Art and Science in the Information Age

Investment manager Teng Jee Hum is a self-taught painter and avid collector of contemporary Asian art. In an attempt to understand the nature of things and the meaning of life, he explores the realms of art and science through the medium of painting and focuses his search for truths from within the folds between cultures. Above is an oil painting entitled 'Dialogue' by Jee Hum. More works can be viewed at http://tengjeehum.com.

Inspired by Dr Ho Tak Ming's article on the decline of Chinese medicine over the centuries (published in 'The ALUMNUS, October 2001'), TENG JEE HUM (BBA '78) contributes this article in which he reflects on the differences in the evolution of Eastern and Western art and science, and speculates on how our present information era may yet develop to give the East an edge over the West.

The linear development of important Western art history has occurred in a well-documented sequence from the ancient Greeks down to the Renaissance period Italians, the 19th century French, and then the 20th century Americans, spanning a large part of the second millennium. Was there a similar sequence for Asian art, and if not, why did one not develop, and what were the implications?

We often assume there is a link between creativity and an exposure to the fine arts. On the contrary, looking around us in modern Singapore, we actually see much more creative problem-solving being applied to engineering, transportation, finance, public administration and business enterprises than is obvious from a survey of artistic works and activities gleaned from exhibitions, museums and art publications.

It is generally the observation that western culture seems to be more conducive to the cultivation of creativity, and this is quite obviously reflected in the different routes taken by both Eastern and Western art in the last few hundred years.

Western art has evolved as its main focus the pursuit of the new, encouraging and rewarding never-attempted-before ways of doing things, or new ways of perceiving reality. Eastern art, good examples include Chinese ink painting and calligraphy, has focused more on the repetition of the same time-tested techniques, in an effort by each artist to achieve individual perfection.

Thus, like its science, the art of the West has undergone a continuous series of incremental developments, often disruptive but nonetheless progressive, while that of the East has stagnated for more than half a millennium. This significant difference in the philosophy behind how art has been made leads us to wonder whether the state of the arts is linked to that of scientific and technological progress, and beg questions as to why the two civilisations have progressed at such different speeds.

In his book *Guns, Germs and Steel – a short history of everybody for the last 13,000 years* published in 1997, anthropologist Jared Diamond speculated on why China, having led the world for at least a thousand years in science and technology, suddenly fell behind late-starting Europe from around the 15th century. He attributed the main reason to a failed local power struggle that robbed the eunuchs of their influence in the Chinese imperial court, and hence brought to an end their sponsorship of China's sea-going fleets, presumably contributing to its self-imposed isolation from the rest of the world (and new ideas).

That one decision alone could probably have led to such long-ranging consequence was, in his opinion, reinforced by the relative ease of governing China centrally due to its geographic 'connectedness' or accessibility. Over many centuries, the source of China's strength and its unity under one emperor became its weakness as a result of the irreversibility of poor decisions. This contrasted with the geography-enforced diversity of Europe's many states, where the constant struggle for dominance and survival of the fittest generated the competitive environment conducive to, and perhaps necessary for, the incubation, development, and spread of successful new technologies. Other reasons, attributed by Diamond and other writers, included the invasion and rule by the nomadic Mongols and the widespread influence of the teachings of Confucius.

Along a different line of exploration, we turn next to James Bailey, who in 1996 wrote a book entitled *After thought – the*

computer challenge to human intelligence. Compiling many ideas from various sources in a sweeping analysis of a few thousand years of science and mathematics into a single paragraph, he wrote : "In the ancient Greek world, when the focus of science was on determining where objects such as stars actually were, the dominant form of maths was geometry. Since the Renaissance, when the focus of mathematical science has been on the rate of change, or speed, of physical objects, the dominant maths have been algebra and calculus. Today, the focus of science has shifted from the rate of change of physics to the patterns of biology. Not surprisingly, we are now seeing the rise of the new pattern-finding maths." Subjects like neural networks, genetic algorithms, simulated annealing and cellular automata have started to emerge.

