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The British Art of Colonialism and Science Developments in India

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Abstract

The culture of science is profoundly affected and dependant on both time and local socio-political reality. For example, there was no tabula rasa in pre-colonial India. In at least mathematics, astronomy and medicine, it had a long history. But a slow settlement made a large tooth. It brought about a major cultural clash that deeply affected both the colonizer and the colonized person's cognitive and material life. The British admired any reform attempts, such as the introduction of a predictable law framework, infrastructure development spending, and schooling in the late 19th and mid-20th centuries. Much of the imperial initiatives and changes are counter to India's people's will and health. The UK stripped away India's capital and brought an educated and elite buffer class into the English education system. This paper discusses the developments of science in British Indian colonial culture.

Keywords: Indigenous Studies; Colonialism; Sciences; British

1. Introduction:

Colonialism concerns the colonisation and control of other people's lands and goods [2], the conquest of local land and the rehabilitation of non-capitalist communities to accelerate European capitalism[2]. Mercantilism and political and military control are the driving factors behind British colonial conquest in the Indian Subcontinent [1]. In India, Britain used the army in imperial colonisation, while in North America maritime trade colonialism was used [1]. According to Lloyd, "The depth of British culture's penetration varies widely from Ireland or the Caribbean, to India, to British Africa's virtual apartheid regimes"[1]. The Indian subcontinent remained colonised for the next two hundred years under the British Empire with India's defeat in the Battle of Plassey on 23 June 1757[3]. The British directly controlled two-thirds of the subcontinent and achieved their economic and political objectives [6]. In 1664, the British East India Company (EIC) competed with the French Compagnie des Indes Orientales in tackling escalating factional disputes and

succession wars and rivalries between the regional Indian forces[4]. After the Battle of Plassey in 1757 and the Battle of Buxar in 1764, the British acquired full control of Bengal, gaining revenue and retaining their colonial rule in India[4][5]. Following the mutiny in 1857, the British Crown established a direct monarchy, abandoning the strategy of annexation as a sign of gratitude instead of curry in certain indigenous countries. However, in those indigenous countries' internal relations that controlled the Crown, the colonial administration retained its right to interfere [3][2]. Indigenous countries joined Pakistan or India in 1948 under the accession treaties and adopted the same legal, administrative and political structures as those imposed by colonial power. The British encoded laws in India with the aim of maintaining "order," "certainty" and "uniformity" in terms of the rationalization of law in the weberian sense[6], as well as Bentham's liberal concepts of rule of law and concepts of equality[7]. The British eliminated many local feudal landowners and set up a British-style bureaucracy whose new aristocrats seemed to adopt the British way of life. It adopted its English language, history, literature and philosophy, and an elite class that was biologically Indian and culturally English to expand its power base. Colonial exploration and understanding coincided with the growth of new technology and its manufacturing and business uses. There was no mistake at all. The interaction between cause and effect was both intimate and nuanced. Technology, modernization, and supremacy were all marching together. This lies in the logic of history, which was built in every possible way to change human perception and interaction. Much attention has been given in recent years to evaluating the place and role of technological advancements and inventions in the colonial process [8]. This imperial history of the British, which affects ethno scientific and religious minorities, requires proactive post-colonial peace building [9].

2. Divide and Rule:

The British used the tactic of “divide and rule” to incite conflict between Hindus and Muslims. The policy of division and rule used religion to bridge the gap between Indians, which eventually resulted in the deaths and displacement of millions of people, as well as the destruction of key economic assets[3][10]. The British realized that India was a land of socio-cultural diversity and that, in order to exploit and control the land, it was imperative to incite the Hindus against the Muslims and the masses against the princes, as well as to incite one caste against the other to increase caste divisions and class disparity among the Hindu community. For example, the British denied the legitimacy of the Muslim Sultan Tipu rule and used propaganda to violate the Hindu constitution on landed property [4]. This divide and rule strategy also arose in the lull of the Muslim community when the colonizer became wary of the popularity of the Congress, due to its highly nationalist undertones. The British knew it was critical that they develop a good relationship with the Muslims if the Indian National Congress's influence was to be countered. The British thus reached out to Syed Ahmed Khan, who was later knighted and believed that cooperation with the five British would benefit Muslims more than forging an alliance with the Hindus in national agitation [11]. Britain's anti-

Muslim attitudes have declined in favor of initiating anti-Hindu policies. Another example of the policy of division and rule was the 1905 partition of Bengal, which sought to suppress the spirit of Bengal's progressive intellectuals [12]. The partition was an astute project designed to bridge Hindus and Muslims' gap and stifle their national movement [11]. The British rulers have tried to destroy the integration of Bengal by dividing the largely Muslim eastern regions from the largely Hindu western regions in order to undermine the unity of the people. The British objective was to rule and exploit people, but Lord Curzon viewed it as a policy to promote its administrative efficiency [12].

