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CALCUTTA: THE EMERGENCE OF A SCIENCE CITY (1784-1856)

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The paper narrates briefly the emergence of Calcutta as a city where one finds the early glimpses of a cultural encounter between East the West, and where a few scientific societies and institutions were first established. The emergence of Calcutta as a science city is synonymous with its growth as an imperial city. The paper focuses on the Asiatic Society, the Agriculture and Horticulture Society and the Calcutta Medical College and concludes that science was valued more as a cultural activity than a purely economic exercise.

One thinks of modern India, and Calcutta figures in – the city, its imperial past, its nationalist tradition, its commerce, culture and people. The Raj and the city grew together. Two distinct civilizations met here; there was some fusion, some rejection, and Calcutta remained a melting cauldron for a long time.

One important aspect of this meeting point was the introduction of modern science and technology. Calcutta was one of the first to receive and acclimatise them. But this import was not value-free. They came as an integral part or perhaps as the mainspring of the whole colonial system. They were effective tools in both the conquest and the consolidation of the empire. Calcutta thus had the earliest scientific societies, institutions, journals, etc. The inspiration and guidance came from London – the chief metropolis of the empire. But soon this periphery grew at a fast pace and emerged as the metropolis of the East. What began as a colonial outpost gradually developed into a metropolis with a string of institutions, an array of individual sparkles, and an urban ethos which would receive, examine, accept, reject, amalgamate, or generate many new ideas and objects.

The emergence of Calcutta as a science city is synonymous with its growth as an imperial city, or perhaps imperialism itself. Here, one may ask, can there be an imperialist side to the core of natural knowledge? Many would argue, science is universal; and certainly you can not call it colonial simply because of its association with a colonial city! I believe, socio-political circumstances do shape natural knowledge. More so in a colonial framework. The essence of colonialism is dependency, so is that of colonial science. The colonial scientists were offshoots of the metropolitan culture and drew sustenance from it. MacLeod defines metropolitan science as not just the science of Edinburgh or London, Paris or Berlin; but as *a way of doing* science, based on learned societies, small group of cultivators, certain conventions and certain priorities[1]. The colonial scientists were also a small group of cultivators; they also established learned societies; but the priorities, realm and scope of investigations were not always

determined by them. This made all the difference. It became mostly derivative, and was, in the eyes of the metropolis, some sort of a dependent if not low science, identified usually with data-gathering.

There is one more dimension. Natural knowledge serves to confer prestige on the metropolitan power and thereby legitimises imperial control over peripheral territory. But prestige alone could not have been the sheet-anchor for the empire. So, the focus had to be on the applied sciences – botany, meteorology, physiology, applied mechanics, etc. I am not arguing that all science at the periphery was applied science, for example, the astronomical observations. But colonial science was primarily science applied to production of systematic knowledge about the colony (its flora, fauna, minerals and topography) and the solution of certain practical problems of the day. Certain material benefits did accrue and some 'development' did take place. But here the key question arises: whose development and for whom? This, however, has been the subject of several long debates.

One thing is clear, colonial science does represent an advance over pre-colonial science. For example, the pre-colonial India did not have any scientific society or any scientific journal. As a result, research remained esoteric and tended to get lost. William Jones[2] was the first to realise this and founded the Asiatic Society in 1784. This society soon became the focal point of all scientific activities in India. On 7th September 1808, it resolved to form a Physical Committee 'to propose such plans, and carry on such correspondence as might seem best suited to promoted the knowledge of Natural History[3]. In early 1814, N. Wallich, the great collector of botanical specimens, proposed the establishment of a museum devoted to 'history and science' to which the members of the Society enthusiastically responded[4]. William Jones had worked more on Sanskrit literature. His successor Colebrooke's secretaryship was more significant, because he put emphasis on grammar, philosophy and science. But the Physical Committee remained dormant and in 1826, the Society decided to abolish it.

