

CHRONIQUE DE LA RECHERCHE

HERMENEUTICS AND CROSS-CULTURAL COMMUNICATION IN SCIENCE : THE RECEPTION OF WESTERN SCIENTIFIC IDEAS IN 19th-CENTURY INDIA *

While an appreciable amount of work has been done since Schleiermacher and Dilthey on the problem of understanding in cross-cultural communication in general, little attention has been focused on the problem of understanding in the transmission of scientific ideas between different cultures. Quite to the contrary, the widespread belief that science is a rational activity producing objective knowledge, and that the label « scientific » compels any human not under the spell of dogmatic beliefs to accept all ideas that bear this label, precludes the recognition of communication in the domain of science as being problematical.

Indeed, science, its lesson learned from Galileo, goes so far as to proclaim that neutrality and objectivity require that the rôle of the individual be discounted as much as possible, and thus dismisses the entire problem of understanding as an empty one. Hermeneuticians since Dilthey, on the other hand, assert that, in the social sciences, the observer's culture, past, goals, perceptions and imagination are so intrinsically involved in the shape of reality apprehended, that discounting these would be equivalent to denying that these fields exist at all, amounting thus to an arbitrary impoverishment of the world we hope to render intelligible. This way of posing the problem, which assumes a sharp distinction between the methods of the natural and social sciences, has resulted, of course, in those philosophers who wish to promote some sort of theory of understanding being on the defensive, too busy seeking, in face of the impersonal criteria of the natural sciences, to establish the legitimacy of the humanities as knowledge to seriously examine the claim of science itself to provide culturally neutral knowledge ¹.

To my mind, however, the hermeneutician's assumption can be legitimately

* An earlier version of this paper was given at the colloquium « Science & Empire (1700-1947) », organized by the National Institute of Science, Technology and Development Studies, New Delhi, India, January 21-23, 1985.

1. Among the more recent writings on the subject, see especially, Hans Georg GADAMER, *Wahrheit und Methode : Grundzüge einer philosophischen Hermeneutik*, Tübingen, J. C. B. Mohr, 1975 ³ ; IDEM, « Hermeneutics and Social Science, » *Cultural Hermeneutics*, 2, 1975, p. 307-336 ; Jürgen HABERMAS, *Erkenntnis und Interesse*, Frankfurt-am-Main, Suhrkamp, 1973² ; Karl Otto APEL, « The A Priori of Communication and the Foundation of the Humanities », *Man and World*, 5, 1972, p. 3-37 ; ID., *Transformation der Philosophie*, Frankfurt-am-Main, Suhrkamp, 1976. These references are only indicative of the literature in the field and are far from exhaustive.

carried over to the natural sciences and the ball then lies squarely in their court to answer the following question : Does the cultural background of a scientific community not inevitably enter into the way it conceives of nature, thus having a decisive influence on the nature of the knowledge gained, in much the same way as the individual's rôle affects his observations in the humanities and the arts ?

Now I have elsewhere, in an attempt to elaborate a relationship between science and culture, argued that a society's conception of nature is determined by the way it conceives of itself, that is, by its social-interactive framework or meaning structures that it defines for itself ; and that theories, being expressive of the metaphysics of a society, are also part of the internal communication of that society ². Science would, on this view, be historico-culturally constructed, and would mean different things to different societies and to the same society at different times of its history, implying thereby that the process of transmission of scientific ideas, at least across cultural boundaries, is a problematical one in which the interlocutors operate a distortion in order to absorb into their socio-cultural framework those ideas of other cultures that they accept.

Taking my cue from Lakatos' famous dictum — « Philosophy of science without history of science is empty ; history of science without philosophy of science is blind » ³ — I shall in this paper attempt to illustrate, on the basis of a concrete example, as to how knowledge conceived of within the epistemological framework of one culture is received, adapted and absorbed by another culture. As an Indian, the example suggests itself readily : the contact between British and South Asian scientific cultures in the late eighteenth and nineteenth centuries. This, as is fairly well known, was a period, within the context of the Subcontinent, of apprenticeship in the new *Weltanschauung* rather than one of active production in the sciences and is, for that reason, all the more interesting from my point of view. The area that I would in particular consider is Bengal for the simple reason that that was where the first serious and sustained contacts were made between the two cultures ; where the impact of British rule worked much longer and went much deeper than in those up-country provinces which were organized during the nineteenth century ; and where the first educational establishments, fashioned on the English system, were set up, which in turn served as a model in the « downward-filtration », so to speak, of this system to the rest of the Subcontinent. Now, while conceding immediately that much of this exchange was determined by the economic ambitions of the Indian protagonists and the constraints imposed by the British colonizers — that is, by the asymmetry of the colonial situation — I would like to submit that a part, at least, of this exchange was also fashioned by the epistemological a prioris of the actors. What follows is a research hypothesis, and not an account of any original, factual discoveries. I shall thus content myself with presenting, in outline, a new interpretation of some well-known facts.

