THEOSOPHY-SCIENCE GROUP

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EDITORIAL NOTES

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2009 THEOSOPHY-SCIENCE SEMINAR, Near Adelaide, 2Oct -4Oct.

Plans are well in hand for this meeting of the Australian Theosophy-Science Group, being held at the Old House, Woodhouse Activity Centre, Piccadilly, Adelaide Hills. The overall theme is "Building bridges: science, psyche, and Cosmos" and a full day will be focused on the theme of "Consciousness".

Two people are coming from NZ and six from interstate, mainly from around Brisbane. About 25 South Australians plan to attend, mostly on a day basis. This Science style seminar, the first to be held outside the Springbrook (Qld) or Sydney locations of previous meetings, will hopefully encourage more science-interested TS members to participate in sharing their interests.

This Seminar is being organised by our long-time member, Victor Gostin, helped by several Adelaide members. At a recent Adelaide University, School of Earth and Environmental Sciences Awards Ceremony, Victor was honoured (as a research fellow or adjunct) as "an exceptional communicator of science and advocate for the School, and for providing sustained assistance to students".
Victor is the Coordinator of the Theosophy-Science Group.

PROFESSOR RICHARD SILBERSTEIN IN THE NEWS

Measuring our Thoughts and Emotions -- Success by Professor R.Silberstein

A privately owned company "Neuro Insight", founded four years ago by Professor Richard Silberstein is expanding its services from Germany and Austria into Britain and the USA. Professor Silberstein founded the Brain Science Institute at Swinburne University, Melbourne, where he developed EEG-style technology to measure how fast the parts of the brain linked with memory and emotions are operating while people are watching TV or engaging in other activities. This has huge applications to the art of advertising and storytelling, and keeping the viewer engaged [see article in the MEDIA section of the Australian newspaper 24-8-09 p35]
(Richard is a Founding Member of the Theosophy-Science group.)

OUR WONDERFUL BRAIN

by Dr Victor Gostin

"The discovery of neuroplasticity, that our thoughts can change the structure and function of our brains, even into old age, is the most important breakthrough in our understanding of the brain in four hundred years. Dr. Norman Doidge, Columbia University, New York, introduces principles we can all use to overcome brain limitations and explores the profound brain implications of the changing brain in an immensely moving book that will permanently alter the way we look at human possibility and human nature".
The above is about a new book by Norman Doidge, MD "The brain that changes itself." published by Scribe.

The New York Times says:
"The power of positive thinking finally gains scientific credibility. Mind-bending, miracle-making, reality-busting stuff...with implications for all human beings, not to mention human culture, human learning and human history." For more information, see:
http://www.normandoidge.com/normandoidge/MAIN.html.

Our brain operates at the "edge of chaos":
Scientists are offering new evidence that our human brains function at a critical point between randomness and order. This phenomenon is called self-organized criticality - where natural systems spontaneously organize themselves to operate at the borderline between order and chaos (such systems include heart rhythms and earthquakes). This allows the brain to respond quickly and extensively to small changes in our environment.
For more information see: http://www.world-science.net/othernews/090318_criticality.

GLYCINE FOUND IN A COMET SUGGESTS LIFE IS COMMON

An article in the daily press reporting the discovery of glycine, in comet WILD suggests that life may be common in the universe. This is the first time an amino acid has been discovered in a comet. Amino acids are the building blocks of proteins in DNA. A robot space probe that returned to Earth in January 2006 after a visit to comet WILD 2, brought back dust from the comet, containing glycine.

Dr Malcolm Walter, Director of The Australian Centre for Astrobiology at the University of New South Wales in Sydney said that "finding chemistry so important to life in a comet was a very big discovery. We didn't need any special creation here on Earth. You'd have to say that finding that complex component of life increases the possibility that life may have got started in other places in the solar system and the wider universe". Life's chemical ingredients could have been delivered to Earth in comets and meteorite impacts. "The fall of comets [on the early Earth] would have been quite substantial. Most of the water on Earth was probably delivered by comets.

"The more scientists looked, the more evidence they found that life's chemistry was common in the universe". Other amino acids, said Professor Walter, "had been previously found in meteorites that had fallen to Earth, Even water vapour in interstellar clouds was 'very common'. It's everywhere". But glycine, one of 20 amino acids found in proteins, was "a relatively complex compound that plays an essential role in life"

The glycine was collected by NASA's stardust probe, launched in February 1999. In January 2004, stardust came within 240 kilometres of the surface of Wild2. A square shaped like a tennis racquet and filled with a sponge-like silicon called aerogel, trapped thousands of dust particles smaller than sand grains from the comet.

[**Footnote**: The Australian Centre for Astrobiology was formerly at Macquarie University but was suddenly shut down by a new Vice Chancellor. The University of New South Wales subsequently took over. (Dr.Victor Gostin is accredited to the Centre)].

ENDLESS UNIVERSE - BEYOND THE BIG BANG

A Book by Paul Steinhardt and Neil Turok

There has been considerable disquiet expressed of late, including in popular scientific journals, concerning the unsatisfactory nature of the Big Bang model with the arbitrary nature of creation from nowhere with the equally arbitrary introduction of matter and its resulting rapid inflationary expansion (with closely spaced nearby particles separating at speeds greater than that of light) and then an equally arbitrary cutoff to terminate the expansion when it has gone far enough.

A book with the above title, by two highly regarded astrophysicists, presents a new version of a cyclic universe which overcomes the problems listed above. (Steinhardt is Einstein Professor in Science at Princeton University in both physics and astrophysics. Turok holds the chair of mathematical physics at Cambridge, UK, and is Director of the Perimeter Institute for Theoretical Physics in Ontario, Canada. The book is by no means light reading but is of considerable interest to theosophists because a cyclic universe is consistent with Blavatsky's second fundamental proposition. For many years it was hoped by many, especially theosophists, that the current expansion rate of the universe would be found to be slowing down at a sufficient rate to lead to a future contraction to a 'big crunch' followed by another 'big bang' in a continuing cyclic process. The initial very rapid expansion rate of the universe decreased gradually due to mutual gravitational attraction between the galaxies. Prior to 1998, the current rate of decrease was a matter for speculation and there was speculation as to whether the rate of decrease might be sufficient for the expansion rate to reach zero and then turn into a contraction, leading eventually to a big crunch, and perhaps a new cycle.

This hope was abandoned in 1998 with the discovery that, far from the expansion rate decreasing, the universe is now expanding at an increasing rate attributed to an unknown form of 'Dark Energy' with the result that, over time, we will be able to see less and less of the distant universe. (see Newsletter N40. June 1999). Thus, in the far distant future, we will be able to see only nearby galaxies such as Andromeda, (See below for a history, given later in the current book, of the development of modern cosmology.

Steinhardt and Turok produced a completely new version of a cyclic universe. Referring to their model, they say: "A key assumption of the cyclic model is that the dark energy can decay. After a period of perhaps a trillion years, the physical properties of dark energy undergo a transformation that causes the expansion to slow down and eventually halt, leading to a phase of very gentle contraction. .The dark energy acquires the properties of a gas with a very high pressure, which causes it to spread itself uniformly across space. This remarkable

transformation turns out to solve many of the cosmological problems". Indeed it turns out, as will presently appear, that the existence of dark energy is crucial to the new cyclic model.

"At the start of the contraction phase, the dark energy density is low, but once the contraction starts, the dark energy density rises rapidly, ensuring that the universe remains smooth and flat as the contraction continues. Finally the contraction reaches 'a big crunch'. Some of the high pressure form of dark energy is suddenly converted into hot matter and radiation and the universe begins to expand again. The crunch has turned into a bang. Because the universe was smooth and flat before the bang, it remains smooth and flat after it. ... solving the homogeneity and flatness problems" [of the standard model]. In the new cycle, the universe will go through all the same stages, but quantum fluctuations along the way will ensure that it is not an exact repetition in detail.

The above simple explanation of the cyclic model occurs early in the book and may suffice for many people. However, in the bulk of the book, there is a more sophisticated explanation of the evolution of the universe in terms of what is known as M theory which is an outgrowth of String theory, a concept in Theoretical Physics which envisages fundamental particles existing as short linear objects like pieces of string. In M theory, linear strings are superseded by membranes referred to simply as 'branes' and the theory is formulated in 10 (or 11) dimensions with the extra dimensions envisaged as rolled up like a hose pipe. The two authors were excited when they attended a lecture on M theory and realized that branes could move.

They went on to develop an analogous model with the universe represented by two cosmic branes with a springlike force between them, the strength of which varies cyclically. The dark energy density is the stored energy associated with the springlike force. The energy curve has a long plateau representing dark energy which causes the expansion of the universe to speed up as it is doing at present. At this stage the brane separation decreases very slowly. Eventually the energy curve associated with the springlike force dips to negative values and the branes approach at an increasing rate leading to a big crunch, followed immediately by a big bang as the branes separate again. This is a more sophisticated version of the story told earlier in the book of the "crunch" followed immediately by a new "bang", thus beginning a new cycle.

There is a two-page spread in the book representing THE CYCLIC UNIVERSE with a series of pictures of pairs of grey rectangles (or branes), representing the universe at various stages of the cycle. Occasional brief comments accompany some of the pictures. (It takes a stretch of imagination to contemplate flat branes as representing the universe). In the first picture the branes are smooth when "the branes are empty and flat a trillion years after the big bang". In the next 3 diagrams, the branes are shown increasingly wrinkled. Then comes an almost flat pair with the description "wrinkled branes collapse, create slightly non-uniform hot plasma, and rebound". [This is the collapse-bang-rebound situation]. Then follows a widely separated slightly wrinkled pair with the caption: "a microsecond after the bang, branes reach maximum separation but continue to stretch rapidly, filled with radiation". A well separated more wrinkled pair follows with the description: "radiation dilutes away, matter dominates and clusters around nonuniformities to form galaxies and stars". The next pair have the widest separation with the notation "YOU ARE HERE" and the description: "dark energy takes over driving accelerated expansion that begins to spread out galaxies and matter". There follows a final wrinkled pair with little matter and then the cycle returns to the first picture. [the pictorial cycle could of course have started anywhere]. The whole process is cyclic.

The authors referred to their cyclic model of the universe as the "ekpyrotic model", (based on the Greek term "ekpyrosis" meaning "out of fire"). They note that: "The Greek notion was that the universe begins and ends in a giant conflagration with a period of normal evolution in between. The concept had many variants."

Early Cyclic Models

There is a discussion of ancient models of a cyclic universe, especially ancient Hinduism which presents "a remarkably detailed and quantitative vision of cyclic evolution", with timescales comparable to those in modern cosmology. "A day and night in the life of Brahma lasts a kalpa, a period which roughly corresponds to the matter dominated epoch in modern cosmology". Furthemore "a year of Brahma, or 360 kalpas, lasts 3.11 trillion years, roughly 4that of a single cycle in the cyclic model." Buddhists also have a less specific cyclic view of the universe with no ultimate origin mentioned.

"In the West, [specifically in Greece] the cyclic model was the dominant view for six centuries, beginning in 500 BC".[The authors of the book adopted the Greek term, ekpyrosis, (mentioned above) naming their cyclic theory "the ekpyrotic model"]. In the West, the cyclic view was unpopular because of Christian theologians adopting the story of Genesis

The Development of Modern Cosmology

The history of modern cosmology is spread over several chapters. The story begins with Einstein's attempt in 1917 to develop a static theory of the universe based on his general theory of gravitation by introducing a 'cosmological constant' to avoid expansion of the universe at a time well before the discovery around 1930 by Hubble and Humason of expansion, based on the observed redshifts of distant galaxies,. After those discoveries, Einstein abadoned his cosmological constant, regarding it as his greatest blunder. (Yet Einstein's abandoned constant is today regarded as possibly the best explanation for the current increasing expansion rate of the universe). Russian Mathematician Friedman had developed several possible theoretical models including both expanding, contracting and cyclic versions. Belgian priest Lemaitre also developed an expanding model with an origin This was consistent with his religious beliefs although he tried to keep his religious and scientific views separate. Einstein retained an interest in cosmology throughout his life. After earlier favouring a cyclic model when he had to abandon his cosmological constant, he wrote a paper with De sitter in which they consider a model which is flat and expands forever. Einstein died in 1957.

"George Gamov was responsible for combining the Friedman-Lemaitre model with the laws of atomic and nuclear physics to create the big bang model. He was sensitive to the issue of whether the big bang was truly the beginning of the universe. In 1952 he published a beautifully written popular book called 'The Creation of the Universe'. The title of the book suggests that Gamov favoured the idea of a universe created from nothing, but the story between the covers makes clear that he thinks otherwise".

Hoyle, along with Bondi and Gold, introduced, in the 1940's, a so-called 'steady state' model with eternal exponentially increasing expansion, and continuous creation of new matter to maintain a constant density.. Hoyle was a forceful public speaker and there was a long battle with Gamov, fought largely in public. Hoyle coined the term "Big Bang" (derisively) in the course of a talk on the BBC. He was anti-religious and thought that the model was too close

to the biblical story of creation. His concern on that score increased, when in 1950, the Pope weighed into the argument with a Vatican encyclical. The battle raged, largely in public, with Hoyle's forceful oratory. "Many years later, when the discovery of the cosmic background radiation (in 1965) upended the steady state model, Hoyle's caricature had become the standard model.".

The background radiation was discovered in 1965 by Penzias and Wilson who at first thought the radiation coming from everywhere was caused by a fault in their specially designed very sensitive aerial. However, they happened to meet Dicke and Peebles who, with their colleagues Roll and Wilkinson, were planning a search for universal low temperature radiation as a relic of the big bang. This was obviously the source of the assumed noise in the aerial. The two teams arranged to publish successive papers.

"The discovery of the cosmic background radiation became widely interpreted in the minds of cosmologists, physicists and the general public as the final proof that the universe had a definite beginning. This is how it is described in nearly every popular account today from elementary school text books t o graduate school courses".
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In 1992 the Cosmic Background Explorer satellite (COBE) produced a low resolution map of the sky. It also measured the temperature of the background radiation as 2.7^0K (ie.above absolute zero). The WMAP satellite launched in 1993, in due course produced a more detailed spectrum with small peaks and troughs in intensity as a function of wavelength. These yielded much detailed information about the universe. [A recently launched even higher resolution satellite will, in due course, produce an even higher resolution map].

FOOTNOTE
(Michael English from Perth is very interested in M theory and gave at talk at the Theosophy-Science Seminar at Springbrook in May 2003 entitled "Occultism, M-Theory, and the Ekpyrotic Universe", referring briefly to Steinhardt and Turok. The latter had published an article on their ekpyrotic model in "*Science,:*Vol 296*; pp 1436-1439",* May 24, 2002, and probably elsewhere. A summary of Michael's talk is given in Newsletter N52, October 2003. A brief account is included in Victor Gostin's summary of the 2003 seminar talks in "Theosophy in Australia", November 2003.).

THE MYSTERIOUS NUMBER PHI

Summary of a talk by Dr Hugh Murdoch

Theosophy-Science Seminar; Springbrook -- May 2008

PHI is an anglicized version of the letter Ø of the Greek alphabet. (I will use both terms. This intriguing number has had many claims of mystical significance and has many unique properties. A common simple approach is via the Fibonacci series. Fibonacci was a mathematician who around the year 1200, introduced to the West, our current Arabic decimal system of numbering which is a vast improvement over the cumbersome Roman system. The change was greatly appreciated by merchants at the time, for simplifying their calculations. The Fibonacci series begins with 1,2, and then each succeeding number is the sum of the previous two numbers. Thus we have 1,2,3,5,8,13,21.34.....etc. The ratio of any number to its

predecessor approaches the limit [1+(√5-1)/2] which is 1.618034 (to 6 decimal places). The above formula is the formal mathematical description of PHI. Intriguingly, the reciprocal, 1/1.618034 or (√5-1)/2 is 0.618034 which is often used as an alternate expression for PHI. Furthemore. $Ø^2$ is 1+Ø = 2.618034. (Thus all three numbers Ø, 1/Ø, and $Ø^2$ are exactly the same after the decimal point; (a very striking occurrence).

The ratio Ø is very widely found (either expressed or implied) in Egyptian art, literature and architecture. Newton found evidence for it in the King's Chamber of the Great Pyramid from the dimensions of the chamber as well of those of the sarcophagus in the Chamber. In fact it is very widely represented in the very structure of the pyramid. These ratios all stem from the precise angle of the pyramid structure. The structure of the pyramid is impressive enough, but being built at a very precise angle to enable the existence of so many occurrences of the golden ratio Ø between specific lengths and areas is even more striking. The lengths involved are the length of the four sides of the base, the vertical height (at the centre of the pyramid, and the slope height, (both at the centre of the sides and at the corners). In the talk, I demonstrated some of these occurrences with diagrams. One very intriguing incidental fact is that the height of an imaginary vertical circle with the central height of the pyramid as radius, has a circumference equal to the distance around all four sides of the base of the pyramid. This suggests a relationship between Ø and π..

There is a simple geometric construction for Ø. Draw a right angled triangle with height AB 1 unit and base AC two units. (The hypotenuse is thus √5 units). Mark off one unit along the hypotenuse and copy the balance BC (√5-1) to the base as AD. Then the base is cut in the golden ratio as AD/AC = (√5-1)/2 or Ø. This simple procedure was well known to the Ancient Egyptians although they would not have needed to know of the geometry or the numeration involved. The 2 by 1 right angled triangle is widely referred to as the Egyptian triangle.

The Egyptian description for their concept of cutting a length in the golden ratio could well have been the following or something equivalent: "Draw two lines joined by a right angle with one line twice as long as the other. Join up the ends of these lines with another line and mark off on the joining line the length of the shorter line. Then copy the balance of the joining line to the longer line, and that line is then cut in the golden ratio".
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The ratio Ø occurs very widely (either expressed or implied) in Egyptian art, literature and architecture. For example, Newton found evidence for it in the King's Chamber of the Great Pyramid from the dimensions of the chamber as well of those of the sarcophagus in the Chamber. In fact it is very widely represented in the very structure of the pyramid. These ratios all stem from the precise angle of the pyramid structure. The structure of the pyramid is impressive enough, but being built at a very precise angle to enable the existence of so many occurrences of the golden ratio Ø between specific lengths and areas is even more striking. The lengths involved are the length of the four sides of the base, the vertical height (at the centre of the pyramid and the slope height, (both at the centre of the sides and at the corners). In the talk, I demonstrated some of these occurrences with diagrams. One very intriguing incidental fact is that the height of an imaginary vertical circle with the central height of the pyramid as radius, has a circumference equal to the distance around all four sides of the base of the pyramid. This suggests a relationship between Ø and π..

There are a great many examples of interest in Ø from ancient times to the middle ages. The Greeks, especially Plato and Pythagoras, were particularly interested. There are many claims for the representation of Ø in architecture such as the Parthenon and other ancient structures.

There is also contemporary interest of evidence for Ø (or PHI: I have used both terms interchangeably. There are multiple examples of PHI in the crossed diagonals of a pentagon. A novel occurrence is in the shape of a soccer ball. It also occurs in the shape of the structure of a third isotropic form of the carbon atom, (after diamond and soot). Intriguingly, when this was discovered, .the picture of a soccer ball appeared on the front cover of the prestigious scientific weekly, *NATURE*. The scientists described this isotrope as buckminsterfullerene (or buckyballs for short) after the geodesic domes of Buckminsterfuller.

There is a Fibonacci spiral form of PHI, which is represented, for example, in the shape of the nautilus shell and in the spiral growth of certain climbing plants.

I ended my talk with a description of a novel discovery of PHI buried secretly in medieval literature).

A NOVEL DISCOVERY OF PHI IN MEDIEVAL LITERATURE

Summary of a story told on the ABC Science Show, 15 October 2005

(of an interview by Robert Cockburn, a writer and journalist)

Joan Helm is a mother and grandmother who set out to obtain a degree in English from the University of Queensland and ended up getting a PhD from the French Department for solving a literary mystery by finding convincing evidence for the Golden Ratio secretly embedded in the original tales of King Arthur and his knights and maidens, written in French by Chréttien de Troyes. [In English: "Christian of Troy"]. Joan is sure she has found Chrétien's code for Camelot. She was puzzled by the absurd behaviour of the knights and maidens and thought there must be some hidden explanation.

She taught herself Old French to read the original story. She obtained the microfilm of the original document and found the pages had been copied in the wrong order. She sorted them out on her living room floor. The manuscript had no punctuation but consisted of a series of lines of poetry. She found there were minor changes in the modern English translation which altered the line count.

Translating a Guiot manuscript for a modern audience is a huge challenge. Its 800-year-old pages have no numbers, paragraphs or punctuation marks. All that divides its thousands of lines of poetry are a series of beautiful, ornate capital letters painted at random positions that no one has ever explained, but Joan noticed something that had been overlooked in the Penguin Classic. What Joan saw was a brilliant pattern of ancient Greek geometry concealed in the manuscript's lines and ornate capital letters. This had all the elements of a thriller; the most famous romance of all time, in a medieval manuscript locked away in the Bibliothèque Nationale in Paris, and a mystery hidden in its lines for a mighty king.

Like all good detective stories, she found the key by chance in a small detail. Adjustments had been made; which didn't matter by modern standards of literary analysis. When she saw the microfilm, she realized that modern translators had been making small editorial changes

that altered the line count and line numbers which were essential to understanding the meaning of the 12th century. Her attention was caught by a large golden capital E, painted in where Lancelot declares his love for Guinevere, the only capital like it in the manuscript. On a hunch Joan started counting. This capital is at line 4401. The total line count is 7118, which means that this ornate capital divides the total story into a perfect Golden Ratio.

Robert Cockburn: The tale of Lancelot and Guinevere is divided exactly by the Greek mathematical ratio 1.618, known as the Golden Ratio or Phi. Camelot's immortal love triangle conceals the geometric triangle that forms a pentagon. Joan had found the maths of the gods at the court of King Arthur, the sacred maths and geometry that Pythagoras and Plato said created the universe. and it lay unseen for 800 years in the tales of Camelot. But what on earth was Greek geometry doing in the medieval romance? By applying maths to Chrétien's narrative clues she could make sense of episodes like Lancelot's madness over a golden hair. At a significant line number, she says, the hair is a golden spiral whose infinite geometry holds the secret of eternity, a hair to send a man into a trance. It fitted with the medieval obsession with the mystical power of Greek geometry. Joan wanted to decode the entire *Arthurian Romances* using mathematics. She believed she had found Chrétien's secret meaning; a subtext of pagan Greek knowledge brilliantly concealed in Camelot's devout Christian tales, knowledge that was kept alive by Arab and Jewish scholars but forbidden as heresy by the 12th century Christian Church. This, said Joan, is Chetien's deeper purpose. Camelot is not what it seems.

She raised a storm. Codes, keys, maths, geometry, Britain's own King Arthur inspired by Greeks, Jews and Arabs, it wasn't literature; not as anyone knew it. To the literary establishment this was still heresy. A request to decode the tales was refused, and there her work might have ended. But Joan was rescued by the Queensland University's French Department. Professor Peter Cryle said: "Despite our historical claims to great subtlety in interpreting, collectively, thousands of scholars for centuries have slid over the top of what, at least a few of them should have seen".

Robert Cockburn says:
"Joan was free to investigate the *Arthurian Romances* as if she was back in a 12th century court, employing all the disciplines of art, science, history and philosophy. She started to piece together the historical evidence behind the making of Camelot - and what evidence!

Henry II, for whom Chrétien de Troyes wrote the first *Arthurian Romances* was tutored by the very scholar who rediscovered the lost secrets of classical knowledge in Arab and Jewish manuscripts in Spain. Henry was a great philosopher king, a student of Greek, Jewish and Arab learning. He demanded intellectual challenges from his courtiers, but it was at the time of the Crusades when followers of Plato's mathematical marvels were seen as a threat to Christianity.

It was an age of momentous discovery when the power of numbers inspired the kind of awe and paranoia that nuclear secrets do today. Joan is the first person to identify the connections of art and science in the works of Chrétien de Troyes, and now the list of questions grows. Did Chrétien write his romances for a king to solve in an earlier digital age? Were Christians, Jews and Arabs cooperating through the Crusades to a greater extent than we can imagine today? What else lies hidden in other works of literature we think we know so well. And who was Chrétien de Troyes Where did he get his extraordinary learning; was he perhaps a Jewish or an Arab scholar? Nothing is known of Chrétien except from his famous tales".

Robert Cockburn discusses the controversy among scholars of Joan's theory but goes on to say: "Whether Joan's theory is right or not may well be debated for another 800 years, but in the end it's for the reader to decide if Chrétien was trying to reach our minds as well as our hearts with his *Arthurian Romances*. But Joan has proven the undying power of Camelot to inspire us,and also the need to rethink the relationship between Art and Science".

Regards to you all,
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