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SCIENCE IN HIGHER EDUCATION: A STUDY IN VICTORIAN INDIA*

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Science came late into the educational scheme. The great developments in 17-18th century had taken place not because of, but in spite of, the place science occupied in education.[1] The industrial revolution had integrated science firmly into productive mechanisms[2] and thereby had enhanced its importance; naturally the educational establishments could not have ignored it, and soon the higher education in Western Europe underwent a sea-change. Could this wave affect nations like India with a fairly long educational standing and tradition but which had by that time fallen prey to colonization?

One of the intentions mentioned in sec. 43 of the Charter of 1813 for the grant of one lakh rupees to be spent on education was 'introduction and promotion of a knowledge of the sciences among the inhabitants of the British India'.[3] But the Court of Directors gave no directive as to which system of science, indigenous or European, was to be preferred. The Court perhaps tried to avoid taking sides and took refuge in the neutrality of the engraftment principle, calling for the fusion of the scientific and medical technique of the East and West. The result was the whole issue got bogged down into what is known as the Anglicist-Orientalist controversy[4] which the former finally won. Macaulay's distaste for science, the mechanical arts, astronomy, and engineering led to a curricula which were purely literary.[5] Entry of science thus got delayed. In July 1835 the General Committee of Public Instruction recommended even the abolition of the then existing science professorship at the Hindu College and discontinued the instruction of chemistry there.[6] An influential contemporary journal 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.'[7] Against this back drop began the Victorian era.

Purely scientific education did not fit into the exigencies of the Company Raj. But the need was felt to have a class of apothecaries, hospital assistants, surveyors, and mechanics to serve the fast-growing medical, survey and public works departments. Training native youths was obviously much cheaper than getting technical personnel from abroad. So was opened in 1935 the Calcutta Medical College,[8] and in 1843 an engineering class at the Hindu College.[9] In 1844 was revived the idea of having a

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Professor of Natural and Experimental Philosophy. But the controversy arose whether the emphasis was to be put on pure science or on applied science.[10] Around same time Dr. F. J. Mouat, Secretary of the Council of Education, floated the idea of establishing a university.[11] But it was only to be a mere examining body and thereby could not have given a boost to science education as such.

University system could not dispel the air of pessimism which hung round science education. Rather it got accentuated in the name of liberal education. Physical sciences were removed from the list of necessary (viz., Languages, History, Mathematics and Mental & Moral Science) subjects for B. A. Examination.[12] W. S. Atkinson, the DPI of Bengal, wrote: 'Indeed if I am asked what steps should be taken by this Department in furtherance of original research, my answer must be none': and then added the same old ecclesiastical cliche', 'the causes which have produced the degradation of the national intellect among the Hindus are deep seated, and may be traced through centuries of moral, social and political debasement.[13]

It was not that the natives were not receptive enough. That the students reciprocated well can be found in what J. Prinsep wrote to O' Shaughnessy after examining the chemistry students of Calcutta Medical College: 'All the essays are extremely creditable; indeed the extent and accuracy of the information has far surpassed my expectation and I do not think that in Europe any class of chemical pupils would be found capable of passing a better examination.'[14]

Vernacular periodicals like *Samvad Prabhakar*, *Tattvabodhini Patrika*, *Somprakash* etc. every now and then harped upon the importance of science education and research. *Somprakash*, for instance, observed that 'in a country like France' even at the primary level or at the very ordinary school sufficient attention is given to science. In India the study of true science is negligible. It remains limited to the Roorkee Engineering or Medical Colleges. In 1869 the Asiatic Society proposed that science should be studied properly at the university level right from the Entrance. But the Govt. refused by saying that the time was not yet ripe. Is not the Education Department the cause of our scientific and technological backwardness?'[15]

Although the Calcutta University was avowedly founded on the model of the London University, the Oxbridge tradition was apparent in the exclusion of science.[16] The education system led to the acquisition of literary, rather than of scientific tastes—'tastes which are best satisfied by the profession of the lawyer, teacher, or the government official.'[17] Bombay was the only University to confer a separate degree in science. The scientific course in Bombay, Lahore and Calcutta were almost similar, except that English which formed a compulsory subject at Calcutta, was altogether excluded from the two former and that Mathematics, optional in Bombay, was a compulsory subject at Calcutta and Lahore.[18] Quantitatively science course was less popular but it gave better results and was preferred by scholarship holders. In 1882 the DPI of Bengal reported that the percentage of success was 20 in literature course and 46 in the science

course.[19] Science course continued to grow in popularity and in 1899 the Calcutta University decided to institute the degrees of B. Sc. and M. Sc.[20]