The scars of divide and rule are still evident in modern India, Pakistan, and Bangladesh. Hindu-Muslim violence, triggered by a strategy of separation and law, is still prevalent in these nations. Antagonism often takes a serious form that contributes to Muslims' marginalization in India and Hindus in Pakistan and Bangladesh. As such, Hindus and Muslims regard each other with mistrust and apprehension in co-existing as they did years before the arrival of the British.

3. Colonial Education in India:

Education in a country is closely related to its culture, as it provides “intergenerational knowledge transfer” [13]. Prior to the British arrival, India’s education system was small in scale and organized with Muslim children being schooled in madrasas and mantas, and Hindu children were taught in pathsalas and tools. These institutions taught children Arabic, Persian, Sanskrit, theology, grammar, logic, law, mathematics, metaphysics, medicine, and astrology [14][15]. The British government, however, ignored this faith-based education system and replaced it with a British system—an action that affirms a colonial motive the British government intended to fulfill by introducing English education into India. Initially, however, the British showed no interest in India's education and religious affairs [14]. The British believed that any interference in Indian education and religious matters might endanger its political and commercial enterprise [16], and in order to ensure its domination and control of India and to keep Hindus and Muslims quiescent, the British founded madrasas and colleges to provide an oriental education within the relevant cultural framework of the country. The founding of Alia Madrasa in 1780 by Warren Hastings (Governor-General from 1772 to 1785), and Sanskrit College in 1823 by Lord Amherst (Governor-General from 1823 to 1828) are two such examples. To advance oriental studies, Governor-General Lord Wellesley founded Lord Fort William College in 1800 so that English officials could learn local languages [14]. However, British Liberals and Evangelicals demanded the introduction of British education with English as the medium of instruction. The British formed a Committee of Public Instruction, composed of two opposing groups: the Anglicizes and Orientalists. The Anglicizes argued in favor of British education by denigrating indigenous education, while the Orientalists argued in favor of indigenous education. Based on Macaulay’s recommendation, Lord William Bentinck (Governor-General from 1833 to 1835) introduced British education in India on March 7, 1835, and devised a filtration model of education, according to which English education was first imparted to the upper classes from whom it would then filter down to the masses [14]. Sir Charles Wood, the President of

the Board of Council, who drafted a report that provided for a comprehensive education system, followed Macaulay. The report recommended that English should be the medium of instruction for higher education, and local vernaculars remain the medium of instruction in schools. The report also recommended universities' founding in Kolkata, Bombay, and Madras as teachers' training colleges, and grade schools—elementary schools, middle schools, and high schools. To implement the recommendations, universities were founded in Kolkata, Bombay, and Madras, and English was introduced as a medium of instruction in the Indian sub-continent's higher education system.

From the viewpoint of justice, Britain's education policy in India was an instrument of domination and a weapon of oppression meted out to Indians. This education system can be compared to the banking education model [17], where education is viewed as a process that deposits knowledge into students. Teachers are the supreme authority in this system while students' pre-existing knowledge is ignored [17]. "The more completely they accept the passive role imposed on them, the more they tend simply to adapt to the world as it is and to the fragmented view of reality deposited in them " [17]. Similarly, the British colonizers imparted British education, science, and philosophy to Indian learners. This indoctrination and oppression imposed on the colonized as an "undue strain inflicted upon pupils" who felt difficulty in expressing their ideas in English [18].

However, it can also be argued that learning the English language can be viewed from an empowerment perspective. The British taught Indians Western knowledge and the English language, which eventually enabled them to be aware of their rights. It can be argued that, enriched with the power of knowledge from Western education, the Indians began to think of their freedom. They spoke about their independence, reclaimed their land, and finally after ninety years of complete British rule, they succeeded in taking back their land from the colonial masters. In British India, the colonial education policy imposed English upon the local populace, subjugated local languages, and even created a buffer class to serve the colonists. This language subjugation is an integral component of the colonial power's structural and cultural violence as viewed by Gatling (1969, 1990) that still exists and affects the Indigenous communities in the Chittagong Hill Tracts (CHT) of Bangladesh[19][20]. The state imposed the dominant language (Bengali) on the Indigenous people in Bangladesh. Indigenous languages are not recognized, and the Indigenous people's language rights to this day are not protected despite their demands for having mother tongue education and recognition in their schools [21][22]. The same applies to ethnic and religious minorities in India and Pakistan, where to this day English is the official language in a majority of educational institutions and the judicial system [23].