2. Kapil RAJ, *La Notion de « science » chez Habermas et Kuhn*, Unpublished doctoral dissertation, Université de Paris I, 1983.

3. Imre LAKATOS, « The Methodology of Scientific Research Programmes », in I. LAKATOS, *Philosophical Papers*, ed. John WORALL & Gregory CURRIE, Cambridge, Cambridge University Press, 1980, vol. I, p. 102.

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Many questions arise in the context of the meeting of these two cultures : What was the attraction of the new ideas that the British brought with them ? What group of people was drawn to them ? What did they learn about them and through what language ? What were they seeking from them ?

An answer to these questions will, I hope, provide some insight into the way ideas can be adopted and modified to fit the needs of those who receive them. For, even a cursory knowledge of the religious make-up of Bengal gives rise to a significant question : Why is it that in spite of its population being almost equally divided into Hindus and Muslims (the Muslims actually constituted a slim majority), each with its own élites, it was only the Hindu élites — drawn, naturally, from the upper castes, principally from the *Brahmins*, the *Baidyas* and the *Kayasths* — who made contact with the British and eagerly sought after their knowledge — modern science ?

While it is true that amongst the Bengali Muslims there was a much greater socially and economically inferior stratum and a correspondingly smaller aristocracy than amongst the Hindus, this fact in itself does not explain the almost complete lack of response from the Muslims to English education in nineteenth-century Bengal⁴. Nor, for that matter, do explanations based on religious outlook⁵, for the Muslim response was very different elsewhere in the country⁶; moreover, it was primarily the Muslim élites of the Subcontinent who, in the preceding centuries, had shown the greatest enthusiasm for European ideas — scientific, religious and philosophical⁷.

It is my conjecture that the Brahminical élites were quick to recognize in this knowledge — that is, partly in the image that it projected of itself⁸ in the English Enlightenment philosophies of the eighteenth and early nineteenth

4. For instance, between 1876-1877 and 1885-1886, 51 Muslims and 1,338 Hindus took the B.A. degree at Calcutta. In 1870 only 2 Muslims sat the B.A., while in the same year, 151 Hindus took the examination [Calculated from the Report of the Public Service Commission, 1886-1887, appendix M, p. 78-79, quoted in Anil SEAL, *The Emergence of Indian Nationalism. Competition and Collaboration in the Later Nineteenth Century*, Cambridge, Cambridge University Press, 1968, p. 303.

5. For an expression of such arguments, see Pradip SINHA, *Nineteenth Century Bengal. Aspects of Social History*, Calcutta, Firma K. L. Mukhopadhyay, 1965, p. 50ff; and Bruce Tiebout McCULLY, *English Education and the Origins of Indian Nationalism*, New York, Columbia University Press, 1940, p. 180ff.

6. In the North-Western Provinces, Bihar, Orissa and Oudh, although the Muslims were in a minority, the community-wise education pattern was quite the opposite of that in Bengal. Cf. A. SEAL, *op. cit. supra* n. 4; and B. T. McCULLY, *op. cit. supra* n. 5.

7. See Ahsan Jan QAISAR, *The Indian Response to European Technology and Culture (A. D. 1498-1707)*, Delhi, Oxford University Press, 1982, p. 9ff. See also, François BERNIER, *Voyage dans les états du Grand Mogol*, Paris, Fayard, 1981.

8. I define an « image of knowledge » as the place knowledge holds inside the value system of a society or culture at any time of its history, that is, how a given culture views knowledge. This image forms part of, and plays a crucial role in, the social-interactive framework of a society. It forms the very meaning structure of knowledge, and manifests itself in the promise that knowledge holds out for the society in question, determines what is to count as knowledge, who or which group inside the given society controls the know-

centuries⁹, and partly in their own perception of this image — « clean knowledge » *par excellence* (and I shall explain in a minute what I mean by this), a mastery of which would help them re-legitimize their position and return to them the power that they had slowly lost over the centuries. If this conjecture proves to be well-founded, then, in addition to providing an answer to the above-mentioned questions, it should also have bearing on another question which troubles contemporary intellectuals and policy planners alike : Why is it that India today, while boasting the third largest scientific community in the world, lags so far behind in scientific production¹⁰ ?

But what then was the Brahminical perception of modern science ? And with what *a priori* did they perceive it ? What, in other words, was the Brahmins' own image of knowledge ? In order to answer this question, let us make a brief digression into history.

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With the establishment of a sedentary way of life in the Indian subcontinent, and the caste system that accompanied it, there occurred, concomitantly, a differentiation in knowledge — an hierarchical stratification — with contemplative and other forms (like linguistics, astronomy, mathematics and, later, astrology) related to religious practices at the apex, and practical *savoir faire* (eg., pottery, carpentry, spinning, weaving, metallurgy, irrigation technology, etc.) relating to material needs at the bottom.

