, for example, has the power to motivate all but the most resistant to clap along."

"In this chapter, the rhythmic drums are metaphor for the human body."

"The reigning theorists of mind, still dazzled by the computer metaphor, tend to reduce mind to procedural or algorithmic calculation. By exploring the imagination – part sensory, emotional, as well as rational – is a great route for getting back to the body." "The imagination is not just a head game, but shows how our bodily emotional systems (like fear, rage, care, joy, and so on) are organized and managed.

-----Thinking with Your Body

Asma talks about dance as a cathartic exercise, allowing a dancer to work off tensions. But it was more than that – it is intensely social.

Dance plays a role in human sexual selection. See "the evolution of beauty." Asma writes "In fact, dancing is a tour de force of neurochemical pleasures: serotonin, epinephrine, endorphins, and dopamine. Pain is blocked, and euphoria is increased in the dancing group."

He notes that rhythm is infectious for humans, but other animals, even other great apes, do not respond.

"The ability to sink to a beat and subdivides time inside a beat is called entrainment. Without entrainment, animals cannot synchronize tightly. Dancing for them is out of the question."

Asma suspects that dancing was already a tradition for Homo erectus. He asked, "but why should such a rare ability, synchronized movement, evolve?" Asma proposes an evolutionary, selection of

the fittest explanation: it is a signal to competing groups: don't mess with us, because we are unified and formidable group. Richard Prum would have a simpler solution – sexual selection could explain it all.

Asma notes that even modern militaries use forms of synchronization as intimidation.

-----The Simulation System

"For decades now, researchers have tethered our social learning advances to the expansion of the Neocortex (rational brain). This expansion happened between 800,000 and 200,000 years ago, during the middle Pleistocene.

"Our ability to coordinate our bodies into sophisticated action sequences, like rhythmic entrainment or tool use, stems in large part from the cerebellum motor system of the brain. We were so focused on studying the expansion of the neocortex that we did not notice... that the cerebellum grew even more rapidly in size and complexity."

"As we've already seen, the cerebellum is important in modeling, predicting, and organizing behavioral sequences." "It is crucial in correcting spatial and temporal relations, like those necessary for dance and tool use sequencing. It is also important in fine visual motor dexterity – the kind that apes excel at when engaging in foraging and food preparation." Gorillas are able to plan how to handle nettles and bamboo in order to take advantage of them as food, overcoming these plants' natural defenses.

"Apes must acquire such multistep chains of behavior by mimicking the conduct directly – the learner moves his body along with the "teacher's" body, or internally mimicking or simulating the behavior by watching first and trying later." This is like a piano teacher positioning the student's hands and body.

Newborn chimpanzees, for instance, are able to mimic facial expressions. They differ from humans and that humans keep it up for longer and are more communication by facial gesture.

"When a monkey reaches out to grab a grape, a specific neuron fires, and when the same monkey watches another primate grab a grape, the same neuron fires."

"In summary, then, my action states (e.g. squeezing hand, grooming motions, tool use sequences, even sexual technique, etc.) are heavily correlated with the action states of my social group. That helps me learn, perform, and comprehend these actions. My body comprehends other acts other bodies."

-----Hot Cognition and Heuristics

Between automatic simulation (bodies reading other bodies) and symbolic modeling, that is to say, mentally planning bodily actions, there is an extensive middle ground of adaptive body modeling called somatic modeling.

Asma calls up Daniel Kahneman, *Thinking Fast and Slow*. Asma calls it "hot cognition" and thinking slow was "called cognition." Neuroscientists (not necessarily Kahneman) think that the limbic regions house hot cognition in the prefrontal cortex regions house called cognition. The hot cognition style of problem-solving is heuristic. The word derives from the Greek word for "find" and it expresses a style imprecise judgment that we might call rule of thumb.

Heuristics solve a problem that will be almost impossible to solve by calculation. How to throw a spear and hit a moving animal, or catch a moving football. We don't do the arithmetic, but our brain knows from experience how to read what we see and adjust our motor planning accordingly. You could not program a robot to be a wide receiver, but the human brain can manage it.

----I Feel, Therefore I Improvise

The external environment constantly presents challenges in may provoke an emotional response. But feelings of anger, sadness, joy, fear and so on may as well come from the inside. They're not just experiences we passively endure, they are motivational forces. Hot cognition (fast thinking) paves fast routes between perception affective states and bodily actions.

Do animals feel emotion? Experiments say yes. Put an electrode and a cat's brain and you can turn him into a raging beast at the push of a button. Emotions are useful to animals: fear keeps them safe, lust keeps them repopulating, panic gives them social solidarity, and care produces parent child bonds.

The artificial intelligence model of human thinking, a rational process, is belied by the evidence. A person may be able to do all of the calculations underlying a decision but not be able to commit. The commitment is an affective act, not a logical one.

The neocortex grew to its current size less than a million years ago. It grew on top of the limbic system, which itself sits atop the reptile brain. Our limbic system is shared by most mammals: an integrated memory and emotion process comprised of the hype hippocampus, amygdala, anterior cingulate and so on. They are somewhat adaptable, but pretty much hardwired.

"Until recently, evolutionary psychologists such as John Tooby, Leda Cosmides, and Steven Pinker characterized the mind as a series of independent problem-solving modules, like separate gears in a watch." ... "Perhaps the most famous such module is Noam Chomsky's "deep grammar." We must be born with the genetically engraved, brain based program that does just one thing – acquire and employ language.

The rival point of view is the "general intelligence" school. It posits that the neocortex is a highly flexible, general problem solver.

The early evolutionary psychologist named above assume that man had evolved in a fairly stable environment, providing evolutionary time for domain specific intelligence to evolve. More recently, paleoanthropologists such as Richard Potts say that the environment was anything but stable as our brains exploded in size. In fact, it may be the chaos of this era that created our multipurpose, problem-solving brains. Refer here to benders paleoclimate book.

We needed to be versatile. That need drove our improvements in hunting and fishing, cooking and shelter.

"If human conceptual thought was largely generated by the evolution of language, and we can estimate the birthdate of our cognitive skills. But it's a big window – somewhere between 200,000 and 30,000 years ago. Sometime after the origin of anatomically modern humans 200 millennia ago, the FoxP2 gene mutated and set the stage for language evolution. That means our rich cognitive life didn't emerge until after the long and successful Homo erectus. Compare: 200,000 years of language-based cognitive life versus 200 million years since mammals first began to emerge with rudimentary emotional systems of lust, aggression, seeking, care, panic and so on.

Chimpanzees bond strongly with their mothers for eight years. People, however, have kinship bonds lasting a lifetime in extending beyond the immediate family. We had the ability to build larger networks of loyalty.

----The Most Playful Ape

Human beings have the luxury of a long and relatively safe childhood. We use play, like all animals do, to learn how to control our bodies.

Unlike animals, we use play to pretend at being grown-ups. We can play it building skyscrapers, cooking, and all sorts of adult activities. It is good practice for adulthood, and it is also an opportunity to innovate, without causing danger to the tribe.

Play is also an opportunity to develop emotional control. It is important to manage one's temper playing as a child just as it is in adult interactions.

-----The Caveman Thespian

We hypothesize that before they had language, half a million years ago, our ancestors probably communicated by gestures, facial expressions and mime.

Mime involves turning a private experience in one participant's mind into a public experience, the mime itself, with the expectation that it will be re-privatized by the recipients. Such communication was instructive, not just entertainment.

Many evolutionary psychiatrists have suggested that this middle Pleistocene era was when theory of mind comes online with our ancestors.

"Play would be selected for, by natural selection, because it allows mammals to take threats (and dominant struggles) off-line and rehearse them in safe environments. Such an early imaginative play was done largely through the body, without much cognitive motivation or even understanding. Play helped early people develop their emotional intelligence."

-----Emotional Intelligence and Improvisation

Human beings are able to read each other. Animals as well – Asma gives examples of a dog and a horse that could read imperceptible signals given off by human beings. People have deep emotional systems that react to others of the family or tribe. We developed emotional intelligence. This is also the foundation for morality.

THREE : Drawing, Dreaming, and Visual Improvisation

-----The Roots and the Walking Bass

This chapter will compare art with music. We learn a little bit of music theory.

Music follows a physical metaphor. High notes are up, low notes are down. Melodic strategies map to visual images. A tune may go up from the root note and back down again, or may wander around above and below the root note.

Asma sets the questions for the chapter: how does the embodied mind

- form images
- retain images
- recall images
- use or manipulate images
- communicate using images
- formalize pictorial conventions

-----Caveman Picassos

Asma observes that stone tools have a long history, going back 1.7 million years or so. The most primitive decorations go back about 300,000 years. These are abstract designs – zigzags, crosses and the like.

Representational art, three-dimensional figurines and two-dimensional cave drawings depicting three-dimensional objects, are much more recent. The French cave drawings are about 30,000 years old, as are the Venus figurines found in various places throughout Europe.

Asma hypothesizes that the increasing sophistication of artwork was associated with the rise of language. The same mental mechanisms may have assisted both, and increasing communication among members of a tribe may have both inspired the art and encouraged art as a means of communication.

-----Images, Dreams, and Proto-Consciousness

The theory was that it took a modern mind to create the cave drawings in Southwest France. However, a severely handicapped girl in England, without language, produced remarkably similar paintings. The theory is that the images may have allowed her to express thoughts in place of language, not in addition to.

Asma repeats "our embodied communication systems – like bodily gestures and image making – contain much more meaning than is usually acknowledged by the rational cognitivists. The reigning paradigm in both the humanities and the sciences is that meaning is linguistically grounded – propositional, inferential, and largely indicative." Asma says, not so.

"Mind has two mental pathways – dorsal and ventral, cold and hot, indicative and imperative. In order to appreciate the interwoven pathways of the mind, consider briefly an experience like fear of a predator – part cognitive and part affective. The emotional/cognition complex in predator fear is a Janus faced experience, partly imperative (e.g., I should run away) and partially indicative (e.g., that creature is a snake).

Brain chemicals tend to affect our imagination. Scientists are just starting to figure this out, but it appears that neurotransmitters like norepinephrine and serotonin reduced during our REM sleep it could be that serotonin has the dual power of raising mood and lowering imagination.

Asma has several pages of analysis of dreams. In ways they are play, integrating the day's experiences, projecting reactions to future situations... many things. Asma's bottom line is that nobody knows with authority.

-----Pictorial Mind and Creative Thinking

Our brains store visual images, not necessarily words. Our image of a blue jay is visual, not a linguistic description.

The fact that we can mentally rotate images, and that takes us some time to do so, is evidence that we store pictorial images not digital code or algorithmic encryption. Our dreams are temporal – the visual images are not static, but moving.

The grammar of images includes the manipulations or operations performed on those images. Images are special and convey relative distances between complement parts but they can easily also express ideas of containment – and being inside or outside something is fundamental in categorizing our experience.

"The deeper grammar that seems to generate several syntax systems, not just language, is the breakdown of the world into entities, properties, and processes. Language is the correspondence of this deep taxonomy, with nouns, adjectives and verbs, but gestural motor subroutines can also be characterized in a similar logic.

-----Voluntary Imagination

It appears that Freud and the Surrealists were largely wrong. Objects in dreams do not have latent meanings. A cigar is not necessarily a phallic symbol.

Asma writes "humans, having a scarcity of instincts, do not possess many reliable preset responses to the world. And the world is not come carved up into obviously meaningful entities, so we must learn (through conditioning and social learning) which creatures in which people to avoid and to pursue. Dreams are part of the process of tagging the world with significance or value."

The way images are manipulated in the mind explains the "how question" – how are image associations coherently but unconsciously structured in the mind, in dreams and waking life?

The "why question" has new to major distant directions,. One is functional and utilitarian – evolutionary adaptation. The other direction of interest is aesthetic. Why do we have and use imagination? Because it provides some of the highest human pleasure and joy.

The long discussion on mixing visual images, imagination of walking trees, flying cats and the like. A recapitulation of Piaget and other developmental psychologists talking about the ages at which children develop the ability to draw pictures of things. Comparing normal and autistic children reveals the internal thought processes behind the depictions. For example, the autistic child will draw a cup exactly as he sees it, other children will draw a handle on the cup even if the handle was away from him and not visible.

The underlying question is whether there is volition in imagination. "I have been suggesting a parallel between dreaming consciousness and the proto-consciousness of pre-humans. But image manipulation becomes increasingly volitional in both the archaeological record and the observable stages of childhood development. Voluntary imagination does not need to wait for novel mixtures and plans to present themselves, nor does it need to fumble into represent on representational clichés."

FOUR : Spinning the Yarn: Creating with Language ----Playing the Head

During the roughly 1 million years in which African Homo erectus was around, it is likely that there was an increase in short-term memory and powers for processing sequences, already paving the way for easy management of the highly productive systems we see in modern languages."

Asma is already covered mammal simulation systems, our ability to learn from others. My body can "read" your body. But simulation is not enough. We also need the ability to order and sequence subroutines into larger meaningful patterns is such adaptive sequencing is likely rooted in the primate task grammar that he previously describes as detected in ape food preparation, or in any multistep goal directed behavior.

Asma says that his argument all along was that Homo sapiens did not have to wait for the evolution of language to acquire the behavioral and cognitive skills of culture. Simulation and sequencing are enough to learn and transmit wrote habitual techniques like fire and toolmaking.

Innovation is something that developed over time. There was probably no conscious "innovation faculty" in the mind of our pre-sapiens ancestors. At first, innovations would probably be generated unconsciously, and then social learning would spread the innovations throughout the population. Asma gives the example of the spread of the word "like" in English. By my recollection it started among the beatniks when I was a kid. Asma doesn't pretend to suppose where it came from, but does note how quickly it spread.

The third ingredient needed for innovation is the sign. Before humans had language they had spontaneous gestures such as chest beating and begging. Asma writes that "the evolution of human

imagination is bound up with the development of storytelling. But storytelling did not have to wait for propositional language to arrive on the scene. Storytelling arose in multiple media: mimicry, cave painting, ornamentation, and early music. The earliest expressions of imaginative storytelling probably re-created or predicted the hunt.

-----How Did Language Evolve?

Components of language exists in many other species, but linguists tend to describe animal systems as communication, not true languages.

Nevertheless, animal communication is more complex than had been thought. Vervet monkeys use different cries for different kinds of predators – danger from above or below. This is a rude semantics – different arbitrary sounds for different types of predators.

Chomsky and Steven Pinker believe in a "deep grammar instinct," or universal language. Our grammar allows us to construct an infinite number of thoughts using a finite number of compliments – words – and combining them in clauses.

A "theory of mind" may be essential in language development. Prior to developing a theory of mind, children seem to think that every agent has the same information they themselves possess. At the age of four or so they come to recognize this is not so.

Here Asma sets himself apart from Chomsky. Instead of postulating a hypothetical "language acquisition device" as Chomsky does, we should consider the "task grammar" system described above in chapter 3. It developed for sequencing and dance and tool use, and it may be a precursor for language.

Two key features are recursion and embedding. We see this in music, motor sequences such as dance, as well as language.

Some scholars think that language evolved quite recently, dating back to the cave paintings, approximate 40,000 years ago. Asma does not give a date. I note that this is after the exodus from Africa. Were it this late, I would expect greater differences between African languages and those of the rest of the world.

Robin Dunbar the anthropologist argues that human language emerged as a kind of verbal "grooming at a distance" needed when the social groups got too large for physical grooming, removing lice. I add as a reviewer that scientists have placed the evolution of body lice about 60 or 70,000 years in the past. This would indicate, though scientists believe, a time when human beings became relatively hairless (and hence, not in such need of lice picking) and started to wear clothes. It would seem to fit into Asma's timeline.

Human groups differentiate themselves by signs. These include ornamentation, gestures, music and such. Language also works this way. We recognize members of our tribe by their accents and speech.

Culture was normative. There was a right way to make a stone ax, a right form of social organization, and a right way to use language within each group. The issue was normative, a question of orthodoxy.

"The black cat is on the fence" causes the listener's mind to decode the signal and see in her headspace black cat sitting on a fence. In this way language allows the speaker and the listener to have parallel mental realities.

As words become increasingly arbitrary, onomonopoeitic, human speech becomes more indicative and less emotional.

Asma writes "once language helps decouple cold from hot cognition, we now have mental headroom to play with concepts, memories, and ideas without triggering life-and-death emotional systems that evolved to save our lives."

-----Storytelling Apes

Asma says that storytelling must have taken off dramatically when the tellers could use words to relate what happened rather than acting it out. In other words, instead of using pantomime to express a deer running away quickly, they can simply say the big deer ran away very quickly.

The imagination lends itself to exaggeration. Asma points out that we imagine heights to be greater when we are afraid of falling and burglars to be larger as described than in person.

Storytelling appears to have evolved, a positive meme which helped the culture bearing it to confront its existential problems. Storytelling evolved to become more professional. It developed its own innate narrative grammar.

"The monster story and the hero story are probably permanent players in the moral imagination because human vulnerability is permanent. The monster is a beneficial foe, helping us to virtually represent the obstacles that real life will surely send our way. As long as there are real enemies in the world, there will be useful dramatic versions of them in our heads."

-----Take It to the Bridge! Improvisation as Helpful Deviance

The section on religion. Religion appears to be about as old as the Archulean tool culture, dating from 1.7 million years ago to 100,000 years ago. Asma makes the point that it was all encompassing. People didn't choose religion – it was woven into their everyday life, and there wasn't any option.

Religious stories involved vast amounts of imagination, sexual imagery, storytelling and the like.

Religion demands some imagination in order to stay fresh. The opposite is dogmatism, which may prevent the analysis of a nonsensical religious tenet. Conversely, imagination may simply add some more nonsense to the brew. Neither one is necessarily on the side of reason.

"Ultimately, Karl Popper and other liberal intellectuals like John Dewey want to claim imagination for the "good guys" in the open society. And there is good reason to agree. But it is also naïve and slightly disingenuous to over identify imagination with critical rational thought."

-----Tuning a Theory

"We can now say with some authority, given our story so far, that the imagination just is this simulation system.... But our natural history reveals that the imagination has two distinct modes: a creative mode that is involuntary, instinctive, spontaneous and unintentional, and a creative mode that is voluntary, deliberate, and intentional. This is the distinction, not prehistory and history, that tells us about the rapid success of Homo sapiens. And it is not just language it ushers in the new era of imaginative, inner headspace. The rise of voluntary simulation or imagination is a result of (A) a new social world, and with greater cooperation and emotional regulation, (B) enrichment of the recursion/embedding systems that we've been describing (of which languages but one case was paren, (C) greater brain-based executive control, and (D) prestige social status for creative innovators.

Asma says that language did not start the revolution from proto-imagination to imagination proper; dreaming did.

Dreams reveal some of the same components and processes that Darwin outlined for waking imaginative work: involuntary impressions, preferential weighting of impression combinations, and (sometimes) voluntary combining. Sometimes I acquire agency, the ability to direct my attention within a dream, and even to direct the dream itself.

The parallel of conscious structures and dreaming and waking the certainly suggestive of how early human minds work.

"Improvisation is hot cognition because it has the lightning fast speed and close emotional impetus of embodied, sensory – motor communication. But musical improvisation is not born in the hot cognition system. Rather, it must be assembled in part in the cold cognition system (where musical conventions are accessed in cultural reservoirs) and then transplanted, through muscle memory rehearsal, into the hot cognition system.

FIVE : Blowing Away the Self:

-----Creativity and Control - Solo Time

"In the Pleistocene social life becomes much more adaptive as our ancestors begin to imagine and predict the minds of their friends and competitors.... We share a Machiavellian social orientation with other great apes (i.e., manipulative and self-serving interactions) but we also have a separate, uniquely human lineage of development in which goal sharing was selected for. We work together – we cooperate. We have shared intentionality.

Asma points out a paradox. We need to clear our minds and get "in the zone." We need to lose ego, but at the same time recognize that we are freeing ourselves to do what ego most wants to do, be creative and imaginative

Humans became good improvisers, in tools among other things, a mere 45,000 years ago as we departed Africa. Here's the question: "what is the self, how did it evolve, and what is its role in creativity?"

-----Evolution of the First-Person Perspective

What does it mean to be self-aware? When researchers paint on the forehead of the sleeping gorilla, who wakes and sees himself in the mirror, he doesn't wonder about the dot. A chimpanzee does, as would a human child.

Consciousness exists at lower levels of animals, but it is unfocused, imprecise and dispersed until it is referred to as self (centralized state consciousness).

Conscious awareness may help us detect errors in our behavior, perception, and judgment, and thereby increasing the flexibility of our thinking. It lets us examine our own beliefs states.

For example, consciousness may help us correct basic errors, such as "those people are not tiny; they're just far away." Parenthetically, I think I recall reading of certain New Guinea natives, spending their lives in thick jungles, who are unable to understand perspective. Or perhaps maybe it was pygmy tribes in Africa's Ituri forest.

For most of hominid history, our brain size was approximate the same as other apes – contemporary chimps and Australopithecus average about 450 mL of brain capacity. Homo erectus expanded to 600 ml 1.8 million years ago. This included an increase in Brocca's area, which deals with language. Of course we can't tell from the fossil record exactly what happened within the skull.

The biggest jump – doubling in size – occurred between 800,000 and 200,000 years ago. This was a period of extreme climate change that meant extreme selection for adaptability – intelligence. This

reviewer adds that temperatures in this period ranged from about 9°C lower than today up to 3° warmer. To put this in perspective, by the IPCC's figures, if we burned all of the fossil fuels remaining on earth, it might raise temperatures by 6°C. Mankind has indeed dealt with severe climate change before.

Asma says that when alternative lifeways are needed for survival, and improvisation is necessary, but hotheaded improvisation (habit based)) will not work for a well in new conditions. Slowing down may have created a meta-perspective that is capable of examining inner options more systematically. Imagination is part of this change, since Homo erectus is moving from stream state to centralized state consciousness.

-----Where Is the Self?

The brain is a multilayered thing. Physically, the reptile brain lies at the bottom beneath the amygdala and other more recent accretions. On top lies the vastly expanded neocortex of the human being.

Asma presents the arguments of a vast number of philosophers, scientists and religious figures but in the long run does not answer the question. His great insight is that it is not an either/or question, but a question of a continuum.

-----Zen, Flow, and Brain Systems

The section is on the quest to lose the self. Buddhists attempt to do it through meditation, chanting the word "om" and so forth. Artists and mystics have used intoxicants throughout the ages.

Asma produces a long list of such artists. In the 19th and early 20th centuries he names Charles Dickens Vincent van Gogh, Oscar Wilde, Dylan Thomas, Billie Holiday, Ernest Hemingway, and William Faulkner. Closer to my generation were Allen Ginsberg, Ken Kesey, John Cheever, Philip K Dick, Janis Joplin, Chet Baker, Ray Charles, Hunter Thompson and Brian Wilson. Younger people are Kurt Cobain, Jimi Hendrix, and Snoop Dogg.

As a Berkeley/San Francisco kid of the 50s and 60s I have always been somewhat skeptical about the exaggerated claims that the druggies made. They were all around me, and I participated, and I didn't witness a vast amount of enlightenment. I did, however, see a lot of people looking for enlightenment and (so it appeared) faking having found it. Whatever the case, Asma was certainly right about the costs. Just about all of my serious dooper friends are dead now, including a few who managed successful careers. My take would be that they succeeded despite, not on account of any chemical enhancers.

I have a great deal of respect for John Lennon and Bob Dylan's musicality, and their ability to express the experience of drugs, but I remain skeptical as to whether the drugs improve their performance or simply give them something to write about.

Asma says that creative people are attracted to the Zen because of its focus on the present moment. He refers indirectly to a couple of beautiful books on the subject, Zen in the Art of Archery, and Zen in the Art of Motorcycle Maintenance. My recollection of these books is that they chronicle a lot of deep thinking about the past and future in an effort to capture an evanescent present.

However it takes place, Homo sapiens' mere ability to grapple with these metaphysical questions is a testament to the uniqueness of our minds. Asma is worth reading because he himself is so well read on the subject and provides leads to an impressive array of thinkers.

A significant contribution is Asma's tying these mental states in which the imagination feels itself freest with scientific measurement, brain scans and MRIs. There is something going on in there.

Asma gives an interesting example of people making a choice in an environment in which they are overwhelmed with information. The people who took a direct, "cold logic" approach to wading through masses of information to choose the best apartment among four did worse than people who were much more quickly exposed to the data and then distracted by an unrelated game. I would add as a crossword aficionado that often the best way to solve a problem is to put the puzzle down for 10 minutes and think about something else. Likewise as a computer programmer – inspiration comes when you let your mind drift a bit.

-----Finding Your Way Back

The key to letting the imagination go is to remove the inhibitions coming from the neocortex. This is called hypofrontality - hypo meaning less, and frontality meaning front brain MRI tests show that rappers and others turn off their inhibitions as they let it flow. Asma says that the drugs and alcohol seek the same effect.... though to be effective reduced innovations have to be combined with increased dopamine.

Increased imagination, letting the mind wander, has its downsides. It takes the mind away from routine tasks such as homework. Too much imagination equates to lower productivity when it comes to routine tasks.

This is a very long section and I must confess I don't follow it well. It is discussing phenomena that, if they occur in my brain, I don't recognize from the description. Not every reviewer can fully grasp the message of every book.

SIX : The Politics of Imagination:

-----The Cultures of Creating and Copying

Asma has an unflattering quote from Carly Fiorina on the Chinese lacking imagination. The Chinese and Westerners are simply different. The Chinese have millennia old tradition of venerating experience and respecting what is. Westerners have a skeptical tradition and challenged what is.

Bertrand Russell offered the opinion that idleness and leisure would be would increase imagination. I think we see the proof of the pudding. 38% of the working age people in the United States are not working; it is higher in Europe. There is no corresponding increase recorded for creativity. They are not justifying their leisure. If that's what it was. Asma writes that competing economic systems want to claim that there is support the imagination.

An obvious problem is that none of the political systems today are what they purport to be. They are all highly socialistic. In every advanced country in the world is quite possible for a person to survive without working. Therefore, the more intelligent are the ones who tend to be working. But they find themselves often in stultifying jobs because they require money in order to set support a lifestyle.

What seems to be pretty much absent is the leisure that Bertrand Russell, Charles Darwin, Herbert Spencer and other Victorians enjoyed, being born with enough money to do whatever one wanted in life, and with the moral imperative to make his life count. No place is that true. Not even among the scions of the very wealthy in the United States.

Societies differ in their lenience tort mistakes and failures. In this, the United States goes overboard, tolerating so many mistakes that the children almost feel no pressure to succeed. This works against creativity. On the other hand, as Asma notes, immigrant families demand that their children work hard and succeed in traditional ways. This would be critically true of immigrants, such as his Chinese wife. Or my half-Japanese ex-wife.

Asma says that there is not a biological reason why Asians excel in math. In this I disagree. Asian children have inborn ability and they are pushed by their parents. But the ability alone is easily measured – it is visible in Asian adoptees and white families.

Asma says that Jed Rubenfeld and Amy Chua argue that some cultures have unique ingredient that produces material and social success. Among Chinese-Americans, along with Lebanese Americans, Nigerian American Jewish Americans. There is a strong practice of impulse control.

There is a link of self-discipline and career success. There is also a strong link between intelligence and self-discipline and career success. Don't overlook it. Nigerians consist of several tribes – Ibo, Yoruba and the majority Hausa tribe. There are quite significant differences in success, even among these tribes.

-----Ethics and the Moral Imagination

On the topic of morality, Kant's categorical imperative was based on logic. Do not act in such a way that your actions could not be made universal.

Asma says that after Darwin it's just antiquated to think of the mind in absolutist terms. Ethics is based on experience. We derive the "ought" from the empirically learned "is." We go with what works.

It turns out that we are utilitarians for the most part in our ethical thinking. The greatest good for the greatest number. Recalls the book "Moral Tribes" which went on at length about the trolley car and the switch.

The fourth ethical framework is called "virtue ethics." There is a universal appeal of virtue, the example given being Atticus Finch in "To Kill a Mockingbird."

"Recent social psychology suggests that human tribalism (underwritten by amygdala based fears about out groups) might be inevitable, but it is also highly susceptible to revision. So flexible and revisable is in group favoritism that it can be weaned off the usual nefarious criteria of blood ties, race, sex, and class, to be reassigned to more benign affiliations." This, in a couple of paragraphs, sums up the self-hatred of whites on American campuses. Tragically for whites, it does not appear to apply to other ethnicities. See "No Campus For White Men."

Asma ignores the fact that evolution is ongoing. Tribalism is an essential component of evolutionary success. It recognizes that there is a competition among groups within society, and that the successful groups will be the ones who leave the most children.

"The strong claim for imagination based ethics is that empathetic simulation can deliver on the liberal utopia. Martin Luther King's and John Lennon's "dreams" are sufficient, on the strong version, to generate moral progress. Cultivating greater empathetic simulation of the others suffering is, after all, a large part of Christianity, Buddhism, and many other moral traditions."

Psychologist Paul Bloom writes "if you want to be good and do good, empathy is a poor guide" empathy is intrinsically biased – we feel more empathy for people who are like us.

"The last major objection to the strong claim of imagination based ethics is one I've hinted at earlier. Nothing in imaginative thinking per se guarantees or even tells us toward the norms of liberalism. In the same way that imagination helps a person recognize the subjective interior of a suffering slave, for example, it also helps the bigot deny the same subjectivity."

"The young male members of ISIS are motivated to barbaric violence in part by imaginative fantasy."

-----Improvisation, Dogmatism, and the Future of Freedom

Asma writes "Arguably, the greatest threats to humans flourishing today are wealth inequality (and all the health deprivation contained therein), environmental degradation, and dogmatism. The last of these, dogmatism, is a topic worth our consideration, because it is perhaps the very opposite of improvisational imagination."

It's take these points one at a time. Wealth inequality is growing bigger, but at the same time the average citizen has more extensive health coverage, and medical science is much further advanced than ever in history. It can never be perfect, but compared with historical norms human health today is very good.

Human beings are extremely aware of environmental degradation. For many reasons, chief among them the sub-replacement levels of fertility in the developed countries, these problems will probably be curtailed. Major species extinctions have ground to a standstill. Environmental degradation will probably soon follow.

Let's agree on dogmatism. Asma notes that it is not confined to any part of the political spectrum. The most deadly "isms" of the past century were mostly from the left, as is the present day attack on free speech in both the old and the new world.

Asma does not take into account the divergent interests between evolution and universal morality. As I write this, the evolutionary interests of European people in their traditional lands appears at odds with the evolutionary interests of Muslims and Africans who are outgrowing their lands. They cannot all be accommodated.

Asma agrees with Dewey that education is a solution: "I submit that we should focus more on improvisation and imagination in our schools. All general education should have experimental, problem-solving components—ones that have no preset solutions, secretly guarded by the teachers. And specific disciplines, from music to medicine, should add a set of "trouble-shooting" courses to their curriculum as well. Many educators would welcome this level of freedom, but administrators—often obsessed with short-term measurable outcomes—would need to back off, in order for it to work. Evaluation of learning goals would need to shift toward more long-term outcomes. And the outcomes themselves could not be as standardized, when the successes of improvisation and imagination are so contextually unique. Sadly, the current trend is more short-term administrative oversight, not less." Ben Sasse offers a conflicting opinion in *The Vanishing American Adult*.

This is a sweeping book, beginning with science and winding up with morality. It has the gentle virtues of Eastern religion, stating points of view without insistence or dogmatism. It gives the reader a lot to think about and discuss.