

# ***The Mindscape of Human Thought***

By Jerry Clemens

The human brain is a mystery beyond its own grasp, weighing three pounds of spongy gray mass, consisting of 100 billion cells; it is the very source of our own amazement. It has allowed humans to dominate all other species, walk on the moon, and compose masterpieces of literature, art and music. Our brains have the power to forge insight and shape talents into surprising ways. The brain is the architecture of our experience, the mindscape of human thought that marks our ability to create, the founder of every invention, every poem, symphony, painter, weapon and regret. This single organ controls all body activities, ranging from sexual function and heart rate to emotion and learning. It is the tool that enables us to teach and our students to learn.

One of the most amazing attributes the brain has is the ability to freeze experiences in time, a synopsis of where memories are stored, where you parked your car this morning, where your next appointment is, the smell of honeysuckle that can take you back to your grandmother's house. Memory is one of the attributes that makes us human, gives each of us a past record of who we are, and builds on our experiences to share our knowledge. That knowledge has been shared over time ever since humans began to wonder, long before Shakespeare stated "This is what dreams are made of."

In seeking to understand itself, the human brain has sought first to understand the world in which it exists. Prior to 1500 most scientific framework rested upon two authorities, Aristotle and the church. Prediction and control were the foundations of our existence. Between 1500 and 1600 there was a dramatic shift in the way people pictured the world in which they lived, the whole way of thinking. Thought was based upon faith and reason as opposed to prediction and control. Faith in a creator and reason would enable our minds to understand its meaning and significance.

Between 1600 and 1700 the belief of a spiritual universe gave way to the view of the majority that mind is a machine, a theory molded by people such as Newton and Galileo. Humans were no longer the center of God's creation; Earth was no longer the center of the universe. Two opposing camps were adapted to the approach of physiology of the mind and body. On one side were the "iatrochemists", those scientists who believed that physiological functions could be explained in chemical terms. On the other side were the "iatromechanists", who followed the approach that mechanical principles were the basis of all bodily functions. (Capra, 1982, p. 106) Claude Bernard, a celebrated physician considered the founder of human physiology saw the living organism as: "a machine which necessarily works by virtue of the physico-chemical properties of its constituent elements." (Capra, 1982, p. 111) Sir Francis Bacon saw the purpose of science as so closely associated with the notion that its purpose is to secure power over nature: "human knowledge and power meet as one." (Medawar, 1984, p39).

The Newtonian view of the world and the mind was soon abandoned by scientists. The machine that had emerged fully constructed by the hands if it's

Creator was soon replaced with an evolving and ever changing system. Jean Baptiste Lamarck believed animals could undergo changes with environmental pressure and passed them to their offspring. This discovery sparked biology's major contribution to the history of ideas in the nineteenth century, the theory of evolution. Charles Darwin was influenced by Lamarck's findings; however, Darwin's theory was of competitive struggle, the concept of chance variation among individuals, later to be called random mutation, and the idea of random selection through survival of the fittest. Published in 1859, his monumental "Origin of Species" was incomplete until twelve years later with "The Decent of Man" in which the concept of evolutionary transformation of one species into another was extended to include human beings. Darwin's ideas about human nature were strongly colored by the patriarchal bias of his time; he saw the typical male as strong, brave and intelligent, whereas the female was passive, weak in body, and deficient in brains. (Darwin, 1882, p. 565)

Darwin and colleagues of his time would have been astonished by recent discoveries in the study of the male and female brain. Anne Moir (1991) claims that females may have more brain faculties than men. The right hemisphere of the brain is known to deal with our emotions, visual and spatial ability, and abstract thought. Our left brain is in charge of practical orderly sequencing, delicate movements of the body, and language. Moir studied how female children seem to comprehend language at a faster rate than male children. Correlating these discoveries with studies into left brain stroke victims may have proved her hypothesis. Males who suffer left brain strokes cannot relearn language skills, whereas females who suffered the same stroke could be re-taught language. Moir concludes that females have brain cells that control language in the right hemisphere of the brain as well as the left. (Moir, 1991).

The view that the human body is seen as a fixed mechanism was converted to Darwin's view as one organism changing and evolving just as species of plants and animals in nature evolve. Darwin's findings, however, were not well accepted and often misinterpreted. Darwin's research suggested that not all races of humans were as fully evolved as others, suggesting that some brains are more capable of reason than others. (Tozer, 1993). Scientists were interpreting Darwin's theories to the extent that arguments were made regarding genetic inferiority. Many believed that with the onset of massive immigration a clash of cultures would produce mentally deficient offspring, a society of illiterates.

Darwin's theory that humans descended from a lower order of species, had characteristics of animals and originally had a smaller primitive brain, was not widely accepted for another fifty years, specifically among public schools. On May 25, 1925 biology teacher John Scopes was indicted on the charge having taught Darwin's theory of evolution to his science class, violating a new law banning teaching of evolution in schools in Tennessee. The indictment charged that Scopes "did teach thereof that man has descended from a lower order of animals." Scopes was found guilty and charged a \$100 fine after perennial presidential candidate William Jennings Bryan took the witness stand and

espoused the Biblical account of creation. A retrial was denied by the U.S. Supreme Court in January, 1927. (Daniel, 1987).

In the late 1800's scientists began to probe further into the study of the brain. In 1885, Hermann Ebbinghaus published what was considered the first experimental research and investigation of human memory. Using himself as his subject he taught himself nonsense syllables and non-vowel-consonant trigrams such as DAX, BUP, and LOC. He learned lists of 13 syllables to the point of enabling himself to repeat the lists twice in order without mistake. At various delays, he retested his retention, and then counted the amount of time it took to relearn the lists. It took 1156 seconds to learn the list the first time and 467 seconds for the second time. (Anderson, 1990). Other researchers began to use the results of Ebbinghaus to produce a variety of techniques and measures to study the memory feature of the human brain. Further efforts into understanding the human brain were led by Sigmund Freud in his study of hypnotism to retrieve subconscious memories in chronically depressed patients in 1885, initiating his development of psychoanalysis of the brain. In 1900 he began to interpret dreams and declared they were hidden symbols revealing the unconscious mind.

In the early 1900's there were tremendous advancements in science, however, there was a fear that our growth of intelligence was accelerating out of control. Before 1940 nearly everyone seemed to think that science was ultimately beneficial, although a few (such as Aldous Huxley who wrote *Brave New World* in 1932) were concerned. Many people were no longer sure that science would ultimately benefit mankind. A growing number worried that our brains have unleashed scientific creations that could not be harnessed and would eventually destroy us, an awareness of a possibility our intelligence could be our demise. Among scientists in the 1940's there was considerable horror at what they had developed with nuclear energy. It was apparent that nuclear weapons could destroy all life on Earth and some scientists formed the Union of Concerned Scientists to work against the misuse of nuclear energy. (Capra, 1982). But it was not only nuclear energy that was perceived as dangerous, some people worried that space travel was affecting the weather, others thought that genetic engineering would accidentally loose plagues upon the Earth.

Rachel Carson's epic book "*Silent Spring*" published bold evidence of the chemical destruction of our world that could destroy us, all from our attempt to control insects with the pesticide chemical DDT (Dichloro diphenyl trichloroethene). "The 'control of nature' is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man. The concepts and practices of applied entomology for the most part date from that Stone Age of science. It is our alarming misfortune that so primitive a science has armed itself with the most modern and terrible weapons, and that in turning them against the insects it has also turned them against the Earth." (Carson, 1962, P.297). Rachel Carson's study launched an environmental movement that spurred revolutionary changes in government thinking toward the environment, toward the protection of our species by focusing on how our intelligence can affect our future.

The journey of the brain throughout the centuries has taught us that every voyage begins as a voyage of the mind. These dreams of voyages became reality when Russia launched the first artificial satellite, Sputnik into orbit in 1957. What followed was the dream come true for Russia's Yuri Gagarin in his first manned orbit of the Earth. These voyages sparked a competitive race to improve intelligence among American students. Fearing second rate status in technological and scientific superiority, the Woods Hole Conference was held in Cape Cod in 1959 with thirty five scientists, scholars and educators to call attention in finding ways to improve science education in the public schools. Appointed by James Conant of Harvard for his role in the formation of the Educational Testing Service, Henry Chauncey was there for the purpose of finding means to test students for their scientific intelligence. (Bruner, 1960). President John F. Kennedy stated: "...we choose to go to the moon in this decade and the rest, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills." Upon the Apollo moon landing in 1969 television showed to a world wide audience a view of our planet Earth, one we had never seen before, the home we once thought was flat until that first brave voyage across the sea.

That view of the Earth, our home, moved the astronauts so deeply that many of them have since declared a profound spiritual experience that forever changed their relationship to the Earth. (Capra, 1982). Why do our brains have this desire to reach so far to look from the outside in? Perhaps our brain is alone, a deep seated sense that we have no other species on equal or advanced intelligence than ours and for an answer we look somewhere else for something else, something other than here at home with our own species. Perhaps the painful awareness of that aloneness motivates us to transcend our limitations and look beyond the boundaries of our finite existence.

As we study our existence today, we are aware that our brains have creatively taken from the surrounding elements to modify and improve its environment. Everywhere we look today there is evidence that humans have become so advanced they have created a variety of materials, tools, and electronic systems that do an enormous amount of tasks for them. The brain can be compared to a radiator as it is responsible for cooling the blood, a telephone switchboard placing connections to people, places and things, and a supercomputer that stores and retrieves memory.

The ironic thing about computers is that not only were they created by our brains, they are programmed analogous to the human brain. Computers obtain information by input, humans also obtain information by input, computers and our brains encode information, store it and retrieve it when necessary. Computers have short term memory on the screen, human brains have short term memory of familiar or common events such as what we saw on our drive to class today. Computers have long term memory in the hard drive, and it could be pulled up at any time, provided it is stored in the right files. Our brains have long term memory too, of events in our childhood or our High School graduation. At times information gets lost or erased in computers, similarly, some experiences cannot be found in our brains when we look for them. Sigmund Freud believed that there

is a place in our brain where unconscious memories are stored. Freud discovered if memories are lost it is because they are stored in the wrong area, however, they could be retrieved by stimulation or hypnosis. An undeniable dissimilarity is that computers have no self esteem or self confidence that would influence its thinking, a computer's thinking is quick and rarely inaccurate, it merely reproduces what it is told.

The synopsis of memory and experience of the brain then may be one of nature's ways of making the human mind efficient enough to deal with a wide variety of challenges so that we may survive anywhere, five billion strong, and creatures of an astounding variety of cultures. We are for the first time aware of our self; all that our species has accomplished is because the human brain gives a sense of itself. That sense is so deep that we build entire cultures to orchestrate ourselves with the world and with others in it. Just as the musician in an orchestra join raw sounds in new and beautiful ways, our brains orchestrate and join disconnected ideas with wonderful inventiveness. We reach into our minds and bring new points of view to problems and add beauty, harmony and clarity where there once was none.

"Our vision is not limited to what our eyes can see, but what our minds can imagine."

-Ellison S. Onizuka

Astronaut on the "Challenger" space shuttle

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