The Society soon came under sharp criticism. Incidentally, this was the time when Charles Babbage was attacking the Royal Society of London and published his *Reflections on the Decline of Science in England.* The publications of the Asiatic Society were criticised for their heterogeneous nature and lack of scientific interest. The Physical Committee was revived in 1828, and a series of lectures called the 'physical class' was started[5]. A new journal *'Gleanings in Science'* was also started. These efforts, however, met with only limited success. Corbyn found its meetings lackluster, and regretted 'there has been a great falling off and other societies in consequence have been founded'[6]. Another contemporary narrates an interesting instance of how the government bought off vocal members:

> 'The Society's Agricultural Committee had the advantage of possessing a very active secretary, intent on progress, who procured sundry excellent papers for his Committee. This Committee which was beginning to know so much, and what was still a greater offence, to tell the public so much about India, alarmed the jealousy of a bureaucratic despotism, which determined to silence it at any price. The first thing was to find or make good place for the secretary and stop his mouth; and accordingly this votary

of progress one morning took his colleagues by surprise (of whom one or two never spoke to him afterwards) by announcing his promotion to a Government appointment. After this blow, the Agricultural Committee withered away under the frowns of government, and the Asiatic Society found it expedient to confine itself to the most harmless antiquarian researchers for the future[7].

Official interference came in other forms as well. In July 1856, for example, the government decided to take away the Museum of Economic Geology from the Society and give it to the Geological Survey of India. This time, the President of the Asiatic Society was T. Oldham who, as Superintendent of the Geological Survey, naturally had an eye on the Society's precious geological collections. He supported the government move; in fact, he might have pulled strings from behind. The majority of the Society's Council opposed it. One of its members, Rajendralal Mitra, felt: 'By giving up the geological department altogether, I very much fear we shall soon be under the necessity of asking the Medical College authorities to take away the zoological collections, and the curators of the Public Library to relieve us of the books[8]. The government had to withdraw and the issue got lost in the bigger question of how to have a real imperial museum. There were several other societies worthy of mention. The Agriculture and Horticulture Society of India, for example, had government officials and influential zamindars as its members, and its funds came through private subscription, sale of plants and government aid. In 1830, the government gave this Society Rs 20,000 for distribution among the most successful cultivators of cotton, tobacco, sugar silk and other articles of 'raw produce'[9]. This Society picked up fast and made ambitious plans. Basically engrossed in the acclimatisation of several foreign varieties of fruits and vegetables[10]; it often assumed the role of an adviser to the planters as to where and how to invest capital in new agricultural ventures[11]. It experimented with flax-culture and tinkered with tea. Dwarkanath Tagore, an effective member of this Society, offered his extensive premises at Manicktolla, rent free, for a school where a few local workers could be trained in flax-culture[12]. The Court of the East India Company appreciated this gesture[13].

Another important scientific society was the Calcutta Medical and Physical Society, established in March 1823. It broke the social and professional isolation of the doctors, and without any government aid, was able to publish its *Monthly Circular and Selections* regularly[14]. These societies started as exclusive European clubs. No Indian was accepted by the Asiatic Society of Bengal till 1829, and no Indian made any scientific contribution to its journal till the 1880s. It would, however, be interesting to know about papers by Indians at the medical and agricultural societies. Radhakant Dev wrote papers on the use of manures and the chemical elements in Indian soils[15]. The Medical and Physical Society of Calcutta elected four Indians – Radhakant Deb, Ramcomul Sen, Madhusudan Gupta and Raja Kalikrishnan Bahadur, as corresponding members in 1827 and they did produce few papers on indigenous drugs[16].

These societies rendered invaluable services, particularly through their journals whose standard compared very favourably with that of European ones. It was no mean achievement that Calcutta, with a reading public of a little more than two thousand, could produce and support scientific journals like the *Gleanings in Science and Calcutta*

Journal of Natural History. The latter even attempted to establish in 1841 an Indian Association for the Advancement of Natural Science[17] on the pattern of the British Association for the Advancement of Science.

These voluntary societies were important institutions in their own right. I shall not cover the official institutions like the Royal Botanic Garden, the Calcutta Mint, Geological Survey, Telegraph Department etc. because these institutions worked along the government lines and had little public contact. The voluntary societies definitely had a more stimulating effect on the city. But their works could have reached the local people only through educational institutions to which we now turn.

The education officials were quite aware of the Indian techno-scientific traditions. In 1824, the General Committee of Public Instruction, Bengal, reported: 'The arithmetic and algebra of the Hindus lead to the same result and are grounded on same principles as those of Europe[18]. Cultural pluralists like Colebrooke, Prinsep, Adam, Campbell and Tytler repeatedly advocated full use of the indigenous systems and institutions. Colebrooke wanted 'to investigate the sciences of Asia.. with the hope of facilitating ameliorations[19]. But none of them could succeed. One by one, Prinsep, Tytler and Adam, had to resign from the Committee of Public Instruction. Prinsep left regretting:

'The publication of Bhaskaracharya's work with commentary was proposed but rejected. An edition of Euclid in Sanskrit was prepared; it too was rejected. Hutton is now suspended, and a vade-mecum of anatomy half through the press is also laid aside; all that might be done is thwarted and frustrated...'[20]

But such arguments fell on deaf ears. The imperial ethos had already assured Macaulay an easy victory. His personal distaste for science led to a curriculum which was purely literary[21]. In July 1835, the General Committee of Public Instruction even recommended the abolition of the existing science professorship at the Hindu College and discontinued the instruction of chemistry there. The Bengal Hurkaru wrote, 'more useful knowledge is to be gained from the study of one page of Bacon's prose, or of Shakespeare's poetry, than from a hundred pages of Euclid[22]'. In 1844, the idea of having a Professor of Natural and Experimental Philosophy was revived. But controversy arose whether the emphasis was to be put on pure science or applied science. One section of the Council of Education felt that 'the course of Natural Philosophy would be only such as is considered necessary as a branch of general education without being specially adapted to or intended for professional men.' The other section thought that 'the course should be a combined experimental and mathematical course.. without which it is quite impossible for the engineer, surveyor, navigator or mechanist to become proficient as practical men in their several departments'[23]. Need was certainly felt to have a class of apothecaries, hospital assistants, surveyors and mechanics to serve the fast-growing medical, survey and public works departments.

In 1845 was first floated the idea of a university in Calcutta[24]. The Bengal Government supported it. Cecil Beadon, the Secretary to Government of Bengal, wrote

to the Government of India, 'the establishment of a university would doubtless be a great boon. It would tend to call into existence a vast amount of talent which now lies dormant from the absence of such a stimulus, and to produce an efficient indigenous class both of scientific and learned men and of public servants[25]. The was not viewed favourably in London. Later, the Court accepted it, but not without the emphatic declaration that 'the education which we desire to see extended in India is that which has for its objects the diffusion of the European knowledge, *having practical objects*. It was not clear what those practical objects were. Contemporary opinion did look for a 'sound and fertilizing instruction in Natural Science'[27], though future events were to belie such hopes.

Earlier, in 1822, a medical school had been proposed. This 'Native Medical Instruction' started functioning from 24 with the twin purposes of teaching both the Western and Indian systems of medicine. Medical classes were started also at the Calcutta Sanskrit College and the Calcutta Madarsa. These efforts, however, took a curious turn in 1833 when the 'language controversy' arose. In this controversy, Dr John Tytler, principal of the Medical School, sided with the orientalists. He admitted that the indigenous systems were medieval, but he knew that they contained grains of truth. For him, the only solution was to allow the students to draw comparisons, sort out errors, and then work towards the improvement of their own systems[28]. Tytler found himself in difficulty when he started preparing Arabic translations of a few European medical textbooks. In order to translate one word of English, he spent hours in searching through Arab lexicons, only to find that its counterpart did not exist. He concluded that translations were unprofitable.

The result was that in early 1835, the medical classes at Sanskrit College and the Madarasa were abolished along with the Native Medical Institution itself. A petition signed by 8,312 Muslims of Calcutta accused the government of 'causing the science of Arabia to cease'. (29) The students of Sanskrit College also reacted the same way[30]. Griffin questions the depth of Tytler's judgement and his competence as an Arabic scholar. No dictionary of the 1820s, he argues, would have contained terminology on European medicine unless it came from Egypt, and Muhammad Ali Pasha's programme of medical education had just commenced. Tytler's own unhappiness with translations also was a poor argument for rejecting them as unprofitable or for thinking that Indians were incapable of understanding the works in English. If the Egyptians could rise to the occasion, so could the Indian Muslims[31].

Now a new medical college was established wherein all pupils were required 'to learn the principles and practice of medical science in strict accordance with the mode adopted in Europe[32]. This was an important event, for thenceforth, through syllabi and language, was to be fostered a 'dependent science', and Indians were made to look for Western models in every field of medical science.

It was easier to dangle western models and flaunt the superiority of western systems, but when some financial investment was required in realisation of its proclaimed

objectives, the government would develop cold feet. To quote a despatch from the Court: 'The plan of establishing a laboratory at your Presidency (Bengal) similar to that at Apothecaries Hall in this country (England), with an establishment of chemists, aided by a steam-engine, and other expensive apparatus, will, we apprehend, be found inexpedient and unnecessary measure and we desire accordingly that it be not carried into effect,'[33]. This veto was given in the very year in which Madhusudan Gupta had become the first Indian to dissect a human corpse – an event to commemorate which the Fort William had even boomed a 51 gun salute.

Pumping resources was thus no easy matter. The local rich came forward. Next year, a large galvanic battery was presented to the College by public subscription. D.N. Tagore offered annual prizes to the tune of Rs 1000 and Mutty Lal Seal later gave a large piece of land. IN 1845, four Indian medicos were sent to England for higher studies; two were sponsored by D.N. Tagore and one earth by Dr Goodeve and the Nawab of Murshidabad. The monetary value of these offers was not much. But it showed clearly enough that the newly emerging educated group of Calcutta was prepared to overcome a deep-seated prejudice to master a western science[34].

The progress was certainly steady and well-geared to meet the immediate requirements of the government. By 1838, the demand for 'Native Doctors' in the army became so pressing that a Hindustani class had to be opened in which anatomy, medicine and surgery were taught in Urdu, the original scientific nomenclature, however, being retained. Later, in 1851, a Bengali class was also opened. Despite the Macauleyan verdict, subdued voices were still heard in favour of the vernacular. The Hindustani and Bengali classes were extremely popular, and many thought that only through them European science could be popularised. Academically also the students of the Hindustani (Military) classes were often found better. In 1848, Professor Webb of the Calcutta Medical College, noted:

'The dissections of the English class were for the most part decidedly inferior to those of the Military class. Whereas the dissecting rooms of the Military class were found generally full of diligent dissectors, and the subjects were never thrown away only partly dissected; the reverse was the case with the English class'[35].

All this, however, could not impress the traditional Kavirajas and Vaidayas, who, confident of getting no encouragement from a foreign government, kept themselves aloof from the modern scientific world. Even those who went to medical college, found the course extremely lengthy and expensive. In 1845, the course was extended from four to five years[36], and the result was, the very next year the number of students fell from 57 to 32. This problem was to continue for some more time. Judicial and commercial jobs offered higher salaries; naturally brighter students preferred them. The question was not of unwillingness but of inducement. The commander-in-Chief had refused to accept Indians as surgeons in the army, only sub-assistantship he would give[37]. So, several medical graduates took to private practice.

The above details show that the voluntary associations played perhaps a more important role in the gradual emergence of Calcutta as a science city than direct government efforts. But government patronage was important. Most of the members of these associations were government officials. Kejariwal, in his study of the Asiatic Society, argues that the world of scholarship and the world of administration were worlds apart and not necessarily complementary to each other[38]. It is difficult to accept this argument. Perceptions differed but not the direction. The establishment of scientific institutions and journals was dictated not so much by the diffusion of scientific knowledge *per se* as by the growing need for the local management of the complex resources of the colony[39]. The government, that too of a trading company, would naturally be guided by economic considerations. But there was no guarantee that scientific excellence would bring economic benefits. So, science came to be valued more as a *cultural* activity. The government asked its officials to undertake such pursuits only in 'leisure' time. Researches thus were individualistic and esoteric, the only binding cord being the scientific 'clubs'.

Another important aspect is that the practice of science remained largely alienated from its social context. In fact, one may ask, was it culturally divisive? Some found cultural dependence quite unavoidable, while others rejected all that colonialism represented and searched for identity in indigenous traditions. The spread of modern science required the penetration of indigenous science and culture by western science[40]. Many Calcuttans responded enthusiastically. Was it because the *Bhadralok* wanted to legitimise their newly-won status[41] or was it a true craving for knowledge and improvement? The truth perhaps lies somewhere between the two. By the middle of the century, nevertheless, the ground had been prepared for bigger experiments, both in terms of organisation and research, in the decades to come.

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