Parts of the former, that is of the « higher » forms of knowledge, like linguistics, and permutations and combinations in mathematics, arose within the Vedic schools as a necessary condition for mastering, communicating and expounding the *Vedas* and other works laconically composed in strict metre in a language *conceived and meticulously developed for oral transmission* — Sanskrit¹¹. Other parts, like astronomy and portions of mathematics, expressed of course in Sanskrit, seem to have developed within the context of the practice of rituals¹².

ledge and what power it gives them, how it is to be validated, etc. My use of this term is very similar to that of Elkana's who, however, uses it in a different context. See Yehuda ELKANA, « The Distinctiveness and Universality of Science : Reflections on the Work of Professor Robin Horton », *Minerva*, XV, 2, 1977, p. 155-173.

9. Cf. John Theodore MERZ, *A History of European Thought in the Nineteenth Century*, 4 vols, London, W. Blackwood, 1904-1912, especially vols 1 and 2 ; also Leszek KOLAKOWSKY, *Positivist Philosophy*, tr. by N. GUTERMAN, Harmondsworth, Penguin, 1972, p. 96ff.

10. For an insightful analysis of some of the problematic characteristics of this scientific community, see in particular, Vandana SHIVA, Jayanta BANDHOPADHYAY, « The Large and Fragile Community of Scientists in India », *Minerva*, XVIII, 4, 1980, p. 575-594. See also Arnab Rai CHOUDHURI, « Practising Western Science Outside the West : Personal Observations on the Indian Scene », *Social Studies of Science*, 15, 1985, p. 475-505.

11. See Amulya Kumar BAG, « Binomial Theorem in Ancient India », *Indian Journal of History of Science*, I, 1, 1966, p. 68-74.

12. This is borne out by Georg THIBAUT, « On the Sulva-sutras », *Journal of the Asiatic Society of Bengal*, 1875, p. 227-275 ; reprinted in Debiprasad CHATTOPADHYAYA, ed., *Studies in the History of Science in India*, 2 vols, New Delhi, Editorial Enterprises, 1982, vol. II, p. 415-478.

Since Sanskrit was the language of the cultivated — which is just what « Sanskrit » means — mainly (though not exclusively) of the Brahmin castes, the knowledge which was expressed in it was the monopoly of these castes¹³. Indeed, so much was knowledge essential to their definition, that most Brahmin castes were named after the branch of Vedic learning they cultivated or the type of ritual they practised. These higher forms of knowledge I shall call, to use a rather weathered and probably much abused adjective, « clean » knowledge. I could, of course, have used the qualificative « theoretical ». However, it is a loaded term in the domain of knowledge, epitomized in the Greek philosophical tradition. Also, it does not quite do justice in characterising the Brahmin ideal of knowledge, for a portion at least of this knowledge — Hindu astronomy, for instance — required measurements¹⁴. Nor, for that matter, would « pure » do, as it immediately evokes inside philosophy the Kantian distinction between « pure » and « practical » reason, or, within the sciences themselves, its complement — « applied ». More positively, I would defend the use of « clean » because it characterizes an activity where, above all, one does not — both literally and figuratively — soil one's hands, precisely what the Brahmin image was all about. Music, musicology, linguistics, astrology, mathematics and astronomy would typify this kind of practice.

Practical *savoir faire*, on the other hand, was transmitted orally in local, vernacular tongues within each of the lower caste groups, most often within the family unit or sometimes through the more centralized guilds for each profession. However, this transmission was in most cases geographically restricted¹⁵. The instruments on and through which apprenticeship took place were not texts in this case, but tools of material production. Now, while many of these artifacts, or products made from them, survive, there is no accompanying knowledge available to us as to the theories which underlay their conception and thus as to their exact origins. Besides, the Brahmins never concerned themselves with these practices, for this *savoir faire* was looked upon disdainfully as the activity of the lower castes and was never considered to constitute knowledge in its ideal

13. Cf. Damodar Dharmanand KOSAMBI, *An Introduction to the Study of Indian History*, Bombay, Popular Book Depot, 1956, p. 260ff. The extent to which the study of Sanskrit was the exclusive preserve of the upper castes is driven home with some force in Albiruni's account of how lower castes were punished with the excision of their tongues if they attempted to read the *Vedas* (E. C. SACHAU, ed., *Albiruni's India*, 2 vols, Delhi, S. Chand, 1964, vol. II, p. 136).

14. Cf. B. L. VAN DER WAERDEN, « Two Treatises on Indian Astronomy », *Journal for the History of Astronomy*, XI, 1980, p. 50-58.

15. Indeed, so closely guarded was this knowledge that it was not easily shared even between the same caste groups in different parts of the Subcontinent. The Dutch, for example, failed to get the Gujarat type of cloth produced in Bengal because Gujarati weavers were unwilling to share their secret. Cf. O. PRAKASH, *The Dutch East India Company and the Economy of Bengal, 1650-1717*, Unpublished doctoral dissertation, Delhi University, 1967 ; quoted by Tapan RAYCHAUDHURI, « Non-Agricultural Production », in T. RAYCHAUDHURI, Irfan HABIB, eds, *The Cambridge Economic History of India*, Cambridge, Cambridge University Press, 1982, vol. I, p. 285.

sense, *qua* clean activity. As it was with other social activities, so too it was with knowledge.

Inasmuch as it was the monopoly of the élites, this knowledge came to play a triple rôle :

1. it downgraded popular knowledge ;
2. it legitimated the socio-economico-politico-cultural system within which it developed ;
3. through the first two rôles, it consolidated the position of these élites themselves ¹⁶.

Knowledge was thus projected as being clean and was equated with power ¹⁷.

To be sure, all knowledge was subject to change. This was the result of the internal dynamics of knowledge itself, as much as it was of the dynamics of society, of splits between Brahminical schools, of new philosophies and protest religions (like Buddhism, Jainism and Vaishnavism), and of the interaction between civilizations, itself often a consequence of wars, invasions and/or trade. However, these changes took place through traditional mechanisms of accommodation and absorption, without ever definitively altering the above-mentioned image of knowledge. Indeed, most of these traditional mechanisms of accommodation and absorption consisted precisely in the adversaries adopting this very image of knowledge.

Islamic domination, however, disturbed this order. While the Turko-Afghan conquerors did not wipe out the Hindu élites — far from it : the Hindu upper castes still lived quite freely and continued to control banking and trade in Hindustan ¹⁸, and even served as functionaries to mediate Islamic rule with the local population — they did threaten Brahminical hegemony. Brahmins no longer enjoyed the same political power at the courts (although many did, in the centuries to come, manage to work their way back into high officialdom) and were now required to pay taxes from which they had been previously exempt. At the same time, mass conversions of low-caste Hindus considerably reduced their traditional power and economic base. It was irksome, besides, for them to have

16. Cf. D. D. KOSAMBI, *Myth and Reality : Studies in the Formation of Indian Culture*, Bombay, Popular Prakashan, 1962.

17. Let me add a quick word of caution on my use of the term « power ». Power, in this context, is not to be identified with political or economic power — it is not always, in every society, and at all times in the history of a society, that the savant has had this kind of material power ; many have in fact prided themselves in remaining materially poor — but rather with that peculiar, unpalpable charisma that devolves upon intellectual activity *qua* legitimating activity, giving the practitioner a moral hold over his sphere of influence. It goes almost without saying, of course, that these are not mutually exclusive connotations of power, and that many times one does find the intellectual invested with both forms.

18. See Mohammad HABIB, Afsar Umar Salim KHAN, *The Political Theory of the Delhi Sultanate*, Allahabad & Delhi, Kitab Mahal, n.d., p. V ; and Ziauddin BARANI, *Fatawa-i-Jahandari*, (c. 1358-1359), tr. by Afsar BEGUM, in M. HABIB, A. U. S. KHAN, *op. cit.*, especially Advice IX and Advice XI.

to treat certain Muslims, who were of socially inferior origins, with deference because of their now superior position. No matter how free they might have felt in their daily lives, theoretically they were not equal citizens with the Muslims. More seriously, however, Islam in South Asia, although itself having succumbed — albeit in diluted form — to the caste divisions of the region, served ideologically to stir discontent in the rank-and-file of Hinduism, who, as a consequence, rose to emancipate themselves from the shackles of Brahminism¹⁹. This, together with changes in their economic power, was a severe blow to the Brahmins, many of whom were reduced to seeking employment as cooks and couriers²⁰.

True, the Brahmins, and for that matter, other privileged castes in the different parts of the Subcontinent, had periodically suffered similar treatment at the hands of the various invaders over the centuries, *but never before had any of these latter come with such a developed body of knowledge in almost all fields, and such an elaborate and powerful counter image of knowledge to that current in the Subcontinent, as the Muslims*. And, thus, in attacking the very core of the Brahmin legitimating rhetoric — the image of clean knowledge — none had ever posed so serious a threat as Islam. Amongst these castes, then, a certain resentment seared.

Not being powerful enough to rid themselves of the cause of their woes, namely, the Muslims, the Hindu upper castes sought to preserve their exclusiveness and, in the process, concentrated upon their own resources and traditional literature. This led to a revival of the study of older texts, especially scientific texts, and the writing of detailed commentaries and digests.

Nevertheless, there was, though only for a time, an interest in Hindu and Islamic learning on both sides, and some intellectual exchange was inevitable. With the establishment of Arab rule in Sind during the Abbasid Caliphate, scientific contact was established between Arab and Hindu cultures, and a number of Sanskrit works, especially in mathematics and astronomy, were translated into Arabic²¹. However, it was in medicine that the exchange was particularly fruitful: West Asian medical practices, which went under the name of *Unani* medicine, came to be widely used in the Indian subcontinent together with the earlier *Ayurvedic* system (as they are even to this day) and in reverse Hindu medical systems gained popularity in Western Asia. But the bulk of the Brahmins isolated themselves. The Hindu writing of the period (or whatever is known of it) is repetitive and lacks fresh insight or originality.

The initiative in scientific and technical innovation thus passed on to the Muslims in Hindustan. That Brahminical arrogance was in part responsible for this is undeniable. It prevented the upper castes from learning Arabic, the vehicular

19. M. HABIB, Khaliq Ahmad NIZAMI, *Delhi Sultanat*, Delhi, People's Publishing House, 1970; also K. A. NIZAMI, *Some Aspects of Religion and Politics in India during the Thirteenth Century*, Bombay/Calcutta/New Delhi, Asia Publishing House, 1961.

20. Kunwar Muhammed ASHRAF, *Life and Conditions of the People of Hindustan*, New Delhi, Munshiram Manoharlal, 1970², p. 108ff, especially p. 111.

21. D. M. BOSE *et al.*, eds, *A Concise History of Science in India*, New Delhi, Indian National Science Academy, 1971, p. 45ff, 133-135, 209ff.

language of Islamic science, not to speak of making any attempt at understanding the world-view of Islam, without reference to which it was impossible to understand or contribute to its scientific enterprise ²².

It must be added though that the Hindus were quick to learn and master Persian and did, in fact, contribute significantly to Persian literature and poetry. But they did not, unlike the Muslims in the Subcontinent, use it as a language of science. This was because Persian came to be the court language of the Islamic empires of the Subcontinent, a mastery of which was a necessary condition for holding any state office. In the domain of knowledge, however, Sanskrit remained their language of elaboration and communication.

The situation was to continue by and large unchanged as to the images of knowledge within the two élites ²³, till the British conquest of that rich frontier province of the decaying Mughal empire — Bengal.

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Much of Bengal's social and historical experience in South Asia derives its specificity from its geographical location. Its population, aboriginal migrants who settled the region progressively, developed techniques of deep-water cultivation and fishing, intimately suited to the fertile but inundated and shifting alluvium of the delta. It was thus a major source of foodgrains for other parts of the Subcontinent ²⁴, and over the centuries was to become famous for its muslin and other fabrics. By the close of the seventeenth century, Bengal presented a remarkable picture of prosperity ²⁵.

Brahminism spread to Bengal during the Gupta Empire in the fifth century. However, the Brahminical élites, who settled there as a consequence, branded the local population ritually inferior and low caste, which of course spurred the latter on to respond with mass support for every major anti-Brahminical movement like Buddhism and Vaishnavism. And when Islam came to Bengal in the wake of the Turko-Afghan conquest in the thirteenth century, almost half the low-caste population of Bengal converted to it. Unfortunately, they found themselves little better off in the professedly egalitarian eyes of the Turko-Afghan élites of Islam — who claimed themselves *Ashraf* (of noble birth), while condescending to label their Bengali brethren *Ajlaf* (lowly born). In the years and centuries to come, the élites formed an alliance of the dominant upper-caste Hindus, and

22. Cf. Seyyed Hossein NASR, *Science and Civilisation in Islam*, Cambridge, Mass., Harvard University Press, 1968 ; see also his *Islamic Science*, Westerham, Westerham Press, 1976.

23. There is, of course, the glaring exception of Sawai Jai Singh II of Ambar. But whether a new *image* of science emerged from this gigantic experiment in composite culture is difficult to say.

24. Cf. T. RAYCHAUDHURI, I. HABIB, eds., *op. cit. supra* n. 15, p. 330ff.

25. See F. BERNIER, *op. cit. supra* n. 7, Annexe, « Réponse à la quatrième demande sur la fertilité, richesse et beauté du Royaume de Bengale », p. 325ff.

the Muslim aristocrats who controlled the state and military apparatus, together with North Indian *Baniyas* who controlled industry and commerce.

Now, although Bengal was, when contrasted with the rest of the Mughal empire on the eve of the British conquest, a model of strength and stability, the alliance to which it owed these features was at best an uneasy one. Internal wranglings between the Muslim nobility and the Hindu upper castes, and intrigue and corruption inside the royal court itself, were a blot on an otherwise rosy picture. Besides, there was some discontent amongst the North Indian *Seths* whose profits were being hampered by Mughal impositions on commerce.

And so it was that the British, who had come to Bengal as traders and had gained important economic privileges from the Mughal court, but found the Bengal rulers a thorn in their side for their continuous objections to the way the British interpreted these privileges, when they decided to rid themselves of this hindrance, discovered in these Hindu junior partners the ideal collaborators in their bid to gain control of the province. Colluding with a section of the Hindu upper castes and North Indian *Baniyas* they succeeded in ousting the Nawab in 1757.

The plunder and devastation in the decades that followed were some of the most gruesome in human history. But when, in the early years of the nineteenth century, the British had settled down to more orderly and permanent forms of exploitation and government, not only were they a couple of hundreds of millions of pounds richer, but the internal picture of the province had been entirely transformed. Ten million lives, or a third of the population (almost all peasants and artisans), had been lost in a space of three years — victims to famine, in large measure a consequence of the ruthless policies of the intervening period²⁶. The domestic market in handicrafts, the backbone of the local economy, had, as a result, also suffered irreparable damage. The Mughal aristocracy, already deprived of its power, now unable to pay the exorbitant taxes levied through the « revenue experiments »²⁷ and the Permanent Settlement which followed them, had been dispossessed of their lands and reduced to a noble penury. The old urban centres had declined and, by 1800, were in obvious decay.

Only Calcutta, and the Hindu upper castes — notably the *Brahmins*, *Baidyas* and *Kayasths* — seemed to prosper and gain new life. Indeed, as that city expanded, from « a straggling village of mud-houses »²⁸, to become the largest clearing house of trade in Asia and the second largest city of the British empire, so too did these castes, who had originally colluded with the British in deposing the old régime, rush into the service of the European commercial houses that were mushrooming in Calcutta. There, serving as « interpreter, head book-keeper, head secretary, head broker, the supplier of cash and cash-

26. Dharma KUMAR, ed., *The Cambridge Economic History of India*, Cambridge, Cambridge University Press, 1982, vol. II, p. 299.

27. I have borrowed this term from Narahari KAVIRAJ, *Wahabi and Farazi Rebels of Bengal*, New Delhi, People's Publishing House, 1982, p. 4. What a vivid image it projects of empiricism in the colonial context !

28. Sushil Kumar DE, *History of Bengali Literature in the Nineteenth Century*, Calcutta, Firma K. L. Mukhopadhyay, 1961², p. 42.

keeper [...] serving to further such acts and proceedings as his master durst not avow », knowing « all the ways, all the little frauds, all the defensive armour, all the artifices and contrivances by which abject slavery secures itself against the violence of power »²⁹, they made the money and gained the legal knowledge necessary to step into the land holdings vacated when the Mughal aristocracy were brought to book for arrears in revenue³⁰. And within a few years of the Permanent Settlement, the new Hindu élites had all but wiped the old aristocracy off the land ownership registers and clinched their hold over the entire rural structure of Bengal.

With one foot now firmly entrenched in the Permanent Settlement, these new élites, or the *Bhadralok* as they came to be called, set out to secure the other in the new urban structures — the offices, judiciary, schools and other professions opened up by the colonial administration. They thus turned their attention to education. As remarked upon earlier, the Hindu élites had learned to maintain their power through a mastery of the language of their rulers ; yesterday's scholars of Persian now became enthusiasts for English.

While it has been almost universally noted, a knowledge of English was, of course, economically essential — « People ignorant of English no doubt got berths, but berths to which only paltry salaries were attached »³¹ — this in no way explains the fervour with which the *Bhadralok* set out to acquire Western *ideas* and Western *science*, through English language education. Indeed, education itself became the hallmark of *Bhadralok* status. « The school is the one gate to the society of the *Bhadralok* », observed the Simon Commission Report³².

Their eagerness is all the more remarkable when one keeps in mind the fact that the British in India, or those *few* amongst them who were interested in intellectual pursuits, were, in the fashion of the *philosophes* of the late eighteenth century, infatuated with Oriental thought³³. In 1781, in response, on the one hand, to a request from « a considerable number of Mussulmen of credit and learning » to promote institutions of traditional learning which « had been the pride of every polished court and the wisdom of every well regulated government both in India and in Persia [but of which] in India only traces [...] now remain, the decline of learning having accompanied that of the Mogul Empire »³⁴, and, on the other hand, « with a view [...] to the production of officers for the courts

29. Speeches of the Managers and Council in the Trial of Warren Hastings, vol I, ed. Edward Augustus BOND. Quoted by Narendra Krishna SINHA, *The Economic History of Bengal*, 3 vols, Calcutta, Firma K. L. Mukhopadhyay, 1965³, vol. I, p. 101.

30. *Ibid.*, p. 4-5.

31. Lal Behari DEY, *Recollections of Alexander Duff and of the Mission College which he founded at Calcutta*, London, 1878, p. 40, 47 ; quoted in B. T. McCULLY, *op. cit. supra* n. 5, p. 44.

32. Indian Statutory Commission. Report, London, 1930, p. 24.

33. See Raymond SCHWAB, *La Renaissance orientale*, Paris, Payot, 1950 ; also Edward SAID, *Orientalism*, New York, Pantheon, 1978.

34. Minute by Warren Hastings, dated the 17th April, 1781, in Henry SHARP, ed., *Selections from Educational Records*, Part I, 1781-1839, Calcutta, Superintendent Government Printing, 1920, p. 7-9.

of justice »³⁵ — it must be remembered that Islam was the official religion of Bengal and Persian was still the court language — the British had founded a *Madrassa* in Calcutta. The subjects taught were Arabic, Persian and Islamic law, with later additions, such as, natural philosophy, astronomy, geometry, arithmetic, logic, rhetoric and oratory — « all according to Islamic culture »³⁶. A few years later, in 1792, they had sponsored a Hindu College at Banaras for « the preservation and cultivation of the laws, literature and religion of the Hindus »³⁷. So great, indeed, was their passion for Orientalism that, in 1800, they set up a college at Fort William, Calcutta, to familiarize newly arrived British covenanted officers with the culture and language of their Asiatic subjects.

The only people committed to introducing Western education into India were the missionaries, particularly the evangelicals, who wanted to use « our arts, our philosophy and religion »³⁸ to rid the Hindus of the moral depravity that, according to them, was the cause of their degeneracy. Quite unsurprisingly, their attempts did not exactly receive the expected enthusiasm from « the Hindu subjects of Great Britain ». If there was a way of going about imparting new ideas to the latter, this was certainly not it. One could convince the Hindu upper castes of almost any of their other shortcomings, but one could not get away with calling them morally depraved. Consequently, and in addition to the fact that they received no great measure of official approval, these attempts made little headway.

In sharp contrast, however, to these projects — of both Orientalists and missionaries — the *Bhadralok*, as early as 1816, had, in order to cultivate « English literature and *European science* »³⁹, and « without any assistance from the Government »⁴⁰, established the *Mahabidyala* (better known as the Hindu College) in Calcutta. The original curriculum « comprised not only reading, writing, grammar and arithmetic in both English and Bengali, but also instruction in history, geography, chronology, astronomy, chemistry and other sciences »⁴¹. The College was managed exclusively by the Calcutta *Bhadralok* and was open only to sons of Hindu families. By 1828, its enrollment figures had touched 400⁴². And within two decades of the opening of Hindu College, the demand for English education had led to the creation of a respectable number of

35. *Ibid.*, p. 30.

36. *Ibid.*

37. *Ibid.*, p. 186-187 : Thomas Fisher's Memoir dated 7th February 1827, quoted in « Appendix A — Analysis of Fisher's Memoir ».

38. Charles GRANT, Observations on the state of society among the Asiatic subjects of Great Britain, particularly with respect to morals, and on the means of improving it. Reprinted in *ibid.*, p. 83.

39. *Presidency College Centenary Volume, 1955*, Alipore, West Bengal Government Press, 1956, p. 2. My emphasis.

40. B. T. MCCULLY, *op. cit. supra* n. 5, p. 21.

41. *Ibid.*

42. Thomas Fisher's Memoir, in H. SHARP, ed., *op. cit. supra* n. 34, p. 183.

English schools « originating with the natives and deriving resources exclusively from them »⁴³.

But the British, still convinced that their Indian subjects, both from the « learned and unlearned classes [...] continue to hold European literature and science in very slight estimation »⁴⁴, opened yet another Sanskrit College, this time in Calcutta, in 1824, to teach Bengali children Sanskrit, rhetoric, sacred literature, law and grammar. But this was not what interested the new élite. Its spokesman, Rammohan Roy, in his now all-too-famous address of the 11th December 1823⁴⁵, pleaded for the instruction of *European* sciences, and when, in 1827, the School introduced into its curriculum, mechanics, hydrostatics, optics, astronomy, mathematics, anatomy and medicine — all in English — almost half of its 91 students opted to study these, even though they were not required subjects⁴⁶. An examination of the Sanskrit College manuscript records has revealed that « on the whole, Hindu students trained in the traditional manner had no difficulty in responding to Western course-work »⁴⁷. And, indeed, the curriculum seemed to correspond most closely to the *Bhadralok* ideal of education : a fusion of the traditional Sanskritic studies of rhetoric, sacred literature, law and grammar with those of Western literature and science. No matter how Westernized they might become, a knowledge of Sanskrit was essential to their being.

Now this enthusiasm for Western science seems incomprehensible unless it is related to the attempts of the *Bhadralok* to legitimize their newly won status. Having ousted their erstwhile rulers and rivals, the Muslims, and reached the summit of the social hierarchy, the new élite, drawn as it was from the Hindu upper castes but with new alliances and in a different framework from that of their ancestors, needed a new social legitimation which would also take account of the changed situation. It was no longer possible to return to classical disciplines, including classical science : their credibility had already been sapped in the preceding centuries by Buddhism, Vaishnavism and Islam. The power of the Brahmins could only be restored by breathing new life into the old structures. This the *Bhadralok* sought to do by replacing classical knowledge and the traditional practice of knowledge by the Brahmins, with modern Western ideas and

43. William ADAM, First report on the state of education in Bengal. Calcutta, 1835, in W. ADAM, *Reports on the State of Education in Bengal (1835 & 1838)*, ed. Anathnath BASU, Calcutta, University of Calcutta, 1941, p. 35.

44. Report of the colleges and schools for native education under the superintendence of the General Committee of Public Instruction in Bengal, 1831, Calcutta, 1832, p. 72. Quoted in B. T. MCCULLY, *op. cit. supra* n. 5, p. 23.

45. Address, dated 11th December 1823, from Raja Rammohan Roy, in H. SHARP, ed., *op. cit. supra* n. 34, p. 98-101.

46. N. K. SINHA, ed., *Days of John Company. Selections from Calcutta Gazette, 1824-1832*, Calcutta, West Bengal Government Press, 1959, p. 227.

47. David KOPF, *British Orientalism and the Bengal Renaissance*, Calcutta, Firma K. L. Mukhopadhyay, 1969, p. 184.

Western science, and through proficiency in, and practice of, these, to reinstate themselves in society. Erudition became their definition.

In order to bear out this thesis, I shall only mention the contribution of Ramohan Roy, the champion of scientific education in India, to the birth of Hindu revivalism, the influence of Comteian Positivism, through Jogendra Chandra Ghosh, on Bankim Chandra Chatterjee's Hinduistic and anti-Muslim writings⁴⁸, to name but a few — a detailed review being outside the scope of the present paper. I might remark that the fact that it should have been Comteian Positivism, with its religious structure, complete with ritual and priesthood, that found an audience in India is by no means coincidental : other scientific philosophies which had much more of an influence in later nineteenth-century Europe — by which time many Indians had travelled and studied in British and European universities — and which had made a considerable impact in England⁴⁹, were until recently largely unknown in the Subcontinent.

A further point worth mentioning is that the languages chosen for the translation of Western scientific texts to supposedly render them more accessible to the local public were, initially, Sanskrit, and, later, also an ornate Bengali (vastly different from the *apabhasha* of the common people) fashioned by the *Bhadralok* to be their exclusive property.

But while the old Hindu knowledge was clean, Western science was — and is — structurally linked to experimentation, that is, to the laboratory, and to the tinkerer's mentality of the experimental scientist ; one thus had to soil one's hands while doing it. How, then, did the *Bhadralok* seek to reconcile the irreconcilable in wanting to incorporate Western scientific thought into their being and into their legitimating rhetoric ?

And here we come to the image that the Indian élites had of the scientific enterprise. For them science was experimental — if you will excuse the expression — only in theory. In other words, while many of them were familiar with writings about the scientific method — Bacon, among others, seems to have been fairly well known to the *Bhadralok* — their choice of subjects for study, and of books for translation, is highly revealing : mathematics, algebra, Euclidean geometry, astronomy, Newton's laws of motion, hydrostatics, mechanics, optics and pneumatics — the list is far from exhaustive. And an acquaintance with the presentation and orientation of these works shows one thing they all have in common : their finality and extremely mathematical, certain, nature — a far cry from the tentativeness and the precariousness of science at the frontiers. One cannot but be struck by the contrast between this presentation of science

48. Cf. Geraldine Hancock FORBES, *Positivism in Bengal*, Calcutta, Minerva Associates, 1975.

49. I have in mind the works of Comte's successors in France and the development of positivism in Central Europe, which gained quick and considerable popularity in translation in England and was thus easily accessible to the Indian élites. See L. KOLAKOWSKY, *op. cit. supra* n. 9.

and that in contemporaneous Europe⁵⁰. The possible explanation, that that was all the British exposed the Indians to, falls when one continues to see the same image reflected even after the return of a number of Indian graduates from British universities in the latter half of the nineteenth century. It is thus with the old image of knowledge *qua* clean knowledge that the *Bhadralok* sought those aspects of Western science that would best correspond to it.

While this analysis focuses on nineteenth-century Bengal, I suspect that the argument can be extended without much difficulty to present-day India — the theoretical bias of contemporary Indian scientific production being all too well-known⁵¹. However, a lot of areas need to be further researched into, and a number of worrisome questions remain unanswered : What, for instance, was the reception of science in other parts of the Subcontinent ? What spurred the South-Indian Brahmins to seek after Western science — they didn't need to reinstate themselves inside their society as their hegemony had never been threatened in anything like the way it was for their Bengali counterparts ? Why did medicine, which is certainly not a theoretical, and much less a clean, subject, have a high status among the *Bhadralok* ? And I would not claim to have any ready answers to these questions and lots of others besides. It is on them that one needs to work in order for a clearer picture to emerge of the process by which scientific ideas were received from Europe.

In this paper, I have, in the face of the contemporary paradigm — which takes science to be a trans-cultural phenomenon and, because its logic is compelling, the transmission of scientific ideas to be non-problematical — and through recourse to an historical example, tried to make the following plea : that a community's traditional epistemological criteria do, in some way, influence its way of apprehending scientific discourse formulated in another tradition, and that the scientific practice that results in the receiving culture is not quite the same as that in the original culture.

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50. See J. T. MERZ, *op. cit. supra* n. 9 ; cf. also Paulo Cesar Coelho ABRANTES, *La Réception en France des théories de Maxwell en électricité et en magnétisme*, Unpublished doctoral dissertation, Université de Paris I, 1985.

51. As a physicist colleague of mine recently remarked : « By physics, Indian scientists seem to mean a "physics of phenomena" and not a "physics of measurement" — except, he hastened to add, in nuclear research ! »