4. **Science and Colonization:**

Emergence of modern science along with its industrial and commercial applications coincided with colonial explorations and understandings. This was no coincidence. Both had an intimate, though complex, cause and effect relationship. Science, modernization and domination all marched together. This lay in history's logic and was to change human knowledge and relationship in every conceivable way. In recent years a good deal of attention has been paid to determine the place and role of techno-scientific changes and developments in the colonial process[24]. New questions have been asked, and certain explanations attempted. For example, what shape "modern' and 'universal' science takes in a colony? To what extent scientific discourses were used to achieve political or economic goals? How was the indigenous scientific tradition perceived and how did the indigenous people react or respond to the introduction of 'new' science? Exact sciences like physics or astronomy may appear cognitively 'insular' in a colony but several other branches of scientific knowledge were not so. How 'colonial' they become in a colonial setting? Lot of work has been done on conceptualizing the colonizers, articulating the colonized, baring their differences, attempting integration, and so forth. New approaches can now be discerned in the writings of Dhruv Raina, S. Sangwan, Gyan Prakash, S. Irfan Habib, V.V. Krishna, Pratik Chakraborty, Anil Kumar and others[25]. They raised new questions and dealt with how the scientific ideas 'travel' and the strategies of hegemony and counter- hegemony. Unlike the previous studies that hovered around the master-slave dialectics or the impact-response syndrome, the new micro-studies emphasize the subsumed contradictions and disjunctions [26]. As a result the canvas has now been considerably enlarged; it involves studies on the power-discourse as well as textual or prospographical studies on cultural displacement and renegotiation.

5. Medical encounter:

Western medical system had an important role to play in the colonization of India. It worked in several ways: as an mechanism of control that would move backward and forward between force and persuasion. It would also work as a site for communication and often resistance. In its previous role it served the state and helped to make sure complete authority. India had never faced such a challenge. Hindus and Muslims had two different systems but collaborated - at least in medicine - and hardly ever fought over it. Madanul- Shifa-Sikandarshahi (an early sixteenth century Indian medical text) is an instance of this combined culture, evolving over centuries of co-existence. Numerous medical texts and commentaries were written in Sanskrit, Arabic and Persian between the tenth and eighteenth centuries.

6. Nuances of the encounter:

The colonial ideology, its policies (however ad-hoc), metropolis- periphery tensions, scientific out-posts, - what all these meant to the colonized people [27]? This takes us to the realm of cultural history. Colonization had brought forth a massive cultural collision that profoundly influenced the cognitive and material existence of both the colonizer and the colonized [28]. This encounter was initially disturbing, even agonizing. Gradually relations stabilised and the recipients started examining what was living and what was dead in their system, and under the new dispensation, what to accept and what not. The encounter also had within it the question of attitude (towards each other), an uneasy acceptance, a quest for identity and, finally, the seeds of decolonization. The question of identity was important for a colonized society and its subdued psyche in the same way as the feeling of superiority and invincibility was for the colonizers. The retrieval of this seemingly lost identity was a precondition for regaining the lost sovereignty.

The most important characteristic of the nineteenth-century Indian thinking was an unprecedented emphasis on cultural synthesis. A number of cultural interlocutors from Rammohan Roy to Vivekanand worked for it. P.C. Ray (1861-1944) provided a sociological explanation for the decline of scientific spirit in India. He blamed the caste structure that had separated mental work from manual work, thus theory from practice[29]. This externalist explanation was not from a laureate but a working scientist. Another Indian scientist who shifted from physical mapping (as a geologist) to cultural mapping was P.N. Bose. He also held the Brahmanical system responsible for the neglect of physical sciences [30]. Only J.C. Bose did not take historical analysis, but he looked to Samkhya and philosophical traditions.

7. Revivalists or revitalists?

What made these scientists look into distant past? Intense nationalism, quest for an identity or concern for the future? Probably all three. All this was part of self-exploration and self-criticism was considered vital. They used the term 'Hindu' but not in a religious sense (or in the way it is being used now). They were not seeking to reconstruct what David Arnold calls 'Hindu Science'[31]. Be it Bankim or Afghani, their aim was just to show that modern science was compatible with their respective culture and traditions. It was not retrogressive revivalism. Instead almost all the interlocutors of Victorian India talked of a cultural synthesis for the simple reason that it gave them the best of both worlds. First it enabled them to absorb culture-shock and then promised a possible opportunity to transcend the barriers imposed by colonialism. The charge of 'revivalism' merits a serious reconsideration. In popular press or discourses, hosannas to ancient wisdom or science were routinely sung. A Tamil journal, for example, claimed, 'ancient Indians knew about space, telescopes, watches, chemical warfare, and had also travelled in air. Now all that is gone [32]. A professional scientist would not have said this. B.N. Seal in his The Positive Sciences of Ancient Hindus did not make such fantastic claims; instead he concentrated on scientific methodology and discussions on

perception, inference, causality, etc[32]. Beginning an article or a book with a quotation from Charak or the Veda does not necessarily mean an exercise in revivalism. The fact that J.C. Bose once gave Sanskrit names to his instruments, or called his institute a 'temple' or sometimes quoted from Upanishads, does not really make him a revivalist. He was probably 'trying out the role of a westernised scientist within an indigenous cultural frame'[33]. P.C.Ray regarded the revival of Hindu orthodoxy as 'fatal to the progress of India' and wrote about it in his autobiography [34]. Sometimes they might have overstated their case or adopted an ambivalent posture on certain issues; but this can be seen as a reflection of the trauma that the Indian nationalism had undergone.

8. Technological change:

It has been seen that technology - whether as tool or form of knowledge - is not value-free; it always manifests political qualities. In colonial conditions, it naturally acquired the contours of the colonial power, both commercial and administrative. Technical change in colonial India was mostly effected as a by-product of economic activities. Conscious innovation in order to bring about a new combination of processes or products was a rarity.

The common refrain of the British officials was that the Indians were resistant to change. Well, resistance to innovation and rejection of new technologies are common in all societies and must be viewed against particular people's historical experience. Mughal emperors accepted certain war technologies from the West (even now South Asia looks to the West for engines of destruction), but (like Ming China) felt no need to introduce mechanical clocks. For them, time was yet to become money. Lack of technological creativity and an experimental tradition have for ages been attributed to Hindu shibboleths. However, records show that even 'conservative' peasants were not averse to adopting new implements or seeds provided they were economically beneficial and technologically viable[35]. What more could they do in a 'cash Raj' which collected rent in cash and forced cash-crops[36]. Artisans rejected saw-gins or filature machines because they had no means to own them[37]. The influence of colonialism and landlordism was also felt in the labour control methods, labour behaviour, choice of techniques, and technical change speed. Be it agriculture or industry, more emphasis was attached to 'use' of knowledge than to its 'transfer'.

The British introduced technology 'projects' like telegraph and railways but these could not develop into 'a technology system.' Technologically speaking, the railways were a great experiment. India's vast and varied terrains served as a 'laboratory' in which the railways engineers 'tested their skills and adapted their practice.' But these could not stimulate new industries. Asia's first railways workshop was established at Jamalpur in 1864 but no technological spin-off could emerge. The railways remained import-oriented and 'enclavist.' In fact it was 'a colony' within the colony. As imperial consolidations involved enormous construction works, civil engineering received all patronage. Industry-oriented branches, like mechanical,

electrical and metallurgical engineering could come only in 1930s, that too because of post-Great war circumstances and restive nationalist demands. For India to industrialise, there had to be structural incentives to invest and innovate using applied science. But these could not come from 'within' as 'within' had lost its sovereignty. The nascent Indian bourgeoisie could not produce heavy capital goods on a weak and dependent technological base[38]. It is important to note that technical men like engineers were less interested in 'local knowledge and practices.' Their technical discourse was universal, and their real concern was to ensure the most efficient use of nature in the service of the state. Probably the same was true for forest management. In contrast, the civilian officials were concerned about traditions and customs but they did not wish to unsettle them (for fear of revolt).

9. Reconstructing India:

For India the twentieth century began on an interesting note: it saw the apogee of the Empire and at the same time the seeds of decolonization sprouted. Like the eighteenth century, it was an era of transition. Swadeshi and Swaraj reverberated the air. These were more than political slogans, rather they symbolised an intense yearning for change. In the midst of growing demands for democracy and development, Gandhi emerged as an extraordinary dissenter. He condemned the West precisely for the same reasons it had prided itself for so long, i.e. modernization and industrialization [39]. He seldom used the term science or technology. His concern was civilization and mechanization. One may not agree with Gandhi's great emphasis on non-violence and anti-vivisection, etc., but he definitely provided a notion of social accountability with which it is almost impossible to differ. Similarly his search for an 'alternative' cannot be overlooked. P.C. Ray showed greater appreciation of Gandhi than other scientists of the day. He had western education, had founded the first great chemical industry in the country, and yet in full consciousness of the relevance of modern machinery, he adopted and pleaded for charakha. He recognised the relevance of Gandhi's emphasis on rural values and social control which the march of western civilization had gradually eroded[40]. The sharpest criticism of Gandhian views came from an eminent engineer, M. Visvesvaraya (1860-1962) and a pioneer astrophysicist, M.N. Saha (1893-1955). Visvesvaraya asked for rapid industrialisation through Indian capital and enterprise. His Reconstructing India was probably the first attempt to make India plan-conscious [41]. The entire 'development' discourse was run by experts, middle class professionals who stood for the state, and through the state for the nation. Politicians and bureaucrats added their own flavours. All this was done in the name of the masses who 'entered the picture only as the somewhat abstract ultimate beneficiary [42]. In the name of the 'masses' the authors of the Bombay Plan asked for a shift from an 'over-agriculturalised' economy to an industrial economy[43]. But in the name of God they refrained from even mentioning the population problem. A more viable proposition was planned development on the socialist (Soviet) pattern. Nehru's heart lay in this but the pragmatist in him led to compromises at every step. Lest right-wing leaders feel alienated, Nehru spoke of independence and democratic structure first, and then socialism and planning [44]. After independence, he perfected the art of mixed economy and mixed politics. He tried to combine

Gandhi and Visvesvaraya, but finally could do justice to neither. The traditional distinction between pure and applied sciences was another casualty of this transient era. S.S. Bhatnagar, Homi Bhabha and many others looked for a composite structure that combined the two. But to 'purists' like Meghnad Saha, pure science was the seed of applied science, and 'to neglect pure science would be like spending a large amount on manuring and ploughing the land and then omit the sowing of any kind[45]. Satyen Bose and C.V. Raman had similar views. Academic science still held a greater appeal for the Indian mind. However, the notion that science and technology were two sides of the same coin, had two interesting results for India. One, it meant assigning a far greater authority and responsibility to the state. Secondly, in the name of coordinating the two, the tendency in practice was to centralise. Hill himself argued for centralisation (which he would not prescribe for Britain). Centralisation and concentration of power was to become hallmark of the scientific establishment in post-independent India.

10. Conclusions:

Prior to British colonialism, previous conquerors could not control India completely. However, within four years of the Plassey Battle, the British conquest unprecedentedly broke Indian social structures, basic institutions, and the self-sufficient village system. The consequences of the Battle of Plassey influenced the rule and the British cultural contact modes in the subcontinent. In the post-colonial period (1956-1987), British areas were found to have higher levels of investments in agriculture and production, but lower levels of investments in schools, roads, canals, and health centers [3]. The public goods in terms of the access to schools, health centers, and roads was minimal in areas that experienced British direct rule because of the heavy taxation and extraction of resources. Poor policies were installed in areas remote to the colonizers. On the other hand, areas that experienced indirect rule exhibited opposite developments. Native rulers had longer tenure to invest in public goods provision, than British administrators [3]. The native rulers' families played an important role in post-colonial politics by manipulating elections and controlling resources. The British introduced Western education, the English language and culture, literature, and philosophy to strengthen India's power. The British demonized Indians, viewing the natives as "incapable of understanding what was in their best interests" [6]. They succeeded in creating an elite class that worked for the British and helped prolong colonial rule, and they provided a legacy that survives to this very day. Despite some positive social transformative steps, the British policy of divide and rule fueled and nurtured conflict in the Kashmir valley, Karachi's port city between Mohajirs and other ethnicities, and the Rohingya and Bihari ethnic conflicts in Bangladesh. These conflicts are a legacy of British colonialism that have claimed many lives and abused the human rights of hundreds of thousands of innocent people in the Indian subcontinent. Given the direct, structural, and cultural violence of colonial policies of divide and rule, education, and laws, the postcolonial states must not sustain the legacy of British colonial policy of forced assimilation, division, and subjugation by imposing the dominant language, religion, and culture against ethnic and religious minorities.

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