

Was there anything called colonial science as opposed to science.

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Abstract: *The history of British India during the last century spectacularly illustrates a close link between science and imperialism. Science has always been, not an esoteric but a social activity. The ideas of science are not the simple products of the logic of experimental methods, rather they stem from the Socio-economic background of previous times. For instance, whatever may be the biological significance of Darwinism; it nevertheless reflected laissez-faire in its full cry. The developments of eighteenth century integrated science firmly into productive mechanisms. The intellectual atmosphere of the nineteenth century, dominated as it was by the ruling class of manufacturers, favored the adventure of science, and this in turn gave birth to a phenomenon called “the phase of colonial science”. For many historians Colonial science is a dependent science wherein the result-oriented research in applied science heavily supersedes the curiosity-oriented research in pure science. For other historians the term “colonial science” implicitly refers to any scientific knowledge produced in the colonies, usually by professionals trained in the metro pole. Some historians eager to “provincialize Europe” have highlighted the role that colonial administrators played in creating new forms of scientific knowledge, which then returned to Europe; still other scholars have explored how subaltern subjects adopted aspects of colonial knowledge only to bend them to their own ends. Meanwhile postcolonial critics have argued more broadly that the same violent processes that produced colonial power also produced scientific knowledge. This paper will attempt to deal with the question whether there was anything called ‘colonial science’ as opposed to science.*

In 1894 Engels noted “if technique largely depends on the state of science, science depends far more still on the state and the requirements of technique”. The nineteenth century British India bears full testimony to this observation. With the establishment of imperial hegemony, popular local knowledge and skills suffered an eclipse and in its place came what Anis Alam calls “production science,” that is a science for profit, science for the accumulation of capital aiming at the full exploitation of raw materials and maximum profit at minimum cost.

George Basalla calls it, may be euphemistically, the spread of western science to the non-western world and tries to explain the phenomenon with the help of a triangular model. During phase 1 the non-scientific society provides a source for European science; phase 2 is marked by a period of colonial science; and phase 3 completes the process of transplantation with a struggle to achieve an independent scientific tradition or culture. Science during the initial stage is an extension of geographical exploration plus the appraisal of natural resources. But now the question arises does this apply to India? In fact every society cherishes some scientific traditions, however crude it might be in form and application.

Sixteenth century India, for instance, had a scientist of remarkable versatility in Fathullah Shirazi who made the first multi-barrelled cannon and also worked out the Ilahiera. Jahangir took keen interest in the field of animals and plants and also in chemical technology, medicine and astronomy. Even Charles Grant, a director of East India Company (during 1790's) acknowledged. “Not that the Hindus are wholly destitute of simple mechanical contrivances. Some manufacturers are carried to a considerable degree of perfection” One Mohsin Hossain of Arcot through his Theodolite impressed George Everest, the surveyor general of India (1830-43), as a remarkable mechanic of inventive talent. Of Radhanath Sikdar who is said to have discovered the highest mountain peak in the world, Everest observed, “in his mathematical attainments there are few in India – Europeans or native that can compete with him. Even in Europe this attainments would rank very high.” In view of the above mentioned examples one can hardly accept Basalla's thesis of the existence of a non-scientific society before the advent of colonial science. His model is thus imperfect and at best, as he has himself admitted, a preliminary or heuristic device. The model can be corrected by substituting “non-scientific society” with “pre-colonial science”.

Basalla warns against the use of ‘colonial science’ as a pejorative term implying the existence of some sort of scientific imperialism whereby science in the non-European nation is suppressed or maintained in a servile state by the imperial power.

One can, however, doubt this explanation in the context of British initial experiences. To quote one example, Sir TH Holland, former director, geological survey of India (1903-1909), confessed, “India at one time manufactured its own metals and inorganic chemicals; but with the opening of the Suez canal and with

concurrent improvements in marine engineering, freight charges from Europe became so reduced that the European manufacturing chemist could 'dump' his bye-products at Indian ports, and from there our growing network of railways has enabled the importer, either to kill the native industries altogether, or to drive them back to remote parts of the country". The establishment of the Royal Botanic Garden, the vigorous survey works, and various geological exploration provide good illustrations of how a colonial power utilizes the various branches of natural science for spreading its economic tentacles. For instance, the plan of botanic garden owes its origin to the need of growing Burma teak on the banks of Hooghly for ship building purposes. Robert Kyd, the then secretary to military Department of inspection, took up the challenge, got full support from the company, and thus started the large scale cultivation of commercially beneficial plants like teak, cinnamon etc. Next, the political ambitions of the East India Company necessitated a thorough geographical knowledge of the sub-continent; hence the survey of India. By far the best illustration of the use of science for colonial purposes can be found in the working of the Geological Survey of India. But it is doubtful whether these surveys could at all help western science take roots on Indian soil. Perhaps not.