Even the much-publicised Wood's Despatch of 1845 did not pay required attention to the field of scientific education and research. Primary education was preferred, for higher learning would have created more awareness among the natives and thereby fuelled discontent. As E.C. Buck later admitted, 'I believe that the position into which the educational system is drifting us is, poilitically, most dangerous... We are overcrowding the learned professions and government offices with university scholars, and the residue; increasing enormously every year, go in the ranks of discontents.'[21]

The non-teaching character of the universities was a great handicap. What to say of giving incentives, the Syndicate of Calcutta University rather resolved in August 1858 to oppose the introduction of a subject like Geology into the academic curricula.[22] In July 1859, Oldham submitted a memorandum to the Government 'on the most effective and at the same time most economical means of teaching Geology and its colateral sciences in Calcutta'.[23] But of no avail. At the Presidency College the Government could make some provisions for teaching in Natural Philosophy and Geology, but the non-governmental colleges where the majority of students received instructions, had no means to appoint qualified science teachers and establish laboratories and, therefore, to offer science courses.[24]

The students, on the other hand, felt handicapped on account of high fees. While Oxford charged only £ 3·10 per annum, the Presidency College in Calcutta took £ 14·8 annually, that too, exclusive of fees for the professional branches such as civil engineering.[25] Scholarships were few and future prospects so bleak as to leave the scholar dissatisfied. The Government of Bengal had instituted two scholarships at the Royal Agriculture College, Cirencester. But the scholars felt unhappy when on return home they found they could get nothing more than deputy collectorships.[26] So in 1887 it was discontinued.[27] Significantly, this scholarship was given by a local Government, and not the Government of India. When the Agriculture College of Salisbury requested the Viceroy to establish scholarships there, he simply refused.[28] In 1896 the Gilchrist Educational Trust withdrew their Indian scholarships, because their scholars never succeeded in getting what they thought adequate employment under the Government of India.[29]

Science education suffered because of lack of employment and promotional opportunities in the scientific departments, which the Government had 'carefully kept as a close preserve for Europeans and Eurasians.'[30] There are evidences to suggest that students of European and Anglo-Indian origin were preferred for science education. In 1864, for instance, an official proposal came to make available works on science and literature for those students.[31] Even those natives who somehow managed to get higher scientific education, had to henceforth work under unhappy circumstances. N. G. Mukherjee, a Cirencester scholar, for example, was placed under a committee

of merchants who did not allow him a free hand in sericultural researches.[32] P. N. Bose preferred to retire from the Geological Survey. P. C. Ray had to contend himself with provincial cadre.[33] J. C. Bose's appointment to the imperial service was objected by A. Croft, the then DPI of Bengal. As Bose recalled later, 'Sir Croft told me frankly that an Indian was temperamentally unfit to teach the exact method of modern science'.[34] An Indian professor's salary at that time used to be two-thirds of an European's. When Bose asked for the full pay of his grade, the Finance Member of the Viceroy's Council (J. Westland) remarked, 'I think Mr. Bose has got his head a bit turned and he can wait a bit for his distinctions and rewards.'[35]

Five major problems plagued science education at higher levels. The first was the very aim and character of educational policy itself. Despite the encroaching claims of science and materialistic philosophy the education departments clung to the notion that their goal was 'character formation'.[36] Moreover, the universities had been deliberately denied the teaching job. K. M. Chatfield, Principal of Elphinston College, admitted that the institution of university professorships would indeed foster the development of knowledge through research but argued that not this but the 'education of youth' was the aim of the system. He contended that 'India is in an exceptional position, and just as the Revival of Letters preceded the development of modern science, so education in India must not be sacrificed by a premature attempt to foster science and original research before education itself is general and set on a firm basis'.[37]

The second problem was that so little laboratory work had been prescribed that the course was almost worthless as an entry to industry. Only few big colleges could boast of even an improvised laboratory. The opening of a chemical laboratory in 1896 in Calcutta was sarcastically referred to by a contemporary as "a giant chemical laboratory for the use and abuse of its giant classes, brimming full of 'sucking' Newtons and budding Leibigs, who one day shall teach the West."[38]