From a scientific perspective, I would venture to suggest that Chinese knowledge and civilisation were unsurpassed up till when the dominant technology was based on geometry. It started to slip behind when the West began to embark on breakthrough technologies deriving from algebra and calculus, and the scientific reductionism that aims to reduce a complex whole to the effects of one part (or parts).

Western civilisation was devoted to the single pursuit of discovering the basic constituent of matter, out of which the whole universe is made up of.

Using mathematics related to logical thinking, that is algebra and calculus, Western scientists invented new technologies of the Industrial Age.

The Chinese meanwhile cultivated energy feeling, and while their geometry placed them very advanced when the practice of astronomy and astrology determined who ruled the world, they quickly fell behind when the basis of scientific inquiry required rigorous logical thinking, and not the intuitive decision-making which they had preferred for so many millennia.

As I understand Bailey, even the prevailing reductionist approach of mathematics and scientific inquiry that has served Western society so well for the past 600 years, is no longer adequate in dealing with the more complex phenomena such as that in the non-linear studies in the fields of the life and social sciences, financial markets, global economies, weather and turbulence, spread of diseases, extinction of species, and so on.

This is because the really powerful application of computer technology, which he termed bit evolution, is not vested in the current breed of sequential process computers built on the reductionist thinking model of the human brain, but instead in the simulation possibilities of computer parallel processing, whereby huge networks of interlinking computers, each programmed with its own logic, are set to interact on huge databases of information, working on questions set by humans.

James Bailey is suggesting the decline in efficacy of the reductionist method in favour of a move towards holistic thinking in pattern recognition.

Present studies into the Chaos Theory[1] and self-organised criticality phenomenon[2] also seem to indicate that manifest behaviours are independent of the properties of its constituents, therefore reductionist approaches will often not reveal any answers to the behaviour of the 'collective' of things.

This suggests that a more probabilistic or holistic approach could be more appropriate to understanding the world.

It is possible that the West is coming round to the holistic approach only because it has apparently explored the limits of the reductionist approach and only recently is it equipped with the tools – massively parallel computers – to tackle the complex problems of the holistic approach. (The Internet is a fine example of one such evolving parallel system.)

In an extension of this view, the future belongs to those who possess huge computer parallel processing capability, enormous and relevant databases, and creative mindsets able to perceive or recognise trends and patterns not immediately obvious to others.

If the new basis of scientific inquiry in the age of information technology, as expounded by Bailey, is indeed that of pattern-recognition aided by computer simulation, perhaps this first significant change in the level of the playing field in 600 years could well provide the true basis supporting an opportunity for the realisation of the 21st century as the Pacific Century[3].

In the very act of reading and writing, Asians have more affinity for the patterns of ideograms and (Chinese) characters – learnt, practised and used from young by peoples whose very basis of handling living in the everyday world is through a holistic approach.

By contrast, Western languages based on the alphabet emphasise sounds and in-sequence relationships, rather than on recognising patterns.

This is at best a very speculative and tenuous argument, but the way Asians have been wired in their brains through countless generations of cultural evolution, while disadvantaged in the industrial age, may just turn out to be an advantage to them in the information era.

[1]'Chaos' refers to the issue of whether it is possible to make accurate long-term predictions about the behavior of a system. (http://order.ph.utexas.edu/chaos/)
[2]'Self-organised criticality' refers to the automatic adjustment of complex interacting systems under certain conditions to a state characterised by power-law correlations in space and time. (http://www.cap.ca/pic/books/Criticality-Jensen.htm; http://www.sst.ph.ic.ac.uk/~kimchris/research/rice.html)
[3]Set within the context of present-day concerns, 'The Pacific Century', a video series produced by Alex Gibney, sheds new light on the importance of political and economic developments in the Pacific over the past 150 years from colonialism to nationalism, from military clashes to economic rivalries, and sets forth a vision of the future.