There are many works dealing with different aspects of colonial science. All of these works stressed on how imperial science has moulded Indian science. David Arnold in his book *Science, Technology and Medicine in Colonial India* though rejects George Basalla's thesis, advanced in "The Spread of Western Science" (Science, 5 May 1962), that the globalization of science occurred in three stages: first, Europeans explored the world; second, they transplanted science to the rest of the world; third, countries outside of Europe took up European science as their own. But he is not willing to throw out Eurocentric diffusion altogether. He shows that Indian science, technology, and medicine can only be understood in the context of British domination, and that scientists, doctors, and engineers brought Western and Indian ideas together to differing degrees. He also shows that some nationalist politicians, such as Nehru, assigned pride of place to Western science, technology, and medicine, while relegating indigenous notions to a secondary role. His examination places science at the centre of British rule in India. Science appears closely involved in both the British practice to develop and rule India as a colony and nationalist effort to imagine and build it as a modern nation. Arnold shows that the company itself did not actively promote science but its control over India opened a rich field of scientific inquiry to European scientists who gained a great deal of information through informal networks of contact with military officers, doctors, and district officers cum amateur scientists in India. The crystallisation of knowledge under these disciplines moved "company science" away from Sanskrit texts and Brahmin pundits and rendered it more properly colonial insofar as the concerns and certitudes of Western science came to dominate its organizations. Without official sponsorship, these officers collected information on India's natural history according to their own personal interests during the course of conquering and administering India. The Company's hunger for revenue also spurred the collection of scientific information. As the Company surveyors traversed the conquered territory, they amassed data that was organized by the sciences of botany and geology. The crystallization of knowledge under these disciplines moved "Company science" away from the Sanskrit texts and Brahmin pundits dear to the Orientalists and rendered it more properly colonial insofar as the concerns and certitudes of Western science came to dominate its organization.

Unlike David Arnold, Seema Alavi in her book "Islam and the Healing" does not privilege the role of colonial state. Her central theme is that medicine was not totally constrained by the framework of colonialism but rather interacted creatively with new western medical knowledge. In her view, under the Mughals there was a holistic view of medicine derived from both Islam and Greek authorities. The author sees the legacy of this view framing responses to colonialism in the nineteenth century. Specific example of the continuing role of earlier holistic views of medicine was the response to the great cholera epidemic 1817-1818, where both traditional unani hakims and western authorities agreed that the government should maintain well-being for example sanitation to maintain public health and so avoid further spread of the diseases. The relative success of the notion was later adopted to address cholera epidemic in England in the 1830s. This cooperation between colonial doctors and indigenous hakims continued for some time but the situation changed from 1820s as modern Western medical ideas were increasingly disseminated, and this new knowledge was not accepted uncritically by the hakims.

In the book "Technology and the Raj : Western technology and technical transfers of India" edited by Deepak Kumar and Roy McLeod there is mention of metropolitan science through the practice of colonial science and a skilful use of crude indigenous technology for metropolitan needs. India is described as a sounding board for western scientific theories and there is a stifled sigh for Indian obscurantism as a hurdle for evolving a nationalist independent science and technology and the civilising mission to find out "to what extent did the Raj provide the principles and precepts, if not always the encouragement which enabled India to complete the process of technological transition from Empire to commonwealth". Right from the preface, the bias of the editor becomes obvious, it boldly proclaims that "today, the language of imperialism and colonialism implies far more than the forcible projection of the political and economic interest of one power into the sovereign domain of another." Western technology and technical transfer to India, 1700-1947, meaning Western

technological hegemony and the receiver's void in the field since the time of Aurangzeb. Here the editor have used the phrase "transition to India" instead of the appropriate preposition "in". In pre British India the process was slow but not primitive. The whole technological process was skill and craft oriented and the output was excellent.

Exploring the major developments in European medicine from the seventeenth century to the mid-twentieth century, Pratik Chakrabarti in his book *Medicine and Empire* shows that the major developments in European medicine had a colonial counterpart and were closely intertwined with European activities overseas. The book sets out to show, through a close examination of a number of related topics, how the history of modern medicine is closely intertwined with the history of imperialism. Developments in medicine in the main European colonising nations both fed into and benefitted from the building of empires.

In the book "Imperialism and Medicine in Bengal", PunamBala examines medical education and medical policies in British Bengal over the period 1800 to 1947. This period saw Western medicine changing and becoming more professional in nature. However, the attempt to impose a similar pattern on the Indian systems of medicine led eventually to a conflict of interest between the two, instead of the peaceful coexistence which had prevailed at first. *Imperialism and Medicine in Bengal* comprises two parts -- the first, outlines the systems of indigenous medicine in ancient and medieval India and also examines the impact of the ruling authorities on the growth of the Ayurvedic and Unani systems of medicine. The second assesses the impact of imperial policies on the medical profession in Bengal. Of particular interest are the underlying attempts to professionalize medicine in India where competition and accommodation between the different forms of medicine was a primary consideration.

Deepak kumar, in his book, *science and the Raj* has dealt with the question, is not science universal? Can there be a "colonial science" and other varieties of science? He comes into the conclusion that colonial science is "inextricably woven into the whole fabric of colonialism" lacking sovereignty with the limited autonomy extended to it in the beginning but declining as the colonial grip tightens.

In my view, colonial science was meant to serve the interest of colonial powers. But traditional science serves the interest of masses. However, colonial science did represent an advance over pre-colonial science. It was far more systematic, methodical, penetrative and pervasive. But here a question arises how did it emerge? A western historian of science explains 'in addition to greed for riches and dominion, the white man became possessed suddenly of a strange spirit of adventure, of an insatiable intellectual curiosity.' Is the phenomenon so simple as to be explained by 'curiosity' and the sudden 'strange spirit of adventure' the scholar has referred to? Or did there exist a pattern, a design and a 'policy'? Several gaps, interruptions, incoherence and inconsistencies raise doubts as to whether or not the Raj had a science policy at all. One can argue that even the absence of an articulate policy itself often points to the existence of some sort of negative policy. The government had set certain goals, though its activities often seem ad hoc, as if they were spontaneous responses to the sudden requirements of the day, while in reality a cause and effect relationship did exist between them. Certain implicit strands of their science policy can therefore be gleaned from the great mass of informative tit-bits that still survive in contemporary accounts and documents.