Journal of Scientific Temper
Vol 2(3&4), Jul-Sep & Oct-Dec 2014, pp. 165-168

EDITORIAL

China — Picking up Threads from a Strong Tradition of Scholarship

When Joseph Needham started looking at the development of science and technology in China, for most western scholars, it was still 'the barbaric oriental enigma'. He asked a simple question, '*what were the inhibiting factors that prevented the rise of modern science in the Chinese civilisation*?' The pursuit resulted in a monumental work on Chinese contribution to the pool of human knowledge. Needham's painstaking work, which runs into seven volumes and 27 books reintroduced China to other civilizations in general and to the western world in particular. As opposed to prevailing understanding, Needham's China was scientifically rich and technologically mature. The observations about Chinese as well as about Indian civilization made in the nineteenth century, continued to blur the vision of scholars through the first half of the twentieth century, even after the detailed work of Needham. It took time to correct the academic myopia.

Georg Wilhelm Friedrich Hegel, one of the most celebrated philosophers of the nineteenth century, in his classical work on Philosophy of History, while introducing India wrote, 'India, like China, is a phenomenon antique as well as modern; one which has remained stationary and fixed, and has received a most perfect home-sprung development.' He further writes 'It [India] has always been the land of imaginative aspiration, and appears to us still as a Fairy region, an enchanted World. In contrast with the Chinese State, which presents only the most prosaic understanding, India is the region of fantasy and sensibility. … In China the patriarchal principle rules a people in a condition of nonage.'

Hegel's harsh description of Chinese civilization in a state of frozen 'nonage' was not only unkind but also based on ill-informed perceptions. It was driven by the colonial

consciousness, which provided the philosophical basis for conquering the world. Asia could not have been ruled and looted without brutalizing the subjugated. Negation and denial of contributions made by Indian, Arab, Egyptian and Chinese civilizations constituted the basis for ruling the two continents, Asia and Africa.

Renewed interest in China among scholars, particularly among historians of science, triggered by Needham's work of late has produced ample evidence about the contribution of Chinese civilization to the pool of shared human knowledge. This knowledge was generated through interaction between human labour and natural forces spread over centuries. Historians of science tell us that meticulously recorded evidence shows that decimal system was invented around 14th century BC, in China. Chinese scholars, as early as that, were capable of performing complex mathematical operations. By the 6th century BC they had developed an understanding of deficiency diseases, diabetes and immunology. The list of discoveries, inventions, innovations and production processes developed in China is fairly long. For example, lacquer, the umbrella, the wheelbarrow, the mechanical clock, the spinning wheel, porcelain, silk production and silk cloth, paper, printing, gunpowder, magnetic needle and two-dimensional maps were first developed in China. These inventions and discoveries span a period of more than 4000 years.

Science and technology progresses brick by brick. It is a paradigm shift that lays the foundation for a new scientific complex. Chinese civilisation did not develop in a vacuum of human ingenuity and ability to abstract conceptual models from material reality. Without a strong, intense and structured tradition of scholarship, technological acumen, engineering skills, artisanship and craftsmanship, inventions and discoveries would not have happened in China. The building blocks of civilisation and 'science and technology' have a dialectical relationship, one sustains the other. Pace of growth of science and technology is a function of rise of civilisation and in turn the civilisational growth strengthens development of science and technology.

A few historians have argued that the European Renaissance was triggered by the arrival of Chinese artefact in Florence, Italy

in 1434. There is another school which traces the roots of scientific revolution in the developments that took place in 12th century Europe. However, as I have argued elsewhere, the 'white man's burden' still haunts the historiography. It refuses to acknowledge evidence that shows mixing of cultures and flow of information resulting into the development of scientific knowledge. Without which the cultures become an isolated black box, where only knowledge-entropy keeps on increasing and forces that organize information into ordered knowledge get weakened. The skewed historiography, instead of asking 'why scientific revolution did not take place in China, India and the Arab world' may pose a question as to why was the magnetic needle not discovered in Europe, or why was zero invented in India, or why was Al Hassan (considered as father of the scientific method) born an Arab.

Isaac Newton's most celebrated, oft repeated quotation 'If I have seen further than others, it is by standing upon the shoulders of giants', does not particularize any specific brand of giants. He was not standing on the shoulders of only European Giants. Newton, or for that matter every scientist who sees further, stands on the shoulders of the giants who brought about paradigm shifts in science and technology. Such giants have existed in every civilization. As we explore the historical obscurity the names of individual inventors and discoverers blur. For example, we do not know who triggered the agrarian revolution or who invented the first wheel, zero or decimal system. The scientific pool of knowledge has been built bit by bit, over centuries. Both, incremental and revolutionary additions to this pool have played an equally important role in the evolution of science and technology.

At the macro level, if we look at the three-dimensional graph of time-geographical location-inventions (and discoveries) it is quite evident that clusters of inventions have shifted on the map of the globe over centuries. These clusters are also in sync with locations where concentration of wealth (in other words rise of civilization) was taking place. It is also apparent that new ideas, generated elsewhere, as well as scholars gravitated towards locations where accumulation of wealth was taking place, and contributed to the expansion of the pool of knowledge. The

interaction of cultures also caused enrichment of ideas, conceptual frameworks and evolutionary processes. Thomas Kuhn acknowledges the significance of 'immature science' or 'pre-paradigm' 'problem solving science' and 'social debates' including myths and superstitions that lead to 'paradigm' shift. Recent work of scholars has shown how Indian, Chinese and Arab contribution was important to bring about the 'revolutionary' scientific changes in Europe.

The 'barbaric enigma' of the past in today's world is a powerhouse of inventions and innovations, it is an economic power to reckon with. It no more can be rejected as 'in the state of nonage' or 'outside the pail of history'. China has amply shown that civilizations that have a strong tradition of scholarship can pick up threads, get into a mode of fast track, short circuit the 'pre-paradigm' phases, and create modern and efficient structures to develop science and technology in a short period of time.

However, social structures based on shared mainstream consciousness of the past have their own inertia. These structures resist changes and impede the process of development resulting into social, political and economic tensions. Therefore, in order to change the dominant social consciousness communication of science becomes an important national project.

In China, in the recent past, important experiments have been conducted in the area of science communication, public understanding of science, scientific temper and scientific literacy. This special issue of the *Journal of Scientific Temper* is devoted to the conceptualization and implementation of nation-wide communication of science projects. The articles also deal with lessons drawn and innovative changes made as the experiential knowledge was gained during the implementation of these projects. The editorial team is indebted to all the Chinese colleagues who have contributed to this issue. We are also thankful to CRISP for their cooperation and coordination. I hope that this issue will have a long shelf life.

GAUHAR RAZA