Another allied problem was the shortage of funds. For example, total grant for the colleges of Bengal during 1871-72 was Rs. 5,50,000 out of which only Rs. 16,100 was given to the Presidency College for Chemistry and Physical Science teaching, and Rs. 29,500 was given to the Civil Engineering College, while Rs. 34,400 was spent on law classes.[39] In 1874 the DPI rejected the proposal of Dr. Watt for a botanical garden at the Hooghly College on the ground that a mali to collect specimens was enough.[40] In 1897 the Government of India had acknowledged the desirability of an agricultural college in NWP, but when the proposal officially came, it developed cold feet. Behind this refusal perhaps lay the spectre of cost which would have amounted to Rs. 50,000 a year.[41]

The fourth problem was that of formulating a suitable curricula and the medium of instruction. Botany had once been very popular, but after 1882 new university regulations added Physiology to Botany and the number of students immediately

fell. At Patna and Rajshahi the Botany classes were thereupon closed and Hooghly College followed suit in 1888.[42] Before 1875, the M.A. syllabi at Madras had only one scientific paper which comprised Zoology and Animal Physiology, Botany and Vegetable Physiology, Geology and Mineralogy, Chemistry, Electricity and Magnetism all rolled into one. No one ever passed in this branch, as the range of subjects prescribed was far too extensive.[43] The custodians of science education in India always ran after European models. C. Benson of Saidapet Agricultural College, for example, justified major emphasis on theoretical instruction there on the ground that Prof. Jorgensen had done the same thing for the Royal Agriculture College at Copenhagen.[44] What was suitable for Denmark was thus held good for Madras also. Adoption of English as the sole medium of instruction in science did hamper its percolation to the lower classes. In 1853 the Japanese language was not half so well advanced as Bengali or Hindi. It was argued that if useful scientific literature in Japanese could be cultivated, there was no reason why the same could not have taken place in Indian vernaculars had they been properly encouraged.[45]

Finally, the most important problem was that of administration and management. This is evident from the treatment meted out to engineering and agricultural education. The Shibpur Engineering College was, for example, nobody's child. While its business was to train subordinates for the PWD, its teaching aspects were under the Education Department. The result was that as regards the book work the students were under the Education Department, while as regards their manual work they were under the PWD.[46] Lack of all-India policy led to certain management anomalies. The Saidapet Agricultural College and Poona College, for instance, were administered by Education Department, while the Kanpur and Nagpur Agricultural Schools were under the Agriculture Department. But none of these provided a complete agricultural education.[47] Voelcker, who toured India in 1890 to report upon Indian agriculture, found that no encouragement was given to the pursuit of scientific investigation in India and that men who might have been original workers in science had to abandon it for the duties of school inspectors.[48]

A section of the newly emergent Indian bourgeoisie did try to impress upon the government. In 1867 the Aligarh Scientific Society requested the government to patronise dissemination of scientific knowledge through vernacular.[49] Making a polite refusal, the government rather called the wealthier classes to offer help in this regard. But when such a person (J. N. Tata) came forward with the idea and money for an exclusive research university,[50] the government started taking refuge in several excuses. Tata had thought of it as an all-India memorial to the Queen. But to Curzon the Tata scheme seemed 'to have no relation either to charity, or to suffering, or to the Queen or to the 300 million of India'.[51] Tata asked £5,000 a year as governments contribution to the proposed institute. Curzon agreed to give £2,000 but not without his usual impetuosity: 'Tata entirely owes it to me that he gets anything; and if he is not wise enough to accept it, I am ready to drop the whole thing tomorrow'.[52]

The Indian National Congress always evinced a keen interest in the matters of education. At its Allahabad session in December 1882, K. V. Joshi asked the Government not to sacrifice the claims of high education to those of primary education.[53] While the Home Government spent 7% of its total expenditure in U.K. on education only, its agents in India did not spend even 1% of the revenues for the diffusion of knowledge.[54] K. T. Telang,[55] B. N. Seal,[56] A. M. Bose,[57] N. R. Sarkar,[58] K. N. Bhadurji,[59] G. Subramania Iyer[60] drew attention to the shortcomings in science education at the different sessions of the Congress. The management of medical education was such that a professor of Surgery often found himself transformed into a Deputy Surgeon General and a professor of Chemistry into a storekeeper to Government.[61]

It may be argued that when Victorian England itself was lagging behind its Continental competitors in science education and research, how could its Government have thought of imparting higher scientific education to its dependencies? It is true that Germany and America provided greater State support to science education than England. But the latter was not sleeping either as publicists like Babbage and Balfour[62] would suggest. Britain saw enormous growth in the number of scientific societies during 1770 to 1870. During the 1860's the Government introduced vast changes in the university system through the Royal Commissions[63]. It marked a change from *polite* to *professional* education.[64] But in India this change did not occur. In 1881 the French held a meeting of their Association for the Advancement of Science at Algiers,[65] their colony. Their British counterpart never thought of holding a scientific meet in India. They held it in Canada[66] and even in South Africa[67] but never in India.

Working within colonial framework it is doubtful whether science education would have shown a better record. A significant feature of colonial science is the relative neglect of medical and zoological sciences, that too, in sharp contrast to larger investment in botanical, geological and topographical surveys from which the British hoped to get direct and substantial economic and military advantages. Hence even though a medical college had been established in 1835, the expected emphasis on research could come quite late in the plague commission report of 1904[68]. Research activities in science like physics and chemistry which had by then reached 'a professional stage' in Europe, were hardly noticeable in India.[69] Only exceptions were J. C. Bose and P. C. Ray. India was found suitable only for field research and Indians for subordinate field works. Real research was to be done in the 'metropolis'. And India got only ancillary units.[70]

References

[1]Bernal, J. D., *The Social Function of Science*, London, 1939, p. 71.
[2]Crowther, J. G., *British Scientists of the Nineteenth Century*, London, 1935, p. 7.
[3]Howell, Arthur, *Education in British India*, Calcutta, 1872, p. 5.
[4]For meticulous details see, Griffin, H. M., *T. B. Macaulay and the Anglicist-Orientialist Contro-*

versy in Indian Education, (unpublished Ph.D. thesis, Pennsylvania University, 1972), p.11.
[5]*Ibid.*, p. 488.
[6]*Home, Public*, July 8, 1835, no. 4 (all archival references unless otherwise indicated are from the National Archives of India).
[7]The Hurkaru, April 28, 1838, also quoted in *The Calcutta Monthly Journal*, XLVII, Oct. 1838, p. 206.
[8]*The Centenary Volume of the Medical College of Bengal*, Calcutta, 1935, p. 12.
[9]*125th Anniversary Souvenir of the Bengal Engineering College, Shibpur*, 1981, p. 1.
[10]*Home, Public*, Sept. 13, 1845, nos. 19-30.
[11]Mouat, F. J., *Proposed Plan of the University of Calcutta*, Calcutta, 1845, pp. 57-62.
[12]Selections from the *Records of Govt. of India*, no. LIV, Calcutta, 1867, p. 11.
[13]Emphasis as in original. West Bengal Archives, (hereafter abbreviated WBA) *General, Education*, Aug. 1860, no. 90.
[14]*Calcutta Monthly Journal*, Vol. III, 1837, p. 826.
[15]Ghosh, Benoy, *Samayikpatre Banglar Samajchitra*, Vol. IV Calcutta, 1966, p. 530, and the *Athenaeum*, no. 2168, May 15, 1869, p. 672.
[16]*Nature*, Vol. V. April 25, 1872, p. 510. Most of the professors were Oxford or Cambridge graduates, who sought to impart to the Indians such an education as they had themselves received. Murdoch, *J. Educational Reform*, Madras, 1893, p. 2.
[17]Note by E. C. Buck, dt. 10th Jan. 1886, *Home, Education*, Oct. 1897, Nos. 14-88, Pt. B.
[18]Croft, A., *Review of Education in India*, Calcutta, 1888, p. 147.
[19]*DPI Report*, Bengal, 1891-92, Calcutta, 1892, p. 5.
[20]Minutes of the Calcutta University, 1898-99, para 331, Members of the science Degree Committee were J. C. Bose, E. Lafont, Mahendra Lal Sarkar, A. Pedler and P. C. Ray.
[21]E. C. Buck to the P. S. to Viceroy, dt. Sept. 12, 1895, NAI, *Elgin Papers*, microfilm no. 2023.
[22]*Home, Edu.*, Aug. 27, 1858, no. 4.
[23]*Ibid.*, May 20, 1959, no. 1.
[24]Sen, S. N., The character of the introduction of Western Science in India during the eighteenth and nineteenth centuries. *Indian Journal of History of Science*, 1 1966, p. 112.
[25]Report of Proc. of a Public Meeting held at Chupra (Bihar) in July 1870 to consider the Educational Policy of the Govt. of India, *Tracts on Indian Education*, Calcutta, n.d., p. 14.
[26]*BSA, Rev. Agri.*, March 1887, Nos. 76-80.
[27]*Ibid.*, April 1887, Nos. 112-113.
[28]*Rev. Agri., Agri. & Horti. J.*, Jan. 1881, nos. 34-35, pt. B.
[29]Under-Secretary of State for Indian to the P.S. to Viceroy, July 22, 1896, *Elgin Papers*, NAI micro. no. 2030.
[30]Mitra, S. C., Original Scientific Research in Bengal, *Calcutta Review*, Vol. 103, no. 205, 1896, p. 366.
[31]*Home, PWD*, March 4, 1864, nos. 20-21.
[32]Bihar State Archives, *Rev. Agri.*, March 1890, nos. 12-14.
[33]Several similar instances can be cited. For details see, Kumar D., Racial Discrimination and Science in 19th Century India, *Indian Economic and Social History Review*, Vol. XIX, no. 1, Nov. 1982, pp. 63-82.
[34]*The Statesman*, Jan. 20, 1925.
[35]*Home, Edu.*, Nov. 1897, nos. 5-28.
[36]Gumperz, E.M., *English Education and Social Change in Bombay (1858-1898)* unpublished Ph. D. thesis Univ. of California, 1965, p. 327.
[37]*DPI Report*, Bombay, 1868-69, App. B. P. 227.
[38]*Indian Engineering*, Vol. XIX, Jan. 11, 1896 p. 162.
[39]*WBA, General Education*, June 1872, no. 75.
[40]Zachariah, K., *History of Hooghly College*, Calcutta, 1936, p. 80
[41]*Revenue, Agri.*, Dec. 1901, no. 3.
[42]*WBA, General, Edu.*, Dec. 1901, no. 3.
[43]Sathianadhan, S., *History of Education in Madras Presidency*, Madras, 1894, p. 104.
[44]*Rev. Agri., Agri. & Horti.*, Oct. 1880, No. 6 Pt. B, file no. 46.
[45]Basu, B. D., *Education in India under East India Company*, Calcutta, (n. d.) p. 127.
[46]*Papers on Technical Education in India*, Calcutta 1966, p. 45.
[47]*Home, Edu.*, July 1903, No. 116.
[48]Voelcker, J. A., *Report on the Improvement of Indian Agriculture*, Calcutta, 1897, p. 331.
[49]*Home, Edu.* Sept. 1867, nos. 19-20.
[50]*Ibid.*, Dec. 1899, Nos. 33-36.
[51]Curzon to Northcote (private letter dt. Feb. 19, 1901), *Curzon Paper NAI*, Microfilm roll 9.
[52]Curzon to Northcote (dt. July 22, 1901). *Ibid.*
[53]Zaidi, M. A. (ed.), *The Encyclopaedia of the Indian National Congress*, Vol. II, New Delhi, 1977, p. 169.
[54]Speech by H. C. Mitra, *Ibid.* p. 168.

[55]*Ibid.*, Vol.I, p. 275.
[56]*Ibid.*, Vol. II, pp. 162-164.
[57]*Ibid.*, Vol. III, pp. 309-324.
[58]*Ibid.*, p. 477.
[59]*Ibid.*, Vol. II, pp. 406, 488 & 680.
[60]*Ibid.*, Vol. IV, pp. 97-100.
[61]Speech by M. N. Banerjee at Calcutta session of the Congress in 1901, *Ibid.*, p. 145.
[62]*Nature*, Vol. LXIV, May 30, 1901, p. 109.
[63]Basalla, G., *Science and Govt. in England* (1800-1870), Ph. D. thesis, Harvard University, 1963, p. 251.
[64]Roach, J. P. C., Victorian Universities and the National Intelligentsia, *Victorian Studies*, Vol. III, 1959, pp. 131-150.
[65]*Nature*, Vol. XXIV, May 12, 1881, p. 31.
[66]To quote Sir Lyon Playfair, 'the inhabitants of Canada received us with open arms, and the science of the Dominion and that of the United Kingdom were welded. '*Nature*, Vo. XXXII, Sept. 10, 1885, p. 438.
[67]*Ibid.*, Vol. LXXII, Nov. 23, 1905, p. 77.
[68]*The Bhore Committee Report on Medical Sciences*, Vol. I, Calcutta, 1946, pp. 23-24.
[69]Larwood, H. J. C., Western Science in India, *Journal of Royal Asiatic Society*, 1962, p. 72.
[70]Kumar, D., Patterns of Colonial science in India, *Indian Journal of History of Science*, Vol. 15, 1980, pp. 105-113.