Article

The Origin of Consciousness in the Integration of Analog (Right Hemisphere) &Digital (Left Hemisphere) Codes

Paul C. Vitz*

Institute for the Psychological Sciences, Divine Mercy University, Arlington, VA (USA)

ABSTRACT

This article proposes that human self-consciousness came into existence through the transcendence of previously constructed but separate analog and digital codes, primarily located in the right and left hemisphere. This concept of transcendence is modeled on the sudden insight of Helen Keller. This insight, starting with the ability to name things, gives rise to a qualitatively unique human self-consciousness. It initiated human language and brought about the first human experiences of the past, the future, awareness of death, moral responsibility, and other distinctly human experiences. After a discussion of analog and digital codes in support of this interpretation, it is proposed that the self-conscious insight took place about 50,000 years ago in the brain of an early primitive human. The work of Tomasello and of Bickerton is used to identify necessary mental abilities that preceded the capacity for self-consciousness and language. Other relevant theorists treated include McGilchrist & Jaynes.

Keywords: Consciousness, origin, integration, analog, digital, right hemisphere, left hemisphere, transcendence.

We begin with presenting a once familiar but now rather forgotten scene in the life of Helen Keller. Remember Helen was a blind, deaf and mute child who was taught languageby using words communicated to her by patterns of touch on her hand created by the fingers of her teacher. Others may never have heard or read about this scene and so some context is needed before quoting Helen's own description of what happened.

Helen was born a normal healthy child in 1880 in a small town in Alabama. However, at age 19 months she had a serious fever for a few days, and after recovering her parents discovered that she was blind, deaf and mute. A little over five years later her teacher Annie Sullivan arrived from Boston trained as a teacher of the blind and deaf. At the time Helen would often have temper tantrums; she had no eating manners, and was in many respects wild and uncontrollable. She had no serious communication with anyone, even her parents. She was essentially an intelligent but wild high level primate. (There will be more on this later.) Her teacher took her to live in a small cottage behind the family's main house. Here Annie physically forced Helen to learn to eat with a spoon and fork, to wear clothes correctly and in other ways she developed a relationship of tough love with Helen. After a short time Helen quieted down and the two became deep, life-long friends. Soon Annie began to teach words to Helen. She did this by pairing patterns of touch on Helen's hand with various objects, such as a cup. Rather quickly

*Correspondence: Prof. Paul C. Vitz, Institute for the Psychological Sciences, Divine Mercy University, Arlington, VA (USA). E-mail:1vitz.ips@divinemercy.edu I am grateful to colleagues who read and contributed to this article, most especially to: Craig S.Titus, Matthew McWhorter, AurelianoPacciolla, and Greg Kolodziejczak.

Helen learned several hundred words in this way. For example, when given an object she could reliably give her teacher the correct tactile code, or word, for the object. But there was no qualitative change in behavior or interaction with Annie. But one morning in 1887 there was a dramatic change. Here is Helen's own description of what happened.

We walked down the path to the well-house … Someone was drawing water and my teacher placed my hand under the spout. As the cool stream gushed over one hand she spelled into the other the word water, first slowly, then rapidly. I stood still, my whole attention fixed upon the motions of her fingers. Suddenly I felt a misty consciousness as of something forgotten… somehow the mystery of language was revealed to me. I knew then that "w-a-t-e-r" meant the wonderful cool something that was flowing over my hand. That living word awakened my soul, gave it light, hope, joy, set it free!

I left the well-house eager to learn. Everything had a name, and each name gave birth to a new thought. As we returned to the house every object which I touched seemed to quiver with life. That was because I saw everything with the strange, new sight that had come to me. On entering the door I remembered the doll I had broken. I felt my way to the hearth and picked up the pieces. I tried vainly to put them together. Then my eyes filled with tears; for I realized what I had done, and for the first time I felt repentance and sorrow.

I learned a great many new words that day. … I do know that *mother, father, sister, teacher* were among them- words that were to make the world blossom for me… It would have been difficult to find a happier child than I was as I lay in my crib at the close of that eventful day and lived over the joys it had brought me, and for the first time longed for a new day to come. (Keller, 2003.26-7)

Later, Helen wrote that in the prior years she had "no concepts whatever of nature or mind or death or God. I literally thought with my body. Without a single exception my memories of that time are tactile" (Keller, 2000, p.5). She described her previous mental life.

I know I was impelled like an animal to seek food and warmth. I remember crying but not the grief that caused the tears; I kicked, and because I recall it physically, I know I was angry. I imitated those about me when I made signs for things I wanted to eat…But there is not one spark of emotion or rational thought in these distinct yet corporeal memories.(Keller, 2000. p. 5)

Note that though she expressed emotional behavior she had no experience of what we know as the meaning of the emotion. I term this basic animal-like awareness as qualia 1. It is presumed that even qualia1 is qualitatively different from the physical stimulus and the sensory-neurological response which underlie this basic awareness.

Helen turned out to be both intelligent and sensitive, indeed a remarkable woman. She graduated from Radcliff College at Harvard, wrote several books and became an important and positive public figure.

However, our concern is with the meaning of her sudden qualitative change in consciousness (From qualia 1 to qualia 2).Her sensory experience was of water on one hand and on the other the tactile code for water. Suddenly she transcended the two separate but associated experiences

and knew that w-a-t-e-r was the name of what she was sensing. This insight is not just a simple linking of a tactile code with a sensory experience. She already had a good number of word–object paired associates. (See discussion of Bickerton, below.)This is a kind of simple stimulus-response association. However, she transcended both experiences. Although she spoke of this as "a strange, new light", this was presumably not a visual light but a kind of intellectual light. That is, she transcended both codes: the water itself being a strong analog experience or code (temperature and tactile movement) and the right handed tactile pattern, although beginning as a sensation (analog), because these tactile events were discrete and sequential and without any natural significance would be quickly sent to and processed by the left hemisphere where these already familiar codes had a digital representation. (Initially almost all new experience starts in the right hemisphere but with familiarity it commonly goes to the left hemisphere. McGilchrist, 2009, p. 40, 75, 94.)

Another way to describe her new level of experience is as the sudden irruption of symbolic thought. The terms integration and mapping from one code to the other are equivalent. However, for the insight resulting in integration or mapping to occur she had to *transcend* the two codes to a mental level above them. In short, transcendence and integration or mapping presumably happened at the same time and can be summarized as the basic "language insight" and represents the sudden occurrence of new quality of experience here called qualia 2.This qualia 2 is presumed to be non-material. As such qualia 2 might be understood as either a non-physical emergent capacity or as a special kind of supervenience with new properties not capable of being composed from its lower level components. Perhaps this is close to what Polanyi (1968) meant by a higher level boundary condition.

It is very probable at the time of the insight the water was splashing on her *left* hand and the tactile code was on her *right* hand. Evidence for this comes from a photo of Helen and Annie Sullivan showing them communicating by tactile code right hand to right hand thus clearly implying Helen's contact with objects and sensations was through her left hand when she was learning words. (Keller, 2003 p. 252). Since the right hand is more strongly connected to the left hemisphere and the opposite is true for the left hand this would imply that Helen put together, she integrated, at a higher level both right and left hemisphere experiences. As just noted I refer to this major insight as the "naming insight" or the "mapping insight" including its expression in behavior, her ability to ask for and apply names. For every sensation there is a name, or can be one, and for every name there is a referent or can be one. She has learned there is a mapping possible between these two different kinds of experience. It seems reasonable to suggest that this new, revolutionary understanding created for Helen for the first time in her life genuine human consciousness. This human consciousness was brought about by the integration of both the right and left hemisphere. Or put differently, as developed below, this distinctly human consciousness resulted from the ability to map or integrate digital and analog codes. (Much more about these codes is given below.)

A diagram will help. In Figure 1, the lower level shows how the two codes or experiences were understood by Helen prior to her insight: The entire Figure 1 shows her situation after her naming insight. It portrays Helen's new situation as conceptually transcending, that is, as hierarchically above, the much more limited animal like awareness existing with each basic code shown in the two lower boxes (Here I acknowledge my intellectual debt to Walker Percy as a

theorist about the nature of language, in his *The message in a bottle,* 1975, especially chapter 1, The Delta Factor.)
The neurological nature and location of this new kind of consciousness is apparently unknown. Perhaps this consciousness involves an integration of all or most of the brain and thus has no location in the usual sense. Nevertheless, Figure 1 summarizes the preceding case for the origin of the language insight and with it true human self consciousness, qualia 2.

It is important to note that there may be levels of qualia 2 involving higher order mental understanding. These levels would be termed qualia2a, 2b, 2c, etc. They are at level 2 since they are not presumed to be qualitatively new forms of consciousness but they do identify higher levels of intellectual understanding. For example Lonergan (1990, pp14-15, 120; also 1997b) has proposed hierarchical levels of human consciousness. His first level seems similar to qualia 1, the second and higher level called "the meaning of meaning" to qualia 2a. Still higher levels 2b, 2c etc seem be similar to his levels of value judgment and of responsibility.

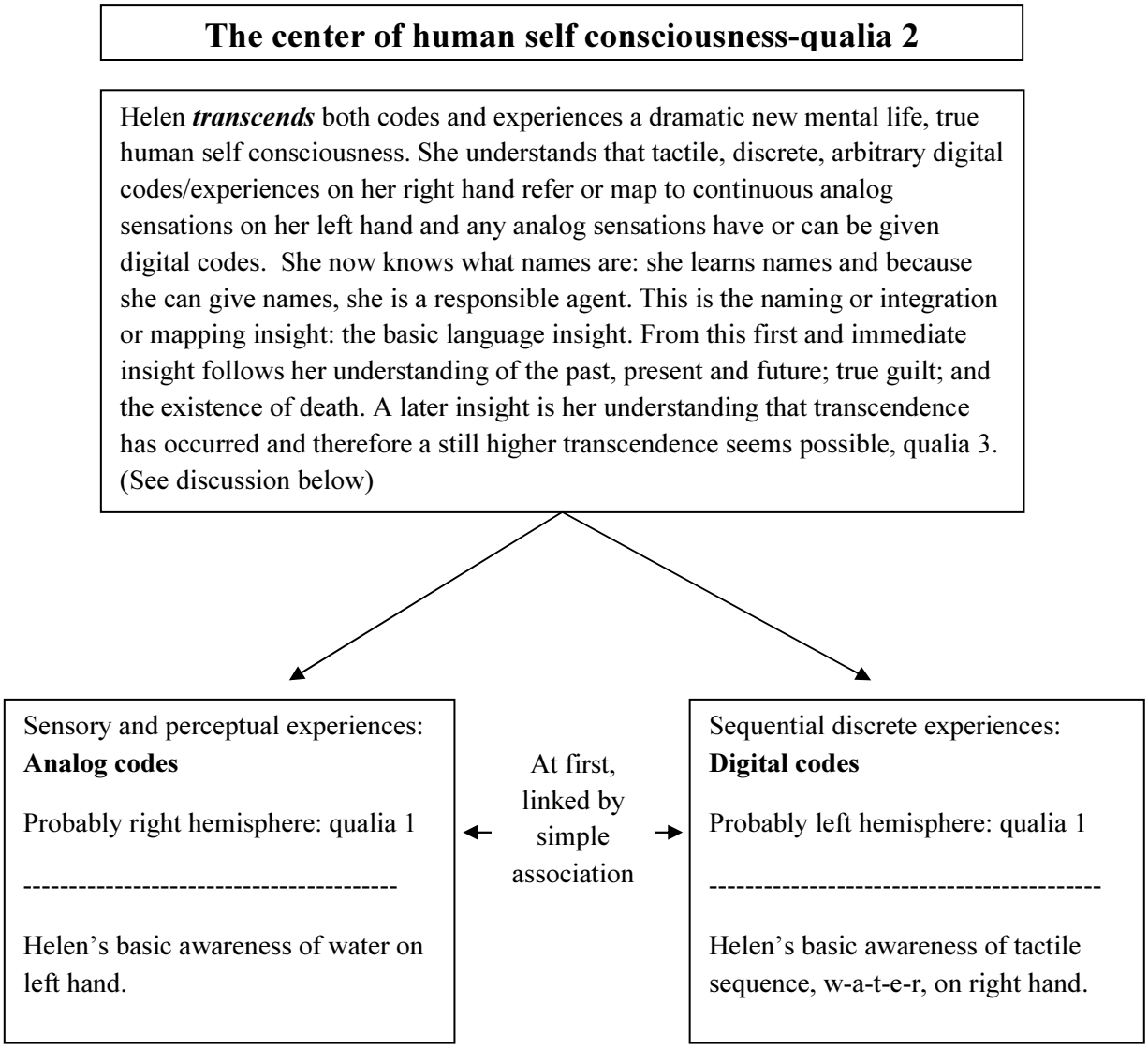

Figure 1.Helen Keller's mental situation before her language insight, lower level and after her insight, the entire Figure.

What is the evidence of this qualitative change in consciousness mentioned by Helen? **1.** There is her clear description of sudden illumination of light coming in to a previous very limited and dull kind of awareness. She likens this to a ray of sunlight suddenly lighting up a gray and frozen landscape. **2.** She goes about learning lots of new names, especially of the people close to her. Each new name gave her the delight of knowing something new and important. No doubt she also learned then, or shortly afterwards, she could name some things herself. **3.** Since she is engaged in a conversation with her teacher she has the ability to infer what another person is thinking. **4.** She discovers a doll she had broken earlier (shows object permanence) and for the first time she feels remorse, a guilty responsibility and sadness for what she had done. The moral life has dawned on her! **5.** Also she writes for the first time she knows there is death! This strongly implies that those living at the lower level of pre-human consciousness, qualia 1, don't know there is death. **6.** She claims, in addition, that just after this experience for the first time she knew there was a past a present and a future. In short, she also discovered the human understanding of time.

Human Consciousness in Helen Keller

Let us look more closely at Helen's experience to understand how some of her new knowledge could have arisen:

1. Her experience of light might have been of physical light, but more likely in view of her blindness since the age of 19 months, she is describing a qualitative change and great enlargement of her consciousness. This change clearly implies that this new consciousness is at a higher level and therefore she has transcended the earlier level of a relatively simple animal awareness. She now experiences existence at a level *above* the previously established simple awareness of analog and digital codes. The experience of this transcendence means that possible further transcendence is possible.

2. She goes about learning many new names; she has a vocabulary explosion. In becoming a knower of names and probably learning that names can be given she becomes aware of her self as the name giver. That is, human self consciousness comes into existence with the naming or language insight. She understands there is a mapping between words, digital codes and things, analog codes and that she, her self, is the knower of words and the "mapper" between the two codes. By asking for names of her family members and continued interaction with Annie she shows she assumes other persons can be known and she shows the human drive to relate to others.

3 & 4. Helen discovers a doll she had broken before her dramatic insight. This ceramic doll she earlier had dashed on the floor in irritation with Annie Sullivan; at the time she was delighted when she felt the fragments of the broken doll at her feet. (Keller, 2003, p.26) After her language insight and now with a "self" she returned to their house where, as she entered, she remembered the doll she had broken. Helen picked up the pieces and vainly tried to put them together again. Her eyes filled with tears and she realized what she had

done and for the first time felt repentance and sorrow. (p.28). She knew she was responsible for what she had done. At this time Helen also had a loved old rag doll named Nancy but whether the new doll had a name we don't know. But her attempt to repair the broken doll and the frequent way that children understand dolls to be their babies or friends suggests that this event could have communicated the idea of death as well as guilt.

5. Her subsequent behavior that day is described as a series of joyful events. Such a sequence of present and then past moments combined with her earlier memory of the broken doll could have easily provided her first experience of past, present and anticipated future. That night she was looking forward to a tomorrow for the first time. Without such an understanding of time she previously could have had no notion of death. This was also true of the similar case of Laura Bridgman, Lamson, as discussed below.

In a book, 2013, by Thomas Suddendorf, *The Gap: The science of what separates us from other animals*, the author notes important human abilities that make for the large human- animal gap. He especially emphasizes the following: 1. moral life, right vs. wrong; 2.the ability to infer what others are thinking; 3. the ability to grasp time and to have thought about the future; and, of course,4. the use of language and the resulting expression of culture. Suddendorf's two summary principles describing the gap were also shown by Helen, namely: the interaction with her teacher and her request for family member's names showed a drive to link up with other humans and in her response to the broken doll she demonstrated her ability to reflect on a scenario involving her own behavior.

Furthermore, in support of Suddendorf it is significant that the core of Helen's change in consciousness was reflected in her new consciousness of such concepts as time and morality and that she was a namer. That is, she experienced a sudden new internal world of self consciousness that was far more significant than that which preceded her ability to communicate with others. This major characteristic of her new consciousness is in agreement with the recent thesis of Berwick & Chomsky (2016, Chapter 3) that the primary significance of human language was not rooted in communication, especially not in any earlier form of animal communication. Instead, they claim human language was primarily a new form of self-consciousness. In general, the present thesis agrees with their position but with one important distinction, namely the importance of internal analog codes in so far as they serve as referents for many words and the presence of many arbitrary digital codes. It was the *transcendence* of these two lower level codes that served as the basis of the qualitative new self-consciousness exhibited by Helen. Therefore the existence of our transcendence is a fundamental and intrinsic characteristic of true human consciousness. The philosopher Roger Scruton (2014) in a very different context identifies this quality of our consciousness as follows:

"Many philosophers have referred to the "mystery" of consciousness, as though consciousness were a peculiar feature of the world that cannot be reconciled with the ordinary assumptions of physics. But this is deeply misleading. If there is a mystery here, it does not lie in some peculiar stuff, or fact, or realm in the world of objects. The mystery, such as it is, arises from the privileged view of the subject, and lies on the horizon within which the {transcendent; my addition} world of the subject plays itself out. No attempt to pin down the subject to the world of objects will ever really succeed. You can extract from the person as many body parts as you will, but you will never find the place where he is, the place from which he addresses me and which I

in turn address." (p.71-72.) Scruton goes on to note; "I know that I am a single and unified subject of experience. This present thought, this pain, this hope, and this memory are features of *one* thing, and that thing is what I am. I know this on no basis, without having to carry out any kind of check, and, indeed, without the use of any criteria---this is what is (or ought to be) meant by the term "transcendental". The unity of self-consciousness "transcends" all argument since it is the premise without which argument makes no sense." (p. 72.)This is not to imply that all of a person's conscious experiences are integrated. For many people, perhaps all, there are centers of consciousness that are disconnected. But, each of these experiences of self-consciousness contains the experience of the person as a unity in the sense identified by Scruton. As a consequence, it is understood throughout this paper that the qualitative nature of human transcendence is impossible to truly simulate in any kind of artificial intelligence system.

It should be noted that there was another and earlier case before Helen Keller. It was somewhat less dramatic but it largely confirms the present interpretation of Keller. This is the case of Laura Bridgman (Lamson, 1890) who was also blind and deaf. Her case history occurred decades before that of Helen Keller. Laura's training began in 1837 when her parents left her at a special school in Boston at the age of seven. She had suffered from scarlet fever at age two and was left without sight, hearing or speech and almost no sense of smell or taste. Only touch remained unimpaired. (Gitter, 2001)At the beginning of her stay at her special school she worked mostly with her teacher Samuel Howe and a friend Lydia Drew. Here I quote from Gitter's thorough account with the internal quotes being taken from reports by Howe.

Although there was no single word that triggered Laura's understanding, she, too experienced a "eureka!" At first Howe had felt as if he were teaching "a very intelligent dog a variety of tricks": The poor child "sat in mute amazement, and patiently imitated everything her teacher did," but the process had seemed entirely meaningless and mechanical. Still he did not give up. Day after day, week after week, he and (Lydia) Drew kept Laura at work, arranging and rearranging letters and matching words to objects. … Then after two months, Laura suddenly made the connection. …All at once "the truth began to flash upon her---her intellect began to work---she perceived that here was a way by which she could herself make up a sign of anything that was in her own mind, and show it to another mind." (What I call the naming insight.) She was no longer a dog or a parrot….She had overcome the "great obstacle,"… (p.83) In both the Bridgman and Keller case their pre-language life is described as animal like.

The insights of Helen and Laura appear to also what Lonergan (1997a), p. 25) called the "Archimedes moment of insight"

Self Consciousness and Transcendence

In short, it is proposed here that with this insight Helen (and also Laura Bridgman.) experienced genuine human self-consciousness for the first time and that prior to that her mental life was that of an intelligent non-human primate. This insight about language and self-consciousness marks the most important difference between humans and other primates.

An early effect of this first experience of transcendence is found in children who respond to the world with wonder and awe. Helen Keller showed it dramatically. Almost everything is new,

special, fascinating and soon raises many questions, often very basic and profound ones. In time as a person grows older our experience becomes familiar and wonder and awe almost disappear. Instead from their now taken for granted transcendent position people begin to look down at the world focusing only on those aspects that are familiar and usually under control. They typically even lose the awareness of their transcendent position.

Many people do however, escape the ordinary familiar experience of self consciousness and become aware that a further transcendence is possible, one above their normal level of human self consciousness. In terms of Figure 1 they "look" up to a possible transcendence above them. The problem is that humans can experience only analog or digital codes and the realm above them cannot be clearly described or articulated. It is ineffable and people stumble about trying to explain what they experienced (Otto, 1958).

However, there are transcendent experiences that are a kind of awe in response to great beauty, truth, or goodness that have long been called in philosophy, the transcendentals; there are also mystical experiences ranging from Maslow's "peak experience" to specific religious experiences probably including near-death experiences. The existence of the first transcendence here called qualia 2, gives rise to the idea of a possible still higher transcendence, a qualia 3. This possibility becomes a fundamental, intrinsic characteristic of human consciousness and is maintained by hints of such a higher level of transcendence by the just mentioned experiences of awe, beauty, truth, mystical states etc.

Analog & Digital Codes

Later I will develop the case that Helen's remarkable experience can serve as a guide to the origin of human self consciousness for the human species. But before we get to the historica lorigin of human consciousness we will first spend some time understanding what are known as analog and digital codes and placing them in a useful context.

A code is anything that we can perceive that stands for or refers to some other thing. An analog code has some physical similarity or *analogy* to its referent. The degree of similarity can vary, but some similarity must exist. A common visual analog code of a person is a photograph of them. By looking at the photograph you can recognize its referent, assuming it is a "good" photo. The physical similarity of analog codes is most often visual or auditory but can in unusual cases involve other senses. Some Braille codes have touch similarities to their referents.

Thus analog codes are continuous and connected in space or time. A digital code, in contrast, is discrete and has no similarity to its referent. Indeed, in this sense digital codes are arbitrary. For example, in the US most people have a Social Security number that refers to them. This number has no physical similarity to the person to whom it refers. Your SS# gives no clue to your height, weight, sex, race or even if you are alive or dead. Likewise our credit card numbers, auto license number, etc. give no information about our physicality. Most digital codes are also part of a system that has rules for how the symbols are to be put in a correct sequence, such as the grammar and syntax rules of a language, rules of logic or mathematics, rules for a computer program, or very arbitrary rules for the way in which an organization or bureaucracy writes its orders, pays its bills, etc.

Analog and Digital Codes: Truly Different

Analog and digital codes are not just different they are different in a qualitative way, that is, they are incommensurate. *This qualitative difference means that the information or message present in each code cannot be communicated to a human being in the other code.* This is a very important distinction and needs some explanation. For example, take a digital message such as a mathematical proof or a legal argument written in English. A person cannot understand the proof or legal argument by looking at the image of it, that is, by just looking at the page on which it is written showing the physical properties of the message. The person must first know the language it is written in, and such languages are primarily digital.

Certain arbitrary visual shapes stand for referents not present in the message itself. You must know the meaning of the symbols used in mathematics or in English, the rules for sequencing symbols, and often even more of the digital code world on which the message is based. Even the above mentioned Social Security # cannot be understood by someone who does not know what the digits stand for. Children have to learn their numbers before doing arithmetic. We are all familiar with the failure to know a digital code with special digital symbols and rules for sequencing them. Foreign languages, many topics in mathematics, computer programs, etc. often let us experience our digital ignorance. As a simple example, when I first saw them as highway signs I didn't know what HOV or Hazmats referred to.

An analogous kind of failure also happens when digital codes try to communicate analog information. Of course, a photograph or picture can be put in a digital code as a sequence of digits and then transmitted to a new location. Television is a familiar example of this. But, as long as the photograph, say of your grandmother, is in digital form you cannot tell even if it is a photograph of a person much less of whom it might be. A digital string loses the important information in the spatial interactions of the different coded points, that is, which digits are above, below or even near each other. And further, the translation of the digits into shades of black, gray & white (much less into the many different colors) is not possible by normal inspection.

No, *for a digital coded analog to be understood by a human being it must be reconstituted in spatial form* on a screen or piece of paper, that is put back in an analog form, for you to recognize your grandmother. Likewise, a digital recording of music, now common, must be put back into analog sound waves so that the human ear and auditory brain can appreciate them. This is analogous to the TV image transmission followed by human recognition. The point remains however, that the two kinds of code provide unique information or knowledge that the other cannot. This principle is caught to some degree in the familiar claim that "A picture is worth a thousand words". And keep in mind that not all words are entirely digital since some words have analog properties such as sound symbolism or strong imagistic associations or strong emotional connections as in swear words.

Further Objective Differences between the Two Codes and the two Code Systems

Some reliable physical differences between analog and digital codes should be noted. (See Wilden, 1972 and Spence, 1973 for still very relevant treatments of these two types of codes.)Digital code symbols are discrete like numbers or letters of the alphabet while analog codes are commonly continuous often without clear boundaries such as photographs or drawings. In a movie although the edge of the screen often serves as a boundary or limit this usually is an implicit and very temporary limit that is left behind by the next image. In addition the viewers of a movie are often unaware of any boundary as they focus on the center of the scene thus leaving the boundary of the scene ambiguous. Analog codes when auditory are temporal but continuous and complex while digital codes are typically sequential, simple and discrete in character. Also analog codes have no way to represent zero or true negation or no. The analog can refuse or reject but it" cannot deny or negate." (Wilden, 1972, p. 58.)

Besides the particular code symbols or expressions each type of code has a *system* within which it functions. Digital systems have syntax or rules that determine if a given sequence is valid or not. As already noted, languages all have some kind of grammar or syntax governing correct usage. Likewise, mathematics and logic have rules for acceptable sequences. Organizations, for example, have rules for how customer orders and office payrolls are to be processed; journals have certain styles and formats that must be used by their authors and of course computer languages have very specific system requirements. If a violation of the rules occurs the system often comes to a complete halt; or, it continues, sometimes containing a very big error that can suddenly manifest itself.

The systems within which analog symbols operate are fewer, less precise and less clear, as is often the case with analog situations, but still present. Visual analog symbols must maintain continuity so that the spatial connectivity is maintained. Sounds such as music and the human voice have typical analog code properties and hence they must also maintain continuity or much of their meaning is lost.

Human Response to Analog and Digital Codes

The great majority of the time when we talk of analog and digital codes we will be referring to how they are processed and experienced by humans and not to their nature as external codes, or as objects. The experiential difference is well summarized as follows:

> The analog is pregnant with meaning whereas the digital domain of signification is, relatively speaking, somewhat barren. It is almost impossible to translate the rich semantics of the analog into any digital form for communication to another organism. This is true both of the most trivial sensations (biting your tongue, for example) and the most enviable situations (being in love). It is impossible to describe precisely such events except by recourse to unnamable common experience (a continuum). But this imprecision carries with it a fundamental and probably essential ambiguity: a clenched fist may communicate excitement, fear, anger, impeding assault, frustration, "Good

> morning", or revolutionary zeal. The digital on the other hand, because it is concerned with boundaries and because it depends upon arbitrary combination, has all the syntax to be precise and may be entirely unambiguous. Thus what the analog gains in semantics it loses in syntactic, and what the digital gains in syntactic it loses in semantics. (Wilden, p. 58)

The difference between the two codes, as noted above, sets up a necessary difference in the location in the human nervous system where they are processed. The reader may already know that these two code types are in a rough sense processed in the right (analog) and left (digital) brain hemispheres respectively. Apparently neurons that respond to spatial and continuous information need to be separated from neurons responding to discrete, sequential information. (Presumably this is also why analog and digital computing are always kept separate from each other and not mixed together.)

In general, for right handed people the preceding distinction means, as noted, the right and left hemispheres of the cortex. Left- handed people tend to be the reverse but not as reliably as their right-handed friends and relatives. *However, it is important to make clear that the distinction between analog and digital codes does not require a hemisphere distinction only that they are processed in different locations in the brain (nervous system).* We will, however often assume an equivalence between the analog/digital distinction and the right/left hemisphere distinction when valid and for editorial variation.

Over the last few decades a great deal of research in neuroscience and psychology has established that the two halves of the cortex typically specialize in quite different psychological processes. The basic distinction was identified in the late 1960's and early 1970's. (Gazzaniga, 1970; Gazzaniga & LeDoux, 1978; Sperry, 1966, 1968, 1982.)

With various complexities and partial exceptions the essential differences have continued to hold up. (Chelbus, Mikl, Brazdil, Pazourkova, Krupa & Rektor, 2007; Corballis, 2002; Hellige, 1998; McGilchrist, 2009; Springer & Deutsch, 1998: Vigneau, et al 2011.) Although, McGilchrist, 2009 interprets the hemisphere difference, based on new evidence, as rather different.

The left hemisphere is generally the verbal and the logical hemisphere, and because of our emphasis on language this hemisphere is often known as the "dominant" hemisphere. This hemisphere deals with much spoken and written language, mathematics, logic, analysis, and related tasks. The core of left hemisphere mental life seems to involve the manipulation of discreet symbols, especially sequences of such symbols. That is the left hemisphere codes reality in strings of clearly defined events occurring in time, with language being the major expression of this capacity. For example, especially in adults, word and face recognition are lateralized in the left and right hemispheres respectively. (Dundas, Plaut & Berhmann, 2013)

The right hemisphere specializes in a very different type of mental operation. It is this hemisphere which responds to spatial information. It codes faces, patterns, and images of all kinds. It is the hemisphere which responds to sensory reality in terms of continuous wholes, rather than distinct parts; thus, it is the sphere of synthesis rather than analysis. The right hemisphere is the locus of our imagistic dreams (Joseph, 1988) in particular, sexual dreams (Bakan, 1976; also Springer & Deutsch, 1998; Davidson & Schwartz, 1977; Klein & Armitage,

1979).

The right hemisphere is the hemisphere of most emotion, especially negative emotion and of intuitive judgments about people and events. For example, Prete, Fabri, Foschi, Branucci & Tommasi, (2015) report that the unpleasant experience of musical dissonance occurs in the right hemisphere while the more pleasant consonance is a left hemisphere experience. (Porges, 2011, pp.138-140 for music and the hemispheres summary.)There is also therefore reason to believe that such activities as our ordinary response to music, sports, dance, and so on, which involve continuous, almost unconscious response to auditory, visual, spatial and kinesthetic information are also concentrated in the right hemisphere.

A recent and most stimulating right and left hemisphere interpretation of the development of modern culture that argues for the modern West as increasingly dominated by the left hemisphere is presented by Iain McGilchrist (2009), a psychiatrist with research experience in neuroimaging.(For an early example of this kind of thinking applied to the development of modernist art, see Vitz, 1988.)

McGilchrist's (2009) work thoroughly justifies the hemisphere distinction and its relevance to human culture. For the present it is important to note that here the primary distinction is between analog and digital codes, with the presumption that they are primarily processed in the right and left hemispheres respectively. McGilchrist focuses most on Western history of the last several centuries while in contrast the remainder of the present paper focuses on the very early history of the human race.

Continuing our description of the right hemisphere/analog code mental life we note that visual-spatial experience requires heterogeneity; in fact, it requires the presence of contradiction and differences in order for vision even to occur. The basic "logic" of such parallel and oppositional systems is roughly, "the more differences, the more contradictions, the better." Experiments with homogeneous visual fields and with images fixed on the retina make the same point, namely, that a visually constant field soon becomes visually nonexistent due to habituation. It is well known that our sensory and perceptual systems are primed to respond to change, especially sudden change.

Moreover, the emphasis of the right hemisphere on continuous visual experience, on the many different shades of color, and so on, means that discrete, arbitrary categories do intrinsic violence to the natural complexity of vision, indeed of all analog experience. In short, analog codes appear to be designed to respond to the facts of empirical differences and empirical contradictions. For example, many perceptual elements identified in the visual system often function in opposition to each other. Contradictions are the essence of such analog perception. (Examples are the sensory and perceptual systems involved in black-white, red-green, blue-yellow, and vertical-horizontal perception.) Such experience, close to sensory reality, is the farthest thing from the arbitrary discrete categories and systems of the digital mentality.

Our auditory experience also has hemisphere effects. The left ear which is more strongly connected to the right brain responds to non-verbal environmental sounds while the right ear which is more strongly connected to the left hemisphere is more sensitive to words or word like

sounds (Gonzalez & McLennan, 2009; Tervaniemi & Hugdahl, 2003). Ordinary response to music is mostly a right hemisphere activity (Joseph, 1988) but trained musicians seem to have more left hemisphere involvement. (Gates & Bradshaw, 1977.) However, important aspects of music seems to involve complex left and right interactions Brown, Martinez & Parsons, 2006; Prete, Fabri, Foschi, Brancucci &Tommasi, 2015. Music when we our hearing it, of course, has some similarity to speech with its sequence of notes; the left hemisphere component gets even more important if a person can read music.

Furthermore, analog experience is saturated with both affective and immediately perceived meaning. Thus, as noted, most emotional experience, especially of elementary and negative emotions is centered in the right hemisphere. All perceptual experience is connected to every other experience happening at the same time. It is well known that simultaneity and spatial contiguity are all that is needed for the immediate impression of causality. Right hemisphere experience, that is, analog experience, as Wilden (p.58) commented has intrinsic meaning: there is no absurdity, no existential angst or cool, skeptical rationality; instead, extreme analog types of people revel in an abundance of meanings. No one ever complained that a dream or drug experience was without meaning at the time of the experience. Superstitious and occult beliefs are the typical representatives of a right hemisphere unseasoned by digital rationalism--and doubts.

Some Qualifications

To the preceding general picture of hemispheric specialization must be added important qualifications. Indeed--and this should not be too surprising--as the number of studies increases and as the questions asked get more varied, the specific evidence gets much more complex. As new studies continue to come out, one can expect the original simple cortical dichotomy to become something of a "yes, but" dichotomy. Here I will only describe some of the more recent qualifications and complications.

There is evidence that the right brain does have limited verbal capacity. Simple nouns are capable of being understood by the right side; it can also demonstrate word association. However, it is clearly greatly inferior in these capacities to the left brain; and it cannot produce normal speech of any kind (Searlman, 1977). A qualification to this claim is that the words of some songs and swear words are under right hemisphere control. That is, some very emotional language, probably learned early in life, is found in the right hemisphere (Bowers & Pleydell-Pearce, 2011; Gott, 1973; Smith, 1966).

Moreover, many tasks which were originally thought to be simple right or left brain tasks now are understood to involve various sub-activities, some of which take place in each hemisphere. For example, reading is primarily a left brain task, but of course, the pattern recognition involved in seeing and identifying letters has right hemisphere components to it. Indeed, all digital codes are first recognized as part of external reality with some kind of initial or low level analog processing since even the digits are, like letters, simple spatial forms. But because of their discrete, sequential character and absence of any analog meaning they are sent to the left hemisphere for further processing. Something similar is presumed to happen with human speech.

In short, it is no longer feasible to think in terms of an overly simple right-brain/left-brain dichotomy for most normal mental tasks. Instead, both hemispheres are involved at some level of processing for our mental activities. (McGilchrist, 2009, p.1.) Nevertheless, as noted earlier I assume analog and digital codes are *usually primarily* processed in right and left hemispheres respectively.

It is also important to point out that the analog/digital code difference, as noted, clearly implies underlying neurological processing differences. (For anatomical differences between the right and left hemispheres see Galaburda, 1995). Since these two types of codes are qualitatively different at the level of psychological experience, it is plausible to assume that their processing and storage should be differentiated neurologically as well. A simple such difference would be one of location and in the present case, as in the right and left hemispheres, but in some instances the separation might involve different areas within the same hemisphere. Nor would it be surprising if the neuronal functions underlying analog and digital symbols should be different. For example, what are called analog symbols, as already noted; involve continuous processing while discrete processes presumably underlie digital mental life. There is recent evidence supporting these suppositions in Mochizuki & Shinomoto, (2014) who explicitly use the terms analog and digital to express the difference. In addition, the neurotransmitters that serve these two processes may be different. See Oke, Keller, Mefford, and Adams, 1978, who report a left-right hemisphere difference in the concentration of norepinephrine. There is also evidence published by Kurup, 2003, supporting the claim that the right hemisphere chemical dominance is linked to creativity.

Two Kinds of Consciousness?

A number of writers have proposed that the two hemispheres are each centers of a qualitatively distinct kind of consciousness. This idea, however popular some years ago, is incorrect or, depending on how it is described, an oversimplification. Essentially we have only one kind of consciousness but what it attends to can vary greatly. Our consciousness might focus on digital codes when writing a legal brief or purchase order but later focus on analog experience while playing tennis or practicing dance.

Patients-who have had the neural link between the two hemispheres, the corpus callosum, surgically cut--do not report having two kinds of consciousness. Furthermore since most everyday activities involve, as mentioned above, both right and left hemisphere processes an integrated type of consciousness experience should be the typical experience.

Nevertheless, there is an aspect of truth in the notion of two types of consciousness. Most of us are aware that our mental state is quite different when we are engaged in certain activities. For example, many sporting activities such as golf, sailing, and mountain climbing, especially when the involvement is intense, induce a mental state very different from normal consciousness. There is a kind of total involvement in the sensory and perceptual world that results in the suspending of what can be called "self-consciousness." (Dreams are also much like this.) These strong right hemisphere activities involve an intense absorption that can be most gratifying, not just because of the pleasure of the activity but also because self-consciousness with its anxieties

about the future and self-presentation has been suspended. There is also evidence that emotional experience is somewhat lateralized with the left hemisphere being somewhat associated with optimistic emotion and the right with most other emotions especially when negative and pessimistic. (Sackheim, Greenberg, Weiman, Gur, Hungerbuhler & Geswind, 1982; Davidson, 1995; Porges, 2011.)

In short, there is reason to believe that at times there is a clearly experienced distinction between the two brain mentalities as associated with emersion in either analog or digital codes. However, this difference in experience is the result of what our consciousness is attending to and not a qualitatively different state of human consciousness.

Gazzaniga & LeDoux (1978) articulate this position clearly when they write that in general, "the cerebral hemispheres in man do not oppose each other but instead work together to maintain the integrity of mental functioning" (p. 72). Also note that one of the important functions of the corpus callosum is to bring sensory and perceptual experience occurring on one side of the body to the other side. The left hand literally needs to know what the right hand is doing. Thus integration is mostly what is going on. More recently some of this complex interaction is identified by Pinel & Dehaene, (2010).

A significant qualification to this is proposed by McGilchrist, (2009, p.18). He emphasizes that another important function of the corpus callosum is to inhibit the other hemisphere, though transfer of information is also important. He noted that in the corpus callosum many of the neurons and other neural structures are inhibitory and that some neuroscientists have suggested that the whole point of the corpus callosum is to allow one hemisphere to inhibit the other. Inhibitory processing is part of its function but the corpus callosum seems primarily to serve an excitatory function. (Bloom & Hynd, 2005).

There is reason to believe that this ordinary, integrated consciousness has a self-conscious quality derived from spoken language and probably based on, or expressed through, left hemisphere processes. That is, language appears to be the integrating and central experience for most human self consciousness. Thus, right hemisphere mental life is integrated into consciousness primarily through language. However, self-recognition and much of our basic identity depends upon the analog experience of our body, how we look and sound to our self, and the integrated experience of our emotions. (McGilchrist, 2009, 88-90; Schore, 2003)

The major right hemisphere component of spoken language is presumably what is known as "tone', the emotional state of the speaker that goes along with the communicated information. This tone is very important, of course, as in some instances it can completely change the information communicated. This is especially so when the tone has a sarcastic quality. For example, "Yah, Yah" can often mean "no, no". The expression "self-consciousness" is more appropriate to describe mental life focused on informed by left hemisphere/digital experience, and "human awareness" to describe the experience of pure right hemisphere mental life focused on sensory and perceptual experience and often emotionally loaded.

Self Consciousness and Language

The present model proposes that the essential insight for language was the naming insight and that with it came the first experience of the self. This is exemplified in the case of Helen Keller. This means that prior to this insight in the preceding animal like state there was not conscious experience of a self. However, this does not mean that the self or me or I was the result of language and its syntactical rules. Bermudez (1998) has shown that the first person pronouns of the self cannot be derived from linguistic mastery. Instead he shows that self-conscious thought requires using pre-linguistic body based experiences of things. Such experiences are what are called analog in the present context and the naming insight which is the beginning of language requires that a digital code for the self be linked to already existing analog code(s). In support of this interpretation is the neuroscientist Allan Schore (2003) who writes "The core of the self is thus non-verbal and unconscious, and it lies in patterns of affect regulation" (pp. 21-22) and that it develops in right hemisphere analog experience focused on the mother and her emotions. The two different ways of human responding to analog and digital codes are summarized in Table 1. Keep in mind, however, in reality there are many mixtures of analog and digital.

Typical Analog Experiences	Typical Digital Experiences
Continuous	Discrete
Spatial	Sequential
Image	Word
Holistic focus	Part focus
Synthetic	Analytic
Concrete	Abstract
Metaphoric meaning	Literal meaning
Spatial as in performing	Sequential as in writing
Sport, dance, hunting	Math proof, legal brief, definitions
Imaginative	Logical
Parallel processing	Serial processing
Implicit	Explicit
Intuitive and instinctual	Rational
Timeless	Timeline
Subjective	Objective
Simultaneity	Before & after
Empirical observation	Theoretical prediction
Meaning: natural & strong	Meaning: arbitrary & weak
Strongly emotional, negative	Weakly emotional, positive

Table 1.Typical differences between analog and digital code experiences for humans

A Proposed Historical & Developmental Sequence for Human Self-Consciousness

Stage 1: Approximately 70,000 years ago to approximately 40,000 years ago. (In individual humanlife there is an analogous time from birth up to just before the experience and development of true language, for example from birth to around two years of age.)

Prior to Stage 1 the brain of intelligent primates slowly gets larger. (However, Klein and Edgar, 2002, p.91, propose that this process involved sudden spurts more like what evolutionary scientists call a punctuated equilibrium.)Keep in mind that though these early humans had the biological potential for human language, it is proposed that they had not yet learned to utilize it.

Then roughly 50 to 60,000 years ago only one or possibly a pair of very intelligent primates with a new kind of brain arises very likely in northeast Africa. These primates are human in the biological sense but do not yet have the ability to express true human language, human cultural activities or to fully experience human moral and ethical understanding. This is similar to a human infant who at birth has not yet developed the latent but distinctive human capacities of language and the moral life. These especially intelligent early humans grow in number and are generally successful. Also, as with young children up to roughly 2 years of age, they showed interest in and made simple geometric shapes as found in the very earliest cave and stone markings. Also like young children, these pre-full language humans enjoyed collecting small, bright or interesting objects as in the early evidence of human made beads.

As such, the occurrence of the first human is an "ontological leap" that will express itself psychologically and culturally somewhat later in the "language insight". This intellectual development is described below. That the neurological potential for language, suddenly emerged at about this time, is quite consistent with the important thesis of Klein and Edgar (2002, pp. 270-272). However, keep in mind that though these early humans had the biological potential for human language, it is assumed here that some time, presumably several thousand years, was needed before these pre-language humans learned to truly utilize it.

Explicitly what is being proposed here is: 1. A psychological identification and description of the analog and digital code-based nature for the full understanding of language and the simultaneous occurrence of human self –consciousness. This is the language insight described with Helen Keller. 2. A developmental interpretation of how this capacity for language in the early history of humanity took place based on an analogy to human language development in the modern child. This is described below.

One of the first important capacities that must precede any language insight is the ability to share intentions with others. Social communication in order to coordinate actions of any complexity requires such shared intentions. In human infants this capacity has been observed at 12 months and may develop by nine months, in short, before genuine language. Intentionality is usually first indicated by pointing with the hand/finger and by eye/head direction. Research showing this by 12 months of age includes that by BehneT., Carpenter, M. &Tomasello, M. 2005; Tomasello, M. Carpenter, M. Call, J. Behne, T. & Moll, H. 2005; Tomasello, M. & Haberl, K. 2003.Thus, by 12 months a new element enters into the infant's repertoire. Previous interactions had been dyadic, that is, the infant related to a person, typically the mother, or sometimes to an object. But now a

triadic interaction becomes possible, that is, the infant can look at an object that the mother is looking at and then relate to the mother with respect to the object. The mother and infant can jointly attend to an object. As Jerome Bruner (1977) noted:

> What has been mastered at this first stage is a *procedure* for homing in on the attentional locus of another. It is a disclosure and discovery routine and not a naming procedure. …It has, moreover, equipped the child with a technique for transcending egocentrism, for insofar as he can appreciate another's line of regard and decipher their marking intentions, he has plainly achieved a basis for what Piaget has called decentration, using a coordinate system for the world other than the one of which he is the center. (p. 276)

In other words, the infant is capable of joint visual attention with its mother. Again we see, before the development of language per se, the beginning of social interaction involving the coordinated communication between two selves. But, this foundational communication is not yet true language.

The claim that intentional communication is absent in the great apes and of its relevance to early human development has been well articulated by Michael Tomasello (2014). The present interpretation is that this development of cooperative intentionality is unique to humans, that it preceded the language insight and was a necessary precursor for language to emerge.

In addition, during this period of approximately50,000 years ago, these very early humans also began to develop an extensive list of both analog and digital codes each located in different brain areas, e.g. right and left hemispheres. The analog codes are sensations and perceptions but might include some percepts that are slightly less specific and somewhat more abstract, such as simplified faces, or sun shapes or circles, tree or even vertical line shapes, or slight simplifications of certain sounds made by babies, children, adults or significant animals or birds. These analog codes in the brain have an analog neural representation similar to the external physical stimulus. For example, a loud sound has greater amplitude to its neural response than a soft sound. Shapes of objects apparently have internal analog neural characteristics (Behrmann, 2000; Kosslyn, et al. 1997; Shepard & Cooper,, 1982). Digital codes are presumed to create no internal analog neural similarities to what they refer to.

Also, I assume these early pre-language humans developed many digital codes which were primarily primitive vocalizations. These vocalizations or communications like sophisticated monkey vocalizations became associated with certain external conditions like, a snake, or a new and dangerous primate, or with a friendly member of the group. Although some of these vocalizations might have begun with an analog character involving a kind of sound symbolism, they would easily morph into arbitrary sounds. For example, a large often grunting group member could be associated with a short form of his habitual sound of frequent grunting, e.g. "ugh". The group would vocalize "ugh" when seeing him. As Ugh grew older perhaps his ugh would disappear and with it the sound symbolism would go and the vocalization would become an arbitrary digital code for him, especially for the young group members who were born after he stopped uttering "ugh".

This kind of process is described in some detail by Derek Bickerton (2014) who calls it "displacement". Bickerton like most theorists conceptualizes human language as qualitatively different from animal communication. For example, Bikerton proposes that by imitating a

hunted animal's sound, such as the trumpeting of a mammoth, an early man could get others to follow him to where he had already spotted the creature. There the small group of early humans could kill it. Over time, like the man described above called "ugh", the initial imitative sound would be de-contextualized and become an arbitrary digital sound much like a word. This process is what Bickerton means by 'displacement" and what I call the development of arbitrary digital sounds.

Such vocalizations change quickly and would build up into a list of paired sound-image or sound-object associations. *This condition would be analogous to the state Helen Keller was in just before her language insight when her mental life was that of a very bright human primate but without human consciousness.* The Bickerton theory is not enough for the formation of language according to the present theory but, it would be an important period of preparation immediately prior to true language.

McGilchrist (2009, pp10-106) has a remarkable interpretation of sophisticated communication by intelligent social animals that may have been found in human primates before the proposed language insight. This sophisticated communication, according to McGilchrist, was something like music and involved a 'language' or signaling by pitch, intonation and temporal relation.(And presumably loudness.) He cites the language of an extant primitive tribe in the Amazon basin; perhaps African click languages might also be relevant to his interpretation.

Stage 2: Approximately 40-30,000 years ago – the language insight. In individual human life there is an analogous time when the child begins to show clear language mastery often with a great spurt in vocabulary and competence.

Archeologists, anthropologists, and other scientists have identified a period beginning about 30,000 -40,000 years ago when human culture suddenly shows up in the physical record. From then on we find simple artifacts, cave designs and marks, and finally beautiful and sophisticated drawings of animals, that identify primates of what can be rightly called a human character. Caves existed long before then but apparently there were no humans mentally developed enough to have reasons to draw on caves or other surfaces. This time period is posited as starting roughly 30,000 years ago by John Pfeiffer (1982) in his description of that time and the millennia after it as "The Creative Explosion" of humanity.

Others now suggest a beginning as early as 40-50,000 years ago. The anthropologists Cochran and Harpending (2009) generally agree with this and place this "Big Bang" in the upper Paleolithic and they write that "the most popular and attractive hypothesis is that modern humans had developed advanced language capabilities…"(p. 26). What these capabilities were is the thesis developed here. They also quote the Stanford anthropologist Richard Klein who states that the change shown by humans in this period "signals the most fundamental change in human behavior that the archeological record may ever reveal…" (1999, p. 524.)

The French scholar Henri-Jean Martin (1994) very admirably presents this very early human history.

> Finally, after 35,000 B. C. came Cro-Magnon man who ushered in Homo sapiens sapiens, which is what we are. … At this point history accelerates. (p.1). … What should instead be emphasized is the acceleration that preceded the dawn of historic time. There

> is increasing evidence that in the Upper Paleolithic man conquered the means for speculative thought. Somewhat earlier than 50,000 B. C., for example, he began to bury his dead—a first indication that he now situated himself in a greater time span and a first sure manifestation of a preoccupation of a religious nature. …he began to make decorative objects, to sculpt stones, bones, or wood with the aid of flint, to scrape ocher and manganese to make coloring agents, … From about 50,000 to 30,000 B. C. he limited his efforts to incising more or less regular series of lines, dots or hatch marks. Beginning between 35,000 and 25,000 B. C. he practiced a figurative art still limited to parts of the body….. Only very gradually did these figures come to be organized into the realism that we see in the great monuments of cave painting: Lascaux is no older than 15,000 B. C.; Altamira and Niaux date only from 13,000 to 8,000 B. C. (p.3).

As an explanation, I suggest that at roughly this time 40-30,000 years ago, someone, a real individual or perhaps a pair, or perhaps some small group of these still very early human primates, experienced the language insight.

This proposal means that about 30-40,000 years ago the naming insight arouse quite suddenly and with it the start of human consciousness, language and thus human culture. The creative explosion has occurred. (Klein & Edgar, 2002; Pfeiffer, 1982.)Here we treat the experience of Helen Keller mostly, but not completely, as a model of that event in human primordial history. Although, for example, biological death existed before this time, the previous human primates, like Helen, didn't *know* death existed until they experienced the naming/language insight as exemplified by her report.

Thus, death came into "existence" only when humans through language became self conscious of it. Biological death, of course, existed before this but like other higher animals the pre-language humans did not "know" death existed.(Again, for the same ignorance of death in the case of Laura Bridgman see Lamson, 1890, xix.) The first sophisticated burials of the dead, especially those suggesting an after-life, by humans might be a good index of when the naming/language insight first occurred.

This understanding of language beginning with the naming insight would, of course, spread rapidly from its first discovery to all other members of the human primate group with the same brain capacity and would give them a huge competitive advantage compared to all other primates and animals. The complexity of this new human consciousness would take some time to develop in the social and cultural sense. The sudden and almost complete new consciousness experienced by Helen is probably not the best model of what happened in human pre-history since Helen could ask for the already pre-existing names of people, objects, etc. Early humans had to invent new names and basic concepts and these presumably would be invented over the years from around 40,000 B.C. to the present.

More on Human Consciousness

There are of course existing theories or interpretations of humanity's unique consciousness. Perhaps the earliest modern example is that of Julian Jaynes (1976, 1990) with the claim that our consciousness arose primarily in the *breakdown* of the bicameral mind. This theory does focus on the right and left hemispheres but on the breakdown of communication between them, often of a cataclysmic nature. In addition, Jaynes argues for the relatively recent emergence of human consciousness using examples from the literature and history of the Greek, Egyptian, Mesopotamian and Hebrew cultures.

In response to Jaynes, I accept, with many others, that human consciousness began much further back in human history and is linked to the cultural explosion that occurred roughly 30-40,000 years ago. More importantly I propose that it was the *integration* of the two hemispheres, or better still the *transcendent integration* of analog and digital representations of reality that enabled human consciousness. However, I am willing to assume that in many respects this integration did not take place completely when it began and consciousness may have had a long and often difficult history as the integration developed to higher and higher levels of sophistication. Perhaps many of the fascinating examples and interpretations of Jaynes can be reinterpreted as difficulties on a long road to fuller integration after a much earlier irruption of human self-consciousness. My view is also similar to that of McGilchrist,(2009, p.260-262).

In relation to the present model of consciousness the two hemispheres with their analog and digital codes had to be kept separate in order to be transcended. Transcending is not simply merging and probably required both inhibition, for separation and excitation, for connection.

Furthermore, the work of scientists like Terrence Deacon (1997) might also bear on how the brain itself evolved after the original conscious insight that gave rise to elementary language. That is, Deacon presents a case that human consciousness became increasingly complex as the brain and what I would call pre-language abilities and language co-evolved both before and *after* around 40,000 years ago.

One other important point: The present model presents a case for *when* human consciousness took place and for *what* happened when it took place, but it is not a model of *how* it took place. I do not think that the large gap between the subjective and the objective is any closer to being understood with the present model. (See Levine, 1993.)I accept the position of Dietrich & Hardcastle, (2004), that "Consciousness is utterly strange." (p.6). The intrinsic intractability of this gap or problem is identified convincingly by Thomas Nagel (1974, 1979, 2012). Others who support such a position are McDowell, (1994); Searle, (1992) or seem to, are McGinn, (1999); Fodor, (1994).(See also Deitrich & Hardcastle for their logic of why subjective and objective cannot be reduced to each other.)

The present model's identification of the qualitative difference between animal awareness and physical stimulation qualia 1; and more especially my emphasis on the qualitative difference between animal awareness and human self consciousness qualia 2, make clear that what causes these new qualitative states to arise is not addressed here. This question of cause is even more an issue for my proposed qualia 3. Perhaps qualia 1 might be simulated in artificial intelligence (AI) but it is assumed here that AI cannot simulate either qualia 2 or 3 because they are assumed to be

non-material, that is, experience that can occur without being mediated by the brain or other matter. (For a conceptual understanding of a transphysical interpretation of human self-consciousnes see Spitzer, 2015.)

Dietrich & Hardcastle, (2004, chapters 2&3), argue that a materialist or naturalist scientific explanation of how consciousness really works is not possible. However, if I understand them correctly, they also argue that those who claim consciousness is beyond any sort of theory, (pp. 84-87), are also mistaken. They claim that aspects of human consciousness can be discovered that will lead to a greater understanding of consciousness even if its cause and an acceptable scientific explanation will always remain unknown. The present interpretation of consciousness is offered as evidence to support their proposed mixed position, keeping in mind that fundamentally qualia 1, 2 and 3 remain mysterious and that humans are always in one of these states.

More on Transcendence

As described by ***transcending*** both analog and digital codes we arrive at true human self consciousness. This unique perspective I have termed "The Center of Human Consciousness". Most of the time humans are "looking down", that is, attending to analog and digital coded sensory experience, language, cognitions, memories, etc. Sometimes they focus almost exclusively on analog experience, e.g. playing tennis; sometimes almost only on digital experience, writing a law brief or computer program. Sometimes they focus on interior mental experience of these two types. Usually the person moves back and forth between both modes and is integrating both. In speaking, for example, we use both informative words and emotional tone, hence both modalities. When looking down at the world via our analog and digital codes of the world, humans are usually unaware they are doing so. But, even then we are in a transcendent conscious relationship to that world. We are normally outside and above our experience, even when we construct a closed system we are above and outside the system constructed.

Sometimes, however, the person starts "looking up" at the unknown and mysterious transcendent level above human consciousness itself. This "looking up" can be triggered by, as already noted, different experiences that imply transcendence, such as: awe or beauty in nature or music, or in experiencing truth in mathematics, or in experiencing goodness or love in others or in responding to narratives in great literature or cinema or in mystical experience. Abraham Heschel (1959/1997) characterizes this situation as follows, "To the modern man everything seems calculable; everything reducible to a figure. He has supreme faith in statistics and abhors the idea of mystery. Obstinately he ignores the fact that we are all surrounded by things which we apprehend but cannot comprehend; that even reason is a mystery to itself." (p.37). Heschel also notes that we lose our capacity for transcendence and understanding the Divine when we take things for granted (p.40). He continues "Everything hints at something that transcends it." (p.46); "Awe is an intuition for the dignity of all things… Awe is a sense for the transcendence…" (p. 52).

The experience of transcending human consciousness is often indescribable because humans have only analog and digital codes to understand experience and in many transcendent experiences humans leave these two codes behind and enter what has been called a cloud of

unknowing. It is mysterious and ineffable. Just as humans transcended simple animal awareness, *qualia* 1, to arrive at their unique human self consciousness,*qualia*2,so from this experience, many seek another transcendence: *qualia 3.*At its highest level this experience, e.g. a qualia 3c or 3d, has no way to be adequately comprehended with word or image. Presumably there are, however, somewhat lower levels of this transcendence such as 3a or 3b that do involve word and images and involve at least, moderate levels of understanding as reported in certain Near Death Experiences (NDE) as presented by Spitzer (2015).

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