Science Studies, **2** (1972), 31–85

Defiance and Conformity in Science: the Identity of Jagadis Chandra Bose

ASHIS NANDY

Centre for the Study of Developing Societies, Delhi

I

Societies, captivated by the image of an omnipotent technology, often tend to equate the role of science and the formal structure of scientific rationality. Many parts of the world, faced today with the varied challenge of modernization, are especially prone to seek their redemption in the development of science and technology, forgetting that every culture produces its own science as surely as each scientific achievement produces new cultural realities. The hazards of this policy can hardly be overemphasized. The tendency to see in science a mass of dessicated objective knowledge, untrammelled by human emotions, can hand over entire communities as hostages to the very emotions of which they prefer to remain ignorant. On a lesser scale, it can make the individual scientist captive to the subjectivity he is so often tempted to deny, and it can render his work, to that extent, nonrational and noncreative.

These are truisms. But one must remember that in communities where science carries the full burden of social hopes and individual aspirations, they are also potent threats. By conceding psychological determination of the culture of science, in those places and times when both cultural and personal systems are changing fast, one exposes disharmonies that can lead to crippling anxiety, and to a self-examination which can be particularly painful. And yet, to the extent to which a society consciously examines and builds upon the realities of its human content, it strengthens the base of its scientific estate and its ability to utilize the process of scientific growth for the larger purposes of modernization.

The author is grateful to the following people for helping him, in different ways, to write this paper: D. M. Bose, Pulin Bihari Sen, S. K. Mitra, Avery Leiserson, L. Pye, Lloyd and Susanne Rudolph, Edward Shils, R. S. Das, N. R. Ray, Rajni Kothari, M. Nandy, D. L. Sheth and R. Owens.

It is in this sense that the available insights of the psychology of creativity[1] and of culture–personality interaction[2] have become relevant to the study of the culture of science and scientists. They provide a baseline which, though sometimes blurred, is necessary for a surer understanding of those conflicts and forces that characterize a traditional society faced with the challenge of shaping a new identity—an identity which can integrate within it the professional roles of modern scientists. These interdisciplinary vantages have also brought within the scope of exploration the ability of a society to initiate and direct the creativity of individual scientists, and to pattern them as meaningful links between cultural and individual needs. We now know, if not the contours of the psychosocial landscape within which science and scientists operate, at least the type of data that is required for such a survey. Methodologically, this has been facilitated by the shift in emphasis in both these areas: today the roots of creative functioning are being sought less in the absolutes of human psychosexuality and more in the individual's varying attempts to cope with society's prototypes within himself. With the developing interest in the adaptive functions of human personality, personology has been trying to spell out more clearly the space–time matrix that defines creative imagination as an interpersonal, as well as psychosexual, experience.[3] This has called into question the assumed congruence between creativity and unconscious phantasying that was implied in earlier conceptualizations and has successfully proposed a more sophisticated treatment of the complexities of social history, as epitomized in individual cases. As this new scientific reality of a problem-solving, intervening and adapting individual relegates to history the shadowy psychological man, the discipline has been forced to underline society's crucial presence in the form and content of those personal capacities it chooses to call 'scientific creativity'.

In no other section of humanity does this presence create so much

[1] See reviews in M. I. Stein and Shirley J. Heinze, *Creativity and the Individual* (Glencoe: Free Press, 1960); S. E. Gollan, 'Psychological Study of Creativity', *Psychological Bulletin*, **60** (1963), 548–64; F. Barron, 'The Psychology of Creativity', in *New Directions in Psychology* (New York: Holt, Rinehart and Winston, 1965), Vol. 2, 1–134.

[2] For one of the more interesting reviews, see M. Singer, 'A Survey of Culture and Personality, Theory and Research', in B. Kaplan (ed.), *Studying Personality Cross-Culturally* (New York: Harper and Row, 1963), 9–90.

[3] See particularly H. Hartmann, 'Comments on the Psychoanalytic Theory of the Ego', in *Psychoanalytic Study of the Child* (New York: International Universities, 1950), vol. 5, 74–95; E. H. Erikson, *Childhood and Society* (New York: Norton, 1950), and *Young Man Luther* (New York: Norton, 1958); E. Kris, *Psychoanalytic Explorations in Art* (New York: International Universities, 1952); E. Fromm, *Man for Himself* (New York: Holt, Rinehart and Winston, 1955).

anxiety and confusion as in the societies that try to draw, on their versions of the eternal verities, the blueprints of newer national identities. In such peoples, science becomes the battleground where the community's ambitions confront its backlogs, and the scientist becomes a microcosm where the community's adaptive capabilities challenge the creative power of the individual.

Nineteenth-century India provides a good example of such a confrontation. It had a well developed indigenous scientific tradition, an elaborate and deeply entrenched theory of life, and some explicit and implicit rules that related science to the modal life-style in society. Defying these, a handful of men opted for western science and scientific education. Some of them made it their profession, others a rallying call, and still others a symbol of dissent. But in each case they had to opt for a protracted conflict between their Indianness and their professional identity, and they had to fight, in anguish, the problem of forging, out of these two components, a new oneness that would make sense to their society and to them. By examining these conflicts and compatibilities between the universal culture of science and the particularist culture within which it had to survive as a meaningful subcultural strand, we may be able to perceive more clearly some of the environmental dangers to science in a modernizing society. Particularly, it may be useful to investigate the limits to which acculturation of a transplanted science could be taken, the extent to which elements of the antecedent tradition could become functional for the growth of science, the nature of legitimacy a scientist could hope to have in a traditional society where all the societal subsystems were not under equal pressure to change, and the process through which cultural and personal realities became the anchors for scientific imagination and creativity. We shall try to analyse these problems with reference to the life history of an individual Indian scientist of the time.

This scientist, Jagadis Chandra Bose (1858–1937), is important to the history of Indian science for at least one reason. It was he who contributed most significantly to the development of a professional identity which, for a time, seemed capable of mediating social and individual needs, and parochial and universalist demands. In retrospect, his undoubted success on so many fronts suggests that his creative imagination could sum up temporarily, not only the drama of his personal life, but also the changing history of his people. A highly successful physicist and a remarkably innovative botanist, Bose also gave an especial Indian perspective to world science, and was one of the first among modern scientists to enter interdisciplinary research. He was, simultaneously, a savant and a missionary-scientist for

many in the West, and a national hero in India. And yet much of this was to prove ephemeral. In his lifetime itself, modern physics and botany started overtaking his 'Indian science'; today, within three decades of his death, his idiom sounds flat and outdated even in his own country. Though his memory survives among important sections of Indian intellectuals and popular versions of his life offer a significant role model to young Indian scientists, his scientific work has already been stripped of its past glamour, and his concept of Indian science only marginally enthuses professional scientists in India. Newer currents of social change have apparently thrown up newer self-definitions in the Indian scientific community.

Nevertheless, while the struggle for an endurable professional identity continues amongst Indian scientists, and while Bose's brain-children ambitiously continue to help science rewrite the life-plan of all Indians, the relevance of Bose to Indian science persists. The environmental dangers that he faced, and the particularist pressures to which his science ultimately succumbed, are still too real to be ignored. It should be worthwhile therefore to examine today the identity that he offered his profession, and to locate the loves and hates he built into it as bulwarks—bulwarks which, Erikson would say, made his system first rigid and then brittle.[4] The following tentative analysis of some fragmentary life-history data tries to do exactly this.

Section II is a brief description of some of the major subcultural factors which influenced Bose's life. Against this background, section III recounts his childhood and the two identification models which were the loci of his developing identity. The following sections IV and V describe Bose as a struggling researcher, his first breakthrough, the success and recognition which he ultimately achieved, the more persistent and prominent patterns of his adult life in general and of his professional career in particular. Next, sections VI, VII and VIII present an analysis of Bose's scientific identity in terms of three major themes, themes which are shown to be not only the elements of his professional self, but also the dimensions along which he confronted the collective identity of his community. Each of these sections is therefore a part of his biography, as well as an attempt to identify those manipulable symbols of the projective system of his subculture which Bose could build into his professional self. The last section of the paper tries to place these intersecting identities in the context of a historical process which involved the logic of personal creativity and the research idiom of an Indian scientist.

[4] Erikson, *Young Man Luther, op. cit.*, 150.

II

Jagadis Chandra Bose was born in East Bengal in a small, well-to-do family. near Brahmo (originally *kayastha*) family.[5]

His forefathers came from Bikrampur, a place the middle-aged Bose described as a 'producer' of rugged innovative frontiersmen, who crossed seas and scaled mountains 'at their mother's bidding'. Bikrampur 'was not for the weak'; like a spirited mother, she demanded of her children *bikram* or aggressive courage.[6] These demands of his birthplace did not coincide with the demands of East Bengal, though at a certain level they were compatible. Before a changed political geography and enforced mass exodus broke the boundaries of the local life-styles and partially-shared identities of Bengal in 1947, the East was known as the backyard of *babu* culture—the damp, marshy, dialect-speaking nest of provincials where ugly *Baangal* ducklings dreamt of becoming elegant Calcuttan swans.[7] Particularly, the East's adventurous, obstinate, aggressive youth were looked upon with the disdain and sarcasm which has always, and everywhere, tinged the percept of rurals in polished urbanities. The East Bengali response to this superciliousness seemed to indicate that part of the contempt went home.[8] On the one hand, they angrily reacted to any disparagement; on the other, they revealed their deeper identification with their tormentors by ruthlessly rejecting their own authenticity. By becoming second-order *babus* and, with a vengeance, first-order successes, they hoped to gain a greater acceptance of themselves. But if the contempt of others dies hard, self-contempt dies harder; and until political surgery cut off greater Calcutta so completely from the people whose economy and sense of cultural inferiority it had so

[5] Brahmoism was the first Hindu reform movement of modern times. It started in Bengal in the early nineteenth century and mainly attracted urban, high caste, westernized middle and upper class gentry. For a brief introduction, see S. N. Hay, 'Western and Indigenous Elements in Modern Indian Thought', in M. B. Jansen (ed.), *Changing Japanese Attitudes Towards Modernization* (Princeton: Princeton University, 1965), 311–28. Kayasthas are an elite caste in Bengal who took to westernized professions early. They, together with Brahmins and Baidyas, constitute the *bhadraloks*, traditional gentry of the region. These castles also almost totally dominated until recently the *babu* culture, which was the subculture of urban westernized gentlemen, mainly of greater Calcutta.

[6] J. C. Bose, *Abyakto*, edited with comments and notes by P. B. Sen (Calcutta: Acharya Jagadish Chandra Bose, Birth Centenary Celebration Committee, 1958), 21–2; hereinafter referred to as Bose, *Abyakto*.

[7] See note 5.

[8] Jagadis Chandra himself was probably sensitive about his East Bengali past. See C. C. Bhattacharya, 'Acharyadeb Smarane', *Bashudhara*, **2**, 121–4; see also descriptions of his first encounter with westernness and urbanity in Calcutta, below; also 'Jagadish Chandrer Jeebanee', *ibid.*, 124–35; and M. Gupta, *Jagadish Chandra Bose, A Biography* (Bombay: Bharatiya Vidya Bhavan, 1964), 6–7; hereinafter Gupta, *Bose*.

ruthlessly exploited to build its own self esteem, all good Easterners went to Calcutta when they died.

The Boses, in spite of occasional lean days, were a solvent family and ensured Bose a comfortable childhood. His hobbies and pastimes were certainly not those of an economically deprived child. Some later chroniclers,[9] encouraged probably by Bose himself,[10] have tried to give an impression of economic strife in his early life, but this, on closer examination, proves to be one of those log-cabin-to-White-House myths that are periodically popular in the more ambitious segments of a community. It is more reasonable to conclude that, like most other nineteenth-century Bengali stalwarts, Bose had an upper class upbringing. More real were the fluctuations in the family economy of the Boses, due to his father's adventurous bouts of 'big business' which ultimately ended in near-disaster. This probably typical *babu* entrepreneurial inefficiency may have deprived Bose of the sense of security and validation which the westernized maintenance systems were providing the westernized *bhadraloks* while they pursued their revisionist life-styles at the turn of the century.[11] The consequent economic anxiety (generated more by sudden failures in a competitive achievement-criteria dominated socio-economic system than by actual poverty) made Bose sensitive to the traditions of stable, self-contained village communities to which he was simultaneously exposed in his childhood. Attainment of a more stable, less disorderly and simpler scheme of subsistence, rather than the achievement of a higher standard of living, was therefore one of the major themes to which he was exposed by his family. As we shall see, in the adult Bose this specific longing for orderliness was to merge with a wider search for order and for simple unifying principles. Evidently he did not fight poverty by implicity accepting the values of an emerging subsistence system. Rather, in him, because of his early history of economic anxiety, internalized themes of achievement, individualism and competitiveness became linked to sectors other than economy and occupation. The compatibility of this history with the emerging nationalism of the time, which sang the glories of traditional economy and the horrors of 'crass western materialism', is obvious.

Monotheistic, non-idolatrous, caste-denying Brahmoism was the Hindu denomination to which the Boses belonged. But what had started as a radical movement, though not already a spent force, was by then showing

[9] For example, M. Roy and G. Bhattacharya, *Acharya Jagadish Chandra Bose* (Calcutta: Bose Research Institute, 1963), vol. 1, 2; hereinafter Roy and Bhattacharya, *Acharya*.

[10] Bose, *Abyakto*, 22–3.

[11] See note 5.

clear signs of a defensive rigidity. In reaction to the rising tide of Hindu revivalism, it was becoming cocooned within an ideological purity and moralism that was, within a few more decades, to destroy its ability to withstand the more aggressive movements of Hindu reformation. The Brahmos built their monotheism on Upanishadic monism, but now the pure nomism of the Ramarkrishna Mission was taking place— a new movement, increasingly politicized, which sanctified the pantheism of Bengali folk culture and the exclusivism of some sectors of the articulate elite. Yet Brahmoism could still inspire in its followers a sense of personal pride—a feeling that they were in the vanguard of social reform, and that they were obliged to 'keep up with' the expectations of some inner, as well as transcendent, authority.

The nuclearisation of the Bose family was probably due to the elder Bose's transferable job. Similar occupational necessities had led to the fragmentation of many extended families of urban Bengal. There was, however, for the Boses, another indirect licence for this deviation from cultural norms. Brahmoism was still in many ways a threatening movement, preaching a radically different life-style, and it disrupted many orthodox families by encouraging its converts to form new family-units by breaking away from—and breaking with—their more conservative relatives.

The family consisted of Bose's parents, his paternal grandparents, and his five sisters. A brother of Bose had died when only ten years old. There are reasons to believe that his family as a whole was quite ambivalent towards Bose : a lot of adoration and latitude went with a latent fear that the adoration and latitude had gone a little too far. This again was basically an ambivalence of the Brahmo subculture itself. Bose was the only son and the youngest in the family, in a culture which prescribed a preferential treatment for the sons, largely because of their social and ritual role. Contrarily, Brahmoism built its implicit codes of child training on a rule-of-thumb synthesis of imported Victorian puritanism and indigenous high-caste asceticism. The prudish strictness and constraints of Brahmo child rearing were probably a reaction to the tradition of total indulgence and non-interference in the process of socialization; but not knowing itself to be a reaction, it could not free itself from what it was reacting to. That is why the contrast between the two modes of child training become often so total and, when present within the same family, so dangerous. A child in such cases could fathom the latent dynamics well; deep down he knew that he had become a battleground, and that out of his confusion he had to develop a technique of coping with these irreconcilable contrasts, this

multiverse. Let us see how the nature of this multiverse *in* Bose forced him eventually to look so long and so doggedly for evidence of universal oneness.

III

A pregnant insight into the early interpersonal world of young Bose is provided by his favourite *jatra,* or folk play. Beginning a discussion of his significant others with a description of his favourite myth (which by definition was also a personal phantasy) is not an attempt to establish the precedence of myths over the concreteness of real-life persons. We might expect it to draw the outlines of an inner design, against which we shall be able to offset the realities of his outer world.

The cherished myth was the story of Karna in *Mahabharata,* the illegitimate son of the mighty Sun-God, who was left to die at birth by a cruel opportunist human mother. Karna survived to become the proud, aggressive, autonomous, Sun-like son of a friendly accepting foster-father—a carpenter who humbly helped him to reach the solar stature and identity that was his by right. Bose admired the parity-seeking backyard man Karna for the admixture of good and evil in him, and also because, shunning all temptations, he fought fate with a courage that glorified even his final defeat.[12] This defeat, the story goes, was ensured when Karna contemptuously refused to make up with his mother, who was then in an enemy camp and trying to make the best out of a bad situation. He stuck to his past identity, in defeat as in victory, and defied the conspiracy of gods and the basic humiliation of maternal rejection by dying as his father's son in battle.[13] These cherished—and projected—themes of grand defeat, pertinacious obstinacy, conspiracy of fate, personal achievement and *noblesse oblige,* tied together by the images of a heartless treacherous mother and of

[12] Roy and Bhattacharya, *Acharya,* 14.

[13] Bose's persistent fascination with the personality of Karna was also expressed in his request to Rabindranath Tagore to write something about Karna. We do not know much about the actual content of the two-person interaction out of which Tagore's 'Karna-Kunti Sambad' *Rabindra Rachanabali,* Birth Centenary Edition (Calcutta: West Bengal Government, 1962), vol. 5, 578–82) was born in 1899. The work, significantly, is an imagined dialogue in verse between Karna and his mother Kunti. It depicts Karna's tremendous sensitivity to the early betrayal by his mother, his angry refusal to make up with her even at the face of total defeat, and his mother's earnest attempts to undo the past and build their relationship on a new basis. For two fragments of Bose's correspondence with Tagore on this subject, see his letter of 22 May, 1899, in Roy and Bhattacharya, *Acharya,* 14 and in Gupta, *Bose,* 70.

It is noteworthy that 1899 is the year in which Bose's research started showing a new trend. The relation between this trend and changes in Bose's personality is discussed elsewhere in this paper (see particularly section VIII.)

a fiery powerful male progenitor of all life, behind a warm accepting male authority, appear to have had some substance.

We are largely ignorant of the first social relationship of Bose. While he, and his biographers identifying with him, have written and spoken at length about his father, they have been reticent—and defensive—about his mother. We only know that her name was Bamasundari (in Sanskrit, a beautiful woman, in Bengali often Kali or Durga[14]), and that she was an orthodox Hindu and remained so even after her husband had become a Brahmo. But we have no way of knowing what form the confrontation of these faiths took within the family. One of the few episodes biographers recount is a meeting between mother and son that occurred when Bamasundari refused permission to the adolescent Bose to cross the seas for further studies in England. Later she recanted and even sold her ornaments so that the trip could be made. But probably not before she herself, and the outer and inner constraints that she represented, had been associated permanently with traditional Hinduism and, as it must have seemed to her son (himself torn between obedience to traditions and attractions of western higher education), of original Indianness. Two other references found in biographies relate to Bose's childhood. The first, and the only one to find a place in Bose's own writings, describes Bamasundari's motherliness towards Bose and his friends. We are also given to understand by some chroniclers that Bamasundari was strict about young Bose's tendency towards being cruel to animals, and imposed some restrictions on his pastimes and play in his childhood.

These scattered references, taken together, give one the feeling that Bamasundari's indulgent mothering towards her only surviving son went hand in hand with some amount of authoritarian intervention and restraints. These, some informants believe, were associated with the stubborn ritualism that coloured Bamasundari's whole life-style. This would have remained a shaky inference, but for the sensitive observations of some members of the Bose family; they help us to locate, within tolerable limits of reliability, those crucial undercurrents of mothering which formal biographies merely hint at. (Bose also *had* something to say about his mother: his studied silence about her was accompanied by repetitive and almost obsessive references to protective and aggressive motherliness and to nurture and succour in his work—sometimes explicit, always implicit.) The episode of the sea-trip to England, they would have us believe, was typical of Bamasundari's peculiar ability to antagonize those surrounding her, an

[14] See note 21, below.

ability which often elicited from her son an angry tempestuous reaction—and fostered a constant irritability that afterwards became a part of his adult self. It was not so much her crustiness, her 'old-fashioned ritual self' as her son recalled it,[15] as the edge given to it by her angry obstinacy, that many found so exasperating.

An observant nephew also remembers her as 'definitely neurotic', a lay diagnosis referring to the pronounced symptoms of obsession-compulsion that she reportedly showed. This, of course, was nothing uncommon in Bengal. Euphemized as *shuchibai*, or compulsive ritual cleanliness of body and mind, the syndrome in its frequency in Bengal was something more than a preferred character defence in a specific culture-area. Its very 'popularity' showed it to be a socially sanctioned posture of certainty, to face deeper uncertainties generated by modal anxieties.[16] What must have aggravated the stress was the flamboyant anger that accompanied her finicalness. Some relatives in fact relate this authoritarian rage of the mother to failures to meet absolute criteria and purity, to the perfectionist, finicky, scientist-son, throwing tantrums at his own and others' inability to meet his internal standards of excellence.

Simultaneously, the mother remained to Bose a symbol of indomitable will, abrasive defiance of external stimuli, succour, and fixity of purpose.

> Man is not a servant of fate, within him there is the power by which he can become independent of the external world. . . . Thus he will triumph over physical and mental weaknesses. . . . Inner power is self will! . . . At which stage of life is this power born? . . . At which stage of life does this power to fight arise? . . . I was thrown small and helpless into this sea of power at birth. Then outer power entered inside to nurture my body and to help it grow. With mother's milk, affection, pity and sympathy entered my heart and the love of friends made my life flower. Power has collected inside me in response to bad days and external attacks and with it I have fought with the outer. . . . Life takes form due to the power struggle between the inner and the outer. At the root of both is the same *Mahashakti,* by whom the nonliving and the living, the atom and the universe are all powered.[17]

Mahashakti, the ultimate power, is also the name of the ultimate maternal principle, represented by the dominant mother–deities of Bengal.

These images of a mother who was at once terrorizing and benevolent

[15] Bose, *Abyakto,* 125.

[16] By turning symptoms into tolerable angularities the society evidently institutionalized certain behaviour patterns that in some other societies would have remained a part of psychiatric symptomatology. The compulsiveness of Bamasundaris, if it can be called so, could therefore be an accentuated form of Bengali normality, and her kind would seem to have been, if not the rule, scarcely the exception.

[17] Bose, *Abyakto,* 191–4.

sought expression in Bose's favourite myths and folk-lore. Those who are tempted to see in his personal introject a modal phantasy will find confirmation of this in the content of his later traditionalism: the intimacy with the revivalists who invoked these two basic images of mother as their major symbols, the selective response to aspects of traditional Bengali projective system dominated by mother-deities, and the nature of the authoritarianism that characterized his later years. Evidently, in one stage of his life at least, Bose sought out those aspects of the cultural system which were most loaded with myths centring around nurturing and threatening phantasy-mothers and, by coming to terms with them, sought to cement with pseudo-certainty the cracks of his basic split.

We do not know how much he could—or was allowed to—externalize his anger towards his mother, or towards other motherly figures in his younger years. Some symbolic outlets were probably permitted by the tolerant accepting father.[18] On the other hand, one is tempted to believe that the presence in the household of an authoritarian grandmother, nurturant and restrictive at the same time,[19] confirmed Bose's nuclear phantasies surrounding his mother. The history of a death in the family was possibly another validation of the son's percept of an angry murderous mother whose fury was directed against him—Jagadis—as it had been once directed against his dead sibling. The differentiation in the mother image could therefore become, in his case, the matter of a more permanent split. 'Mother's love' to him was to denote both 'nurturing kindliness' and 'annihilating power' for all times to come.[20] When used later as symbols, such imageries were to have especial appeal and evoke especial response, in a basically *shakto* culture—a culture dominated by a maternal deity who, in her multiple incarnations, represented the extremes of benevolent benignity and incorporating terror.[21] His later drift towards the world-view of pantheistic Hindu orthodoxy, which horrified many pietistic Brahmos, was to this extent more than a deliberate rational choice: it represented a bridge between the loves and hates of his infancy and the preferences of his adulthood. More about this later.

Bose's mythical *alter ego* Karna could have perished but for the inter-

[18] See Roy and Bhattacharya, *Acharya*, 9, for a mention of how Bhagwan Chandra encouraged his son to express his aggression indirectly, for example, by terrorizing his elder sister with live snakes.

[19] 'Jagadish Chandra Jeebanee', *op. cit.*, 126. Informants affirm that Bose's grandfather was a much more accepting and indulgent figure.

[20] Bose, *Abyakto*, 140–1.

[21] Shaktoism is the predominant Hindu cult in Bengal, organized around the worship of *Shakti* (literally power, but also the name of Durga as well as Kali, the major mother Goddess of Bengal—and, in fact, of most of India).

vention of a kindly foster-father. And the scientist's childhood and youth were spent in a tenacious attempt to use his relatively conflict-free identification with his father as the core of his self, and to disown that part of his self which was built on his identification with his mother, and with the authoritarian, ritualistic and magical world-view she represented.

Bose's father Bhagwan Chandra (both Bhagwan and Jagadis meant God) was considered to be a cultivated man who, in Bose's younger years, held his appointments mainly in small semi-rural towns of Bengal. 'Cultivatedness' in urban westernized Bengal had, in those times, a special meaning which it is difficult to convey fully today. Nowadays, the idea of 'general education' no longer mixes hopes with ambitions in fond parents, and professionalism and specialization have deprived personal work and knowledge of the connotations they once carried of being conducive to the production of a rounded personality. Suffice it to say that the elder Bose was, in addition to being a successful administrator, also an entrepreneur, an amateur physicist and biologist, a promoter of technical education and a part-time engineer, a devout Brahmo with an almost professional interest in the theology of *Vedanta,* a sportsman and a part-time social worker. He also nurtured ambitions to become a writer and a nationalist leader. It is evident from this wide array of roles and interests, and the admiration that this evoked in all, that the ideal Bengali was a person whose multifarious talents idealized (and thus negated the anxiety of) the personal role confusion typical of those transitory times. We shall see how this role confusion, and the anxiety associated with it, later forced his son to look beyond the identification represented by the father towards the clearer self-definition offered by the mother.

Bose's early history, however, showed identification elements derived from both the parents. Young Bose's curiosity and enthusiasm were, we are told, unfettered. All types of growing, self-propelled, and living objects fascinated him. Associated with this interest in life and life processes was also a preoccupation with aggression. He played with models of battleships, cannons and cannonshells, and trapped and killed birds (his father was permissive in this respect, his mother strict.) The beginning of his lifelong interest in aggressive wild life can also be seen in his childhood practice of catching snakes and playing with them. These symbolic expressions of aggression were, even at that stage, linked to his creative efforts: for example, the brass model of a cannon he made with the help of unskilled labourers was considered to be a remarkable feat of engineering. As he grew up he took to the aggressive 'manly' sports of shooting, riding and *shikar.* His *shikar* was mainly big-game hunting and, in his older age, he was to

look back nostalgically upon his tiger-hunts.[22] These may have been the occasions when he most successfully externalized one of his deepest private conflicts. By aggressively pursuing and 'pacifying' wild aggressiveness, he could perhaps symbolically kill those troublesome inner furies which sought outlets in his games, pastimes and creative products. His companions in these ventures were often adults and these relationships often reflected Bose's fears of being neglected and his search for parity with his elders. A typical incident, we are told, was his unscheduled participation in a riding competition with grown-ups. Though he ran last throughout, he refused to give up and was injured badly in the process. Two similar incidents, involving such obstinate search for recognition and success in competition, were a brawl with a gang of Anglo-Indian classmates and a boxing contest which young Bose won against heavy odds. In each of these cases his father expressed admiration at his son's exploits and, on at least one occasion, publicly congratulated him on his tenacity. One is tempted to conclude that the westernization Bhagwan Chandra represented went beyond the boundaries and forms of his 'civilized' interests, hobbies and occupation. It had deeper ramifications in his acceptance of competition, some amount of aggressiveness, and personal initiative and achievement.

Again, Bhagwan Chandra took a personal interest in his son's education. It was he who introduced his garrulous, inquisitive son to botany and physics. His warm, permissive and friendly attitude towards Jagadis must have been thrown into relief by the cultural mode of distant paternalism, and resulted in the intimacy and respect that characterized the father–son relationship. Of course, there was also the relatively rare circumstance of a small family moving from place to place according to the vagaries of a transferable government appointment; the father may have been forced to intervene actively in the son's upbringing. The mutuality was repaid: the son not only took an interest in the father's religious activities, but also internalized his version of 'active intervening ethics' and his developed sense of *noblesse oblige* (derived presumably from the Brahmo translation of the concept of the white man's burden). To give the best known example, Bhagwan Chandra at one time pioneered a number of industrial ventures, which were to yield fabulous profits later, but to him were merely a source of acute financial embarrassment. This landed him in heavy debt which his son repaid years later. From this distance in history, we have no means of knowing where the decision-making went wrong; we

[22] *Ibid.*, 185–6; and J. C. Bose, 'Dedicated Life in Quest of Truth', in P. K. Chatterji (ed.), *The Presidency College Magazine, Golden Jubilee Vol.* (1964), 64–73. See also Roy and Bhattacharya, *Acharya,* 18–19. Throughout life Bose continued to decorate his drawing room with stuffed wild life he had shot in his younger days.

have only the son's expressed belief that it was his father's risk-taking adventurous defiance of his 'given' safe vocation and income that was being punished by 'fate'. It is evidence of Bose's idealization of his father that he undertook years of trouble repaying loans which even the creditors had written off as bad debts, playing apparently the same theme of noble obligations. Long afterwards, he paid respect to his father's risk-taking entrepreneurship, and to his achievement-frustration, in a sentimental homage.[23] He noted there the similarity between the 'magnificent defeats' of his father and those of Karna, his favourite mythical champion of lost causes,[24] but failed to see the analogous role he selected for himself, and often played with such dramatic fervour. Little Bose also discovered early in his life that his father's religious enthusiasm was coupled with a lively interest in science and technology, an amalgam of interests that was to become a formal synthesis in the son much later. This synthesis was reflected in his—a Brahmo's—preference for Viswakarma, the second-order Hindu god of technology and scientific creativity, over the maternal deities that dominated Bengali religious life.

It was his father, again, who handed young Bose over to two elderly servants for training, protection and upkeep.[25] The first of these servants, who became very friendly with Bose, had been a robber in his younger and more glorious days, and had once been condemned to jail by Bhagwan Chandra himself. He often regaled his ward by his 'tales of bravery' and Bose was truly awestricken when this retired executioner once saved his entire family from pirates, with the help of his only half-forgotten skills. Control of latent aggressive needs by a symbolic gesture of protecting an erstwhile target of attack, a defensive pattern Bose employed so skilfully in his research, apparently had its paradigm in the life-cycle of this early ego-ideal. About the second servant nothing much is known. He was a retired army sepoy who taught Bose rifle-shooting which, we have seen, later became handy in his psychologically meaningful safaris.

[23] Bose, *Abyakto, op cit.*, 121–34.

[24] Roy and Bhattacharya, *Acharya*, 8.

[25] The role of servants in the socialization of the nineteenth-century *babus* can be the subject of an interesting study in transitional institution-like structures. These servants represented the elite culture's anxious recognition that the children required some supervision, constraints and intimacy with adults, for none of which there was much provision in the older model of socialization. By meeting some of these needs, and by validating and invalidating earlier interpersonal experiences of the children, these servants significantly influenced the transition from infancy to adulthood. And to the extent that they, and their more traditional personalities, symbolized the parents or mediated parent-child relations, they also influenced the modernization of the child-rearing system of the subculture. See a vivid account of the authoritarianism of baby-sitting servants in a modernist family, in Rabindranath Tagore, *Chelebela*, Calcutta: Viswabharati, 1944.

Bose's nationalist father sent him for his early education to a village school. (It was still possible in Bengal to combine government service with ardent nationalism and Bhagwan Chandra, one may say, was one of the last to make a success of this combination.) This was considered strange in those days when children of highly placed civil servants were invariably sent to English schools. Possibly this exposure to humble village folk and their life-style underscored his traditional self (particularly his sneaking respect for the stability and orderliness of the traditional socio-economic system), as Bose later claimed.[26] It must have helped him to internalize the blueprints of his adult reference groups to whom he would veer round, whenever threatened by criticism or neglect.

This does not however mean that Bose had very many friends. On the contrary, he was probably a lonely child. This, his poor knowledge of English, his rustic East Bengali mannerisms, and the sudden fall from the status of a magistrate's son to the status of an Indian amongst Anglo-Indian students and teachers, created a rather uneasy situation for Bose when he first entered St Xavier's College at Calcutta. Probably it further sensitized him to his nationality, and colour, and helped him later to associate his personal humiliations with the status goals of his people.

Things improved somewhat afterwards, when he went to St Xavier's College for his graduation (1875–1879). There he developed a decisive, long-lasting intimacy with Father Lafont, a well-known professor of experimental physics and a Jesuit priest. Over the decades, Bose drew sustenance from this relationship in many a personal crisis. This was another validating fatherly figure who combined physics with metaphysics; and for Bose the experience remained another milestone in an unfolding intellectual identity stretching unbroken from infancy to adolescence. Later on, like other young men of his genre, he started toying with the idea of becoming a civil servant. This was a highly valued occupation which, at those transitional times, was giving the achievement-oriented contemporaries of Bose a chance to gratify their needs in society. But the magistrate father vetoed this and induced his son to become an academic. This sensitive and sensible 'counselling' must have helped Bose to find his truer identity, based on his father's idealized but only partly attained role, rather than on a superficial similarity with his occupation.

His early role indecision, a paternal inheritance, pursued him even to England (1880–1884). He first studied medicine (1880–81), but soon changed his mind and graduated from both London and Cambridge Universities in natural sciences. Throughout his undergraduate days, he took

[26] Bose, *Abyakto*, 125.

a variety of courses without specializing in any. However, his relations with the professors of physics and botany were decidedly deeper. In particular, his professor of physics, Lord Rayleigh, seemed to act as a second Father Lafont.[27] One notices that his interpersonal roles were, even in that stage, based on the sustaining identification with his father; and, in offering him confusing and often-contradictory sublimations and ego defences, they substantiate what we have already recognized: a diffusion of identifications in the father himself. And this confusion, that had dogged his father's steps all along, now picked up his scent too, turning careers into pastimes and pastimes into careers, as in the earlier generation.

IV

These were the assets and backlogs with which Bose came back from England in 1884 to become an acting professor of physics in a well-known government college in Calcutta. A benevolent elderly English educationalist and the British Viceroy of the time helped him to get this appointment. Both, by taking a personal interest in such a triviality, provided Bose with another important confirmation of his inner image of male authority.

The college where he taught had practically no facilities for empirical research, a challenge Bose probably enjoyed.[28] He also became entangled in a protracted quarrel with the government education department over differences in salary of British and Indian teachers. The obstinate East Bengali, sensitive to even the smallest slight, protested by forgoing his pay. Though he finally triumphed when the disparity was removed after three years of typically tenacious struggle, his family life and personal work suffered another round of instability brought about by the westernized educational and occupational systems. This conflict revealed another facet of Bose's ego-syntonic identification with his father. Faced with a hostile authority that did not consensually validate his internal concept of male authority, he coped with his problem exactly as one would have expected him to: he appealed to the higher authorities, trying to arouse their sense of rationality, justice and benevolence, to grant him a parity that he had earned through hard-work and personal skill. His success in this was probably the final validation that ensured the more or less cordial relations between him and the British authorities throughout his life, cemented later by the token of paternal reward, a knighthood.

[27] A. Home (ed.), *Acharya Jagadis Chandra Bose* (Calcutta: Acharya Jagadis Chandra Bose Birth Centenary Committee, 1958), 6; hereinafter, Home, *Jagadis Chandra*.

[28] Home, *Jagadis Chandra*, 8.

His inner image of male authority had its reflection also in his friendliness with his students and the egalitarian relationship he established with them.[29] Interestingly, this was a characteristic of this period of his life only and did not extend beyond his 'professional prehistory'.

But the wounds of his conflict with educational authorities probably set the emotional tone of his early career. They made him increasingly suspicious of the westernized systems and started bringing into his awareness his own deep-seated traditional concepts of education and occupation. And the search for personal parity, which had engaged him for years, gradually became a search for national parity in this charged context. That he did not widen and politicize this particular version of nationalism, as he could surely have done afterwards as a national hero, only goes to show how much he preferred to, and could, keep his relationship with authorities conflict-free. His growing concern with traditions could also be seen in the sentimental trips he began undertaking to, as he called them, 'relics of the glory of ancient India'. These visits, often undertaken at great physical strain and risk, started immediately after his marriage (see below), and they strengthened his friendship with the well-known exogenous mouthpiece of Indian traditions, Nivedita,[30] who gradually became a constant feature of these 'pilgrimages'. One cannot but notice that Bose had not till then shown any significant academic achievement, though some of his teachers had admitted his talents.[31] Even as a professor he was more concerned with his scientific hobbies, such as photography and the development of simple laboratory instruments for his college, rather than with sustained serious work of any sort. The waywardness and furies of his youth, to which some of his biographers refer, had evidently their extensions in the aimlessness of his early professional life.

In 1887 he married. It was an arranged marriage. Abala, his wife, came from an orthodox and illustrious Brahmo family that had a pronounced reformist and religious bent. Whether their orthodoxy, combined with social prestige, further strengthened Bose's reliance on Upanishadic metaphysics as the patterning core of his personal and academic credo we do not know, but it is known that his wife was a particularly devout Brahmo whose insistence on regular prayers and meditations must have revived old memories in Bamasundari's son.

[29] Roy and Bhattacharya, *Acharