Topics in the History of Astronomy

Major Research Project

The Effect of Consciousness on Astronomical Understanding and Paradigm Shifts

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Abstract

This paper describes the people, ideas, and paradigms, during key points in history where the views of the nature of the universe and our place in it was fundamentally changed. The requirements for such a change included new ways of thinking each time, by the key people that became noted in our history, such as Tycho Brahe, Johannes Kepler, Nicholas Copernicus, Albert Einstein; and, contemporarily, people like Halton Arp, Michio Kaku and others.

The process of thinking done by each person, their belief systems, and the world they were living in, with the restrictions, beliefs and requirements for getting their research and ideas even to be considered by peers, all have had an impact on what ultimately they perceived first, then went on to prove and make into a new reality for the people that they reached. This thought process requires some measure of vision, intuition, and expanded perception of what is possible, beyond what most people would even consider or even attempt to contemplate because of the current consensus of reality. If we were to perform future research with this understanding and awareness in mind, what could be accomplished and how would this impact the world?

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1.0 Introduction

Throughout history there have been times of obvious jumps in paradigms, where the whole perception of the world changes very quickly – almost over night. These sudden changes are begun with ideas from some special people, who have the courage and insight to think and see the world, as they say, "out of the box". Such is the case in the history of astronomy. The cases in the field of astronomy have had more of an impact on our view of reality and where we come from than almost any other field of study. It is from astronomy and cosmology that we are gaining in insight into the very meaning of existence – who we are, where we come from, and our relationship to the universe as a whole. This paper describes some of these major paradigm shifts and the people and circumstances surrounding them, then ultimately the impact on our world today and contemplations for the future.

2.0 Pre-Historic Astronomy

This section describes the way astronomy began, in the early civilizations such as the Mayans and the early ages of England. There are no real paradigm shifts involved here, but this information will form a basis for future comparisons.

2.1 The Mayan Civilization

The Maya societal and cultural paradigms focused on the measurement of time by observing the movements of the stars and planets and noting astronomical events such as eclipses. They saw a connection with the Earth and the cycles in their lives such as

fertility, agriculture, and disasters. It was so important to them that they recorded these events and the connections on many of their buildings and structures.

One of their documents is the Dresden Codex, an 8-page table containing predictions of the movements of Venus, including the 584-day synodic cycle, and solar and lunar eclipses. The Maya held ceremonies during each predicted eclipse time, perhaps to try to avert a disaster. This information formed the basis for the mythology and religion of the time.

Mayan buildings and other structures appear to be aligned to various astronomical events, or connected with the heavens. The "Caracol" in Chichen Itza was used as an astronomical observatory. The Governor's Palace, in the Yucatan, faces toward a pyramid 3 miles away and the southernmost rising point of Venus, which is corroborated by Venus-related glyphs carved onto the building. Many other alignments have been proposed.

Modern day astronomers have learned quite a lot by studying the Maya obsession with time, astronomical predictions and connections, and may be rediscovering or reinterpreting things that the Maya found thousands of years ago. For example, astronomers have recently concluded that there is a black hole in the center of the Milky Way galaxy. It is interesting to note that winter solstice node of the ecliptic is precessing toward the point where it will align with the galactic center (the black hole) of the Milky Way. This alignment date apparently corresponds to the Mayan Long Count calendar end

Mayan City of Palenque

date of December 21, 2012, and is the winter solstice.

2.2 Stonehenge and other Monoliths

Stonehenge is a spectacular sight to behold, in the countryside of England's Salisbury Plain. Nearby are the stone circles in Avebury, and chalk artworks of horses on the sides of hills. All of these monoliths are remnants of past ages where the heavens were a great mystery and attempts to predict events and take control of our lives led people to build tributes to the gods and the forces of nature.

Stonehenge is a symbol of mystery, power and endurance. Its original purpose is unclear, but some have speculated that it was a temple made for the worship of ancient Earth deities; others have labeled it as an astronomical observatory for marking significant events on the prehistoric calendar. Others claim that it was a sacred site for the burial of high-ranking citizens from the societies of long ago. I feel that it was probably used for all of these things at various times, or even at the same time. It definitely was not constructed for any casual purpose, because only something very important to the ancient people would have been worth the effort and investment required.

A Section of Stonehenge

3.0 Greek Astronomy

Astronomy in the first millennium A.D. as practiced by the Greeks, was dominated by the teachings of Aristotle, who lived in the 4th century. Their view of the heavens was that of concentric spheres, with the Earth in the center, the Sun on one of them, and the stars/heavens on another. Everything was very orderly, but was very anthropocentric. Humans were the center of the universe and the universe was made for us. This view was reinforced by common sense and what could be observed physically around them.

The Greeks believed that the heavenly bodies were made of a fifth element know as "quintessence" – the other 4 elements being earth, air, fire, and water – which was eternal.

Prior to Aristotle, the first Greek cosmologists taught that there was a material unity, thought to be water, underlying the transient phenomena observed through our normal senses. This meant that there was an order amongst all of the perceived chaos. They described their vision o constant creation and re-absorption of worlds from an infinite, boundless unity. Although their ideas of the shape of the Earth and its relationship to the, they did make an attempt to replace mythology with an impersonal law.

The later Greek astronomers concluded that the Earth moved around the Sun, however.

Painting of Plato and Aristotle

From

http://www.ucmp.berkeley.edu/history/aristotle.html

4.0 16th Century Astronomy

The following sections describe 5 men who were relative contemporaries, who each made a major contribution in understanding and expanding the latest views of the Earth, Sun, and planets and relationship to the rest of the universe. Their names were, in chronological order: Nicholas Copernicus, Tycho Brahe, Johannes Kepler, Galileo Galilei, and Rene Descartes.

4.1 Nicholas Copernicus

Nicholas Copernicus was born in Torun, Poland in 1473, and lived until 1543. He studied astronomy, law, and medicine, and ended up being elected a canon of the cathedral chapter of Frauenburg. He was not a priest but, was in an administrative position. However, his books reflected his great insights, where he was attempting to resolve what he perceived as a fallacy of past astronomers. He felt that they had missed the whole point of Ptolemy's "Planetary Hypothesis", with its integrated system of

planets. He was the need for symmetry, and realized that putting the Earth as a normal planet orbiting the sun, was satisfying that requirement.

His "Book 1" described his view of the cosmos, with the coherent, integrated solar system, which explained all observed planetary motions. This adherence to symmetry was important in getting him to reject the complex Ptolemaic system of epicycles, and Earth-centered geometries. It is fascinating how he as then able to deduce the orbital periods of all the observed planets, based on this new geometry, and then created the series of tables which predicted the planetary positions. It is expected, but unfortunate, that most people at that time neglected to read Book 1 and skipped right to the tables

The reproduction of an engraving of Nicholas Copernicus, on steel – published in:

Letture di Famiglia (Lectures for the Family)
Annata VI (Year VI)
Lloyd Austriaco, Trieste, 1857

From

http://www.man.torun.pl/Citizens/Kopernik/mk-pict.html

4.2 Tycho Brahe

Tycho Brahe was born in 1546, bringing a legacy of a demand for increased accuracy in astronomical observations. He particularly contributed to the understanding of the nature of comets.

Before Tycho Brahe conducted his observations, the current thoughts on the nature of comets were based on Aristotle's doctrine called "Meteorology". In this doctrine, Aristotle took the current worldview that everything could be classified as one of the four elements of earth, air, fire, and water, and placed comets into the category of fire in the atmosphere, and in the realm of meteorology. The general population of that time viewed the fiery comets as fearful omens of the "sub-lunar" world.

Tycho Brahe's observations of comets were key to changing that worldview. He was first intrigued by the appearance of a supernova, in 1572, and noticed that it was changing in intensity but not moving. Since it did not move, he deduced that the supernova must be part of the celestial sphere but suspected a problem because of the brightness changes.

Tycho had another chance to observe a new object in the heavens when the "Great Comet" appeared in 1577. Comets had been viewed as originating on Earth, since they changed in appearance and therefore could not be part of the unchanging heavens. Tycho wondered whether comets could be an anomaly like the supernova and sought to determine their nature. Tycho and his team members went out of their way to determine the comet's position, if possible. They measured the apparent distances (across the sky) between the comet and several prominent stars, and tried to determine if there was any parallax. No parallax was ever found, which meant to Tycho that comets were at least six times further away from the Earth than the moon. They were, therefore, part of the heavens and not within the atmosphere of the Earth, which contradicted Aristotle's theory

and challenged traditional beliefs. Tycho's book was published in 1588, assuring the transfer of comets from meteorology to astronomy.

The cometary data that Tycho collected showed that the comets were moving between the planets. At that time, people believed that the planets were attached to concentric, crystal celestial spheres, that each held the stars, planets, Sun, and moon. No other types of objects had been observed to be moving between these spheres. If comets could move in this way, then the crystal spheres could not exist at all. This data allowed Tycho to change his solar system model to make the planets – Mercury, Venus, Mars, Jupiter, and Saturn – orbit the Sun, but he still was compelled to keep the Sun orbiting the Earth, with the moon.

4.3 Kepler

Johannes Kepler was a German astronomer, born on December 27, 1571, and died on Nov. 15, 1630. He was the first strong supporter of the heliocentric theory of Copernicus and the discoverer of the three laws of planetary motion. Kepler's legacy is that he was able to transform astronomy from being just "applied geometry", into a brance of dynamical physics. Always guided by the concept of beauty in the structure of the universe, and specifically by a theory of harmony in geometric figures, numbers, and music, Kepler, in his Harmonices mundi (Harmonies of the World, 1619), announced his third law--a relationship between the orbital periods and the distances of the planets from the Sun. His belief that the Sun regulates the velocity of the planets was a milestone in scientific thought, laying the foundation for Newton's theory of universal gravitation.

Kepler began his support of the Copernican system through what he called “metaphysical reasons”. I think this meant that the ideas made more sense to him intuitively.

Kepler had an interesting background, studying astronomy and theology with a scholarship to the University of Tubingen, and then eventually teaching mathematics. His motivation in his research into planetary motions was religious and the desire to understand the overall structure of “God’s creation”. In his opinion, Copernicus had discovered the layout of this universe, but not the reasoning behind it. His largest set of written works – “Epitome of Copernican Astronomy” – discussed, in question and answer form, the known planetary geometries and then went beyond those to discuss the new concepts of forces causing the planetary motions. This was a good way to get the ideas and concepts into the public, to then test and validate the predictions of planetary motion and positions.

Kepler’s knowledge and interests spanned more than the heavens. He understood and wrote about the workings of the eye, and optics, and supported Galileo’s work about the telescope. He also wrote a book about Jesus and the calendar, and how the current calendar was wrong. The posthumous Somnium (Dream, 1634), which Kepler worked on until shortly before his death, is indicative of his fertile mind. In this work, Kepler describes a journey to the Moon and discusses the existence of lunar inhabitants. A crucial link between the thought of Copernicus and that of Newton, Kepler was an important figure in the 17th-century scientific revolution.

Portrait of Johannes Kepler

from

http://www.kepler.arc.nasa.gov/johannes.html

and courtesy of

Sternwarte Kremsmünster, Upper-Austria

4.4 Galileo

Galileo Galilei was born in Pisa, Italy on February 15, 1564, and lived until 1642. Galileo was a physicist who built and used telescopes to observe and reveal celestial truths, and to develop a new concept of planetary motion, which supported Copernicus' claims. He studied medicine, and then later studied and taught mathematics. It is interesting to note that he was the son of a musician, and most likely learned music himself to some extent – at least that had to have influenced his thinking even in subtle ways.

His ability to understand the optics and concepts involved in creating and using telescopes was very important, as well as the further ability to envision the potential applications and implications of using them for astronomical observations. This required a vision beyond what most other people of that time possessed, although there definitely had to have existed other people like him, who were never given the credit.

Galileo documented his observations in his publication called the "Starry Messenger". His discoveries showed beyond a doubt that the Copernican system was correct – of course that did not make everyone else happy at all, and they resisted his ideas for awhile, until forced to observe the truth for themselves.

Paradigm changes from Galileo's work:

- Milky Way consists of innumerable stars
- Planets viewed in the telescope were enlarged as expected according to the telescope's magnification, but stars were not, which meant that they were at a vast distance away
- Jupiter has moons, which appear as a mini-solar system model to enable people to observe a Copernican-type system from the outside.
- Sun has sunpots
- Saturn has rings
- Venus goes through phases, like the moon.

Ultimately, and unfortunately, Galileo's publications on the Copernican system were proclaimed to be heretical by the Pope and the Catholic Church, and Galileo gave in to them, denouncing his ideas. He did not have the courage to be a martyre.

Galileo Galilei

Courtesy of

http://www2.cybernex.net/~mhodges/biography/galileo2.htm

4.5 Descartes

René Descartes lived from 1596 to 1650. He is a good example of unconventional thinking leading him to new ideas and discoveries. His background was mathematics, which to him gave certainty and definite measurement capabilities. He wanted to apply these concepts that he learned in mathematics to the natural world, but found that established rules and truths that were the basis of geometry and mathematics were nonexistent in the natural world. Instead, the views of the world held by most people were based on assumptions that might not necessarily be true. He noted that people took things that they learned in childhood as truth, without even thinking about or questioning them.

To get past being himself caught in the trap of preconceived ideas preventing him from learning about the truth, Descartes started doubting any and all "alleged" truths. These included even those sensed by sight, hearing, and the other physical senses. He found, however, that in doubting even his own existence that actually proved it, because the mere act of contemplating this meant that he must exist. As a side note, this method of

observing the existence of oneself is a good way of expanding one's awareness, including a method of meditation, and facilitating the ability to think "outside the box".

Other insights can be obtained in the dream state. In 1619, Descartes had a series of dreams about mathematics being the key to true knowledge, an insight that he then developed further later on. He tried to apply these insights to the realm of the mind and thoughts, since he knew that these thoughts proved his existence. He considered matter as a physical, extended substance, and mind as nonextended (not occupying space), indivisible, and immeasurable. However, he was not able to determine how the mind and matter interacted.

Descartes' studies at the Jesuit College in La Fleche, France played a major part in helping him integrate the fields of astronomy, religion and mathematics. The Jesuits (both now and then) combine the subjects in their teachings, and at the time of Descartes were quick in introducing their students to Galileo's telescopes and discoveries.

Descartes' attempt to define matter and space in terms of vortices is interesting. To me this could be an insight into energy fields, higher dimensional space, gravity bending space-time around dense matter, or other things. He was trying to show that motion (vortices) are the source of matter in space, which could be another way of saying that matter is energy in another form or at another frequency. He was ahead of his time in this idea, so he didn't have enough information to form his ideas properly, or at least to be in the same way that we would interpret them today.

Descartes believed that he had derived his ideas from his insights into the "immutable nature of God the creator". He did not make this public at that time because of what he had heard happened to Galileo. But still, his training with the Jesuit priests gave him a solid background in helping him to think holistically and thus "outside the box".

Descartes' impact on the future of astronomy was through his publication of his "Principles of Philosophy" in 1644. Through this work, other people were able to read, understand, and accept that the Sun was not special but one of a vast number of other stars in a boundless, homogeneous universe, and planets revolved around the Sun in paths resulting from rectilinear inertia. His physics was all explained in terms of geometry – however it was not yet able to predict motion. That was the next step in evolution, left to those that came after him.

René Descartes

Courtesy of

http://www.geocities.com/Athens/4753/descartes.html

5.0 20th Century

The last century has produced one of the biggest change in paradigms and consciousness in history. The key player was Albert Einstein, and there are modern scientists that are following in his footsteps to create the next great leap in world views. Like the others that came before, today's leading edge researchers are meeting resistance from the establishment and their peers.

5.1 Albert Einstein

Albert Einstein was born on March 14, 1879 and died on April 18, 1955. He has been said by many to be a genius. Geniuses are by definition people who do not think conventionally or at least are ahead of the rest of us somehow. His legacy to the world, among other things, is his Theory of Relativity and pursuant attempts to derive a Grand Unified Theory of everything to explain the whole universe. He wanted to understand how the universe works on the grand scale, in traversing and envisioning the vast distances involved and how that huge reality would relate to our everyday experiences.

Einstein's view of the world was that there must be a simple explanation for it all. His science was based on his artistry and his sense of beauty, seeing a wonderful "grand design". He viewed himself as being "passionately curious". One of his goals was to know "the mind of God", but he has also been quoted as saying that "God does not play dice", implying a logical - not random – order to the universe. He also said once: "One thing that I have learned in a long life: that our science, measured against all reality, is

primitive and childlike – and yet it is the most precious thing that we have." This implies that we have a great deal to learn and we must be open to all possibilities, not limiting.

Einstein used his sense of beauty, and intuition, developed in part through his practice of music through playing the violin. This sort of holistic thought process enabled him to get to the point of the required "thinking out of the box". Perhaps that was what set him apart from most other scientists of his time – some have said that at the time of his Theory of Relativity publication, less than a dozen other scientists around the world were capable of understanding it.

He obviously was ahead of his time. But why? Perhaps it was because he was not seeing the world as the rest did. He was incorporating other ideas into then-perceived unrelated subjects, such as art, music, and philosophy. He also had a solid foundation in philosophy and religion.

Einstein belongs with the great religious mystics, due to his feeling of humility, awe, and wonder, and his sense of oneness with the universe. He was raised as a Jew, but his practiced religion was not ritualistic. His beliefs were too deep to adequately define in words. However, he identified himself with the 17th century Jewish philosopher Spinoza, who had been excommunicated by the Jews. Einstein is quoted in 1929 saying the following regarding his beliefs: " I believe in Spinoza's God, who reveals himself in the orderly harmony of what exists, not in a God who concerns himself with the fates and

actions of human beings." In 1946, he spoke of Spinoza as "one of the deepest and purest souls our Jewish people have produced."

In 1947, Einstein summarized his belief in a supreme being as follows:
"It seems to me that the idea of a personal God is an anthropological concept which I cannot take seriously. I feel also not able to imagine some will or goal outside the human sphere. My views are near those of Spinoza: admiration for the beauty of and belief in the logical simplicity of the order and harmony, which we can grasp humbly and only imperfectly. I believe that we have to content ourselves with our imperfect knowledge and understanding and treat values and moral obligations as a purely human problem – the most important of all human problems."

"A human being is part of the whole called by us the Universe. We experience ourselves, our thoughts, and feelings as something separated from the rest -- a kind of optical delusion of consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures, and the whole of nature in its beauty."

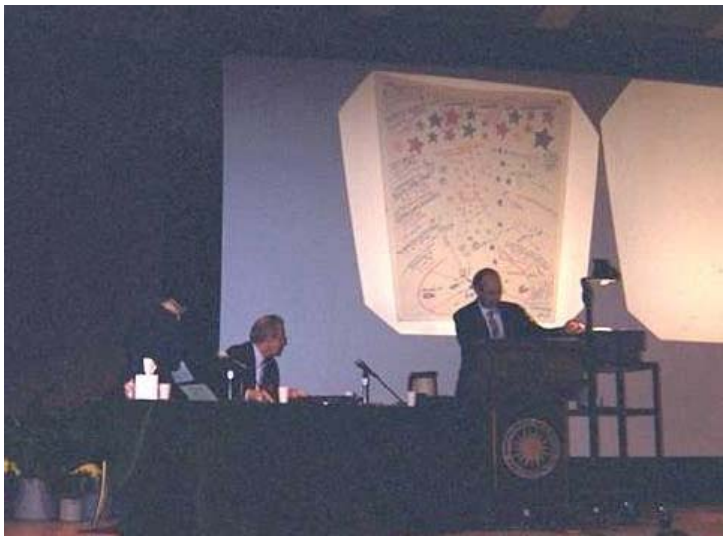
These have been just a few insights into how Einstein thought and why it was inevitable that he be the one to come up with the theories that he did.

Albert Einstein

Courtesy of
http://www.ozones.com/~drozone/einstein/
index.html

5.2 James Peebles and Michael Turner

Peebles and Turner are well-known astronomers of the late 20th and early 21st century, who have been researching the Big Bang theory and supporting data (or lack thereof). They participated in a very interesting debate held on October 4, 1998, at the Smithsonian National Museum of Natural History in Washington, DC, USA. Professors P. James E. Peebles and Michael S. Turner debated whether a basic set of parameters can be determined at this time that would define and help interpret current cosmological observations that indicate the need to introduce a significant amount of dark matter into the current understanding of the composition of the universe.



Peebles and Turner at the "Nature of the Universe" Debate October, 1998 (Turner is shown speaking, and Peebles is watching)

Dr. Peebles said that the current Friedmann-Lemaitre cosmological model is close to being proven correct, pending more data and observations, and is well defined and testable over the full range of observations. Unfortunately, many of the measurements in these observations are questionable because they are based on an untested assumption of the structure of the universe. He felt that cosmologists needed more information before being confident that they know the true nature of the universe. Any new theories are based on old, unreliable data – we need new data, but work is in progress to produce better cosmological tests over the next ten years.

Peebles cited the following as some examples of flawed data.

1. The observed matter is not enough to account for the observed expansion rate – the popular remedy is to postulate a universe dominated by dark matter not in galaxies.
2. The most distant supernovae are fainter than expected – how do we know that they aren't less luminous instead of further away?

Dr. Turner argued that we might have a full accounting of all the energy density in the universe, which could be explained by the Inflation + Cold Dark Matter theory, and established as a model over the next decade through further observations. The model holds that the universe is still expanding, and accelerating, as a result of *our* big bang (not *the* big bang). The universe is flat, with slowly moving elementary particles providing the infrastructure and quantum fluctuations causing the current observed structure.

Measurements from particle and quantum physics of subatomic particles have been crucial in providing evidence of this model. It explains that the burst of expansion (ie, big bang) was caused by a quantum fluctuation in the vacuum energy, creating the universe we see today from a very tiny bit of the actual, whole universe. This caused the observed uniformity and characteristics. These quantum fluctuations are produced by inflation, and also lead to a background of gravitational waves.

Both of their arguments are compelling. I do believe that it is always good to keep collecting more data and be open to the possibility that the model needs to be changed. However, Turner's model is very interesting and explains quite a lot. He mentions in closing that we need to understand, among other things, whether more spatial dimensions exist. If they do then we need to understand how that could affect our entire understanding of the universe. What we observe is a projection, an aspect, of the whole and there must be underlying processes of which we have no idea as yet.

Both of these astronomers are beginning to think "outside the box". Peebles has also proposed a homogeneous type of energy field permeating all of space (like the ether in Michaelson-Moorely's experiment?) that he called quintessence. Quintessence (the name of the Greek's 5^{th} element) would replace the need for Einstein's cosmological constant, long felt to be a sort of "fudge factor" to make the equations work out nicely. There has to be a physical correspondence to any of these components of the mathematical equations or the model they represent is not correct or complete.

Turner's persistence in saying that this modified theory of the big bang is the answer is a little disturbing, since Peebles' arguments are fairly strong that there is just not enough data available to reach a conclusion. Still, these two cosmologists are close to the cutting edge in thinking at this time. The factor of dark matter seems to be the unknown that needs the most explaining. Perhaps that is where consciousness comes in.

5.3 Halton Arp

Dr. Halton Arp was born in 1927, graduated cum laude from Harvard in 1949 and earned a Ph.D. from Caltech in 1953 (also cum laude). His first postdoctoral position was as an assistant to Edwin Hubble. He worked as a staff astronomer at Mt. Wilson and Mt. Palomar for 29 years before moving to Max-Planck-Institute for Astrophysics in Munich. Arp's observations of quasars and galaxies are world-renowned. He is the author of the Atlas of Peculiar Galaxies (1963: a collectors' item), Quasars, Red shifts and Controversies (1987), as well as numerous articles in scholarly journals. Yet, he has been virtually alienated by his fellow astronomers because of his work that shows that red shifts are not necessarily a measurement of distance in the universe. It is interesting, however, to note that even Edwin Hubble, the originator of the Hubble's constant for using red shift to determine distance, up until the day he died always held open the possibility that red shift might be caused by something other than recession velocity.

Arp is another example of someone that has the courage to not follow what everyone else is doing to just get funding. In his book "Seeing Red", Arp discusses the current situation in academia where the universities get funding for the researchers that maintain the status

quo or the conventional theories of the times. It is people like him that will lead the way to learning the truth about the nature of the universe. The data in his book shows that red shift can be caused by objects orbiting each other, including galaxies and components of multiple star systems. This information has been ignored in the laboratory and in educational institutions, for some reason, which goes beyond just a consciousness/awareness issue. It implies that someone (or society) is for some reason wanting to control our progress in research and understanding.

Arp says in his book “Seeing Red”: “The fact that the majority of professionals are intolerant of even opinions which are discordant makes change a necessity. Those friends of mine who also struggle to get the mainstream of astronomy back on track mostly feel that presenting evidence and championing new theories is sufficient to cause change, and that it is improper to criticize an enterprise to which they belong and value highly. I disagree, in that I think if we do not understand why science is failing to self-correct, it will not be possible to fix it."

"This, then, is the crisis for the reasonable members of the profession. With so many alternative, contradictory theories, many of them fitting the evidence very badly, abandoning the accepted theory is a frightening step into chaos. At this point, I believe we must look for salvation from the non-specialists, amateurs and interdisciplinary thinkers—those who form judgments on the general thrust of the evidence, those who are skeptical about any explanation, particularly official ones, and above all are tolerant of other people’s theories."

"The only hope I see is for the more ethical professionals and the more attentive, open-minded nonprofessionals to combine their efforts to form a more democratic science with better judgment, and slowly transform the subject into an enlightened, more useful activity of society. This is the deeper reason I wrote this book and, although it will cause distress, I believe a painfully honest debate is the only exercise capable of galvanizing meaningful change."

Beyond this, Dr. Arp discusses, in his book, his ideas about affecting mass/matter by changing its frequency in such a way as to make it possible to travel vast distances due to the connections between all parts of the universe. Arp also courageously points out the negligence of NASA in doing real research, specifically relative to the discoveries on Mars of possible structures in the Cydonia region of that planet. What is going on?

These kinds of ideas are other examples of how he is not thinking in a conventional way. He wrote a section called the “Zen of Research”, in which he tells about how many of the talented and hardworking astronomers he knew were forced to leave their astronomy work because they were too open minded about basic assumptions, so that even working on subjects that were well funded in universities still did not guarantee a job.

Dr. Halton P. Arp

Courtesy of

http://www.astronomie.de/galerie/projekte/arp/projekt.htm

5.4 Michio Kaku

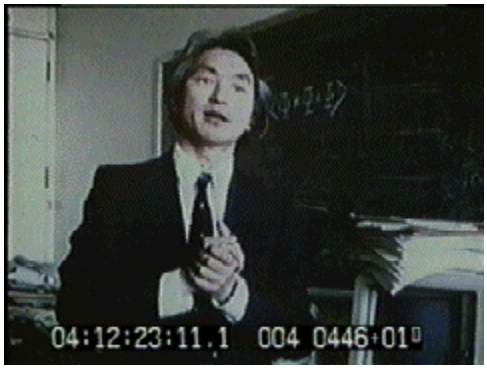
Dr. Michio Kaku is a middle-aged Professor of Theoretical Physics at the City College of the City University in New York. He is the co-founder of the super string field theory and author of several books, as well as a host of a weekly radio talk show. He is one of the most progressive scientists of our time. He writes about multiple dimensions in space, including hyperspace, in a way to finally get past the light barrier problem that seems to be bogging everyone down. He has spoken at several conferences, including those related to extraterrestrial life and unidentified flying objects.

In his book "Visions", Kaku writes:

"For we are no longer passive observers to the dance of nature; we are in the process of becoming active choreographers. With the basic laws of quantum, DNA, and computers discovered, we are now embarking upon a much greater journey, one that ultimately promises to take us to the stars. As our understanding of the fourth pillar, space-time,

increases, this opens up the possibility in the far future of being able to become masters of space and time."

With this kind of vision, Kaku is able to explain how visitors from other worlds could get here if they understood these concepts and applied them to spacecraft and space travel. Kaku is one of the keys to teaching, understanding, and applying these advanced concepts and indeed is in the process of creating a paradigm shift.



Dr. Michio Kaku

Courtesy of

http://www.caipirinha.com/Collaborators/kaku.html

6.0 Search for Extraterrestrial Life

One of the major projects of the last 30 years has been what is called the Search for Extraterrestrial Intelligence, or SETI, project. This project was first funded by the National Aeronautics and Space Administration (NASA), who then withdrew their support suddenly, but the project was able to get private funding eventually. This project has noble goals – to listen to specific bands of radio signals from potential other civilizations out in the universe somewhere. The idea was to listen at certain common wavelengths that someone may wish to transmit at, such as that of the water molecule or molecular hydrogen, but has expanded into a wider band than that.

The problem with this project is the narrow point of view and assumption that it is based upon, namely that another civilization would exist at the same technological development stage as ours, and at the same time would be transmitting signals to us at frequencies to which we are listening. While it is certainly not impossible that such signals could be received, it is a very low probability – unless someone knew that we were transmitting and intentionally responded. Someone would know that we are transmitting if they were actually here visiting us (yes, from another planet) or perhaps even through other ways of knowing such as psychic means, I suppose. Both of those explanations are "outside the box", and it appears that the first reason is more probable – but that is a subject to be addressed at another time.

The SETI project has been allowed to continue, even with just the private funding, because it is easier and more convenient to think that extraterrestrial intelligences are safely tucked away several light-years from the Earth and no threat to our humanity and safe anthropomorphic paradigms.

The other reasoning behind the view that other intelligences cannot be here visiting the Earth is that they could not travel the vast distances and arrive in their lifetimes because "no one can travel faster than the speed of light". How do they know that no one can? The scientists who say this are putting a limitation on what our potential knowledge could achieve. Einstein's equations actually show that now one can travel at the speed of light – but they can travel less than or greater than that speed. As I have described in the

previous section about Michio Kaku, there are advanced concepts being developed to open up all kinds of possibilities.

There is a double standard employed here, where people can be witnesses to criminal actions and testify in a court of law as to the truth of an event, but these same people can't be believed when it comes to any sort of experience related to the possibility of life on other planets visiting the Earth. This is a major example of some kind of control mechanism in place either externally by a group (funding sources?) trying to maintain the status quo or else it is society in general continuing to drag its feet over such a possibility, perhaps because we are not ready for it.

7.0 Paradigms for the Future

Paradigm shifts will continue to occur, based on new understandings and knowledge. We can make some of these changes on purpose, and create our own destiny.

7.1 Incorporation of Consciousness

The definition of consciousness is not merely an awareness of oneself, and the external environment, but also an awareness of that awareness, and a rational or even technological understanding of one's relationship to the universe. This would separate the "mind" from the "brain", and imply the existence of "mind over matter". This is not related to any theology or religion.

Some have said that consciousness is just yet another evolutionary step in the ongoing, ever more complexifying universe. Perhaps this evolution is reflected in our small span of human history as well – our awareness of the universe is part of an interdependence, with the evolution of consciousness within the entire universe. Therefore, this consciousness evolution could be compared to earlier stages of the universe such as the gravitational stage.

7.2 Science Methodology

Methodology of science in the near future needs to be changed, when the new paradigm allows the inclusion of consciousness as a factor. The following components, steps, and considerations are recommended:

1. Intuition and consciousness should be included as valid means of data collection
2. Religious and other belief systems affect the interpretation of data, and must be considered in the data analysis.
3. All ways of knowing must be combined with observational data from external (spacecraft, instrumentation) sources and sensors, to do the following:
    a. Interpret data holistically
    b. Devise new experiments to collect the data
    c. Reinterpret the data
    d. Consider alternative possibilities of interpretation and ways of collecting more data

4. No observations should be ignored, even if they do not fit the current models. These are the most important sets of data to include because they provide insights into the truth.

5. Understand the interactions of the observer and the observations, in the macroscopic world.

8.0 Summary

The history of astronomy and progression of science in general has led us through many changes in understandings and views of the world around us.

The overriding theme in all of these changes is consciousness – awareness and our connection to the universe. People realizing this connection and trying to describe it mathematically or through the idea of a God or artistically, enable them to begin to "evolve beyond their current programming", as they say on Star Trek – the programming of how they perceived the world through the belief systems they were raised with and taught by the society of their day.

That connection is what is missing, in my opinion, in all of the current theories and models. However, that connection has been noted by scientists in different ways, such as the Heisenberg Uncertainty principle and the idea on the quantum level of the observer affecting what is being observed just by the act of observing. This act of observing is

introducing the variable of consciousness and the mind, and then our belief systems and what ultimately creates what the reality that we experience.

The implications of faster than light travel are great. This opens up a new field of study and understanding, and also is connected to consciousness since thought is instantaneous and nonlocal. Perhaps with the integration of consciousness into all of our research, including spacecraft, we will be able to bridge that light barrier and at the same time gain a better understanding of the true nature of the universe without having to introduce constants and dark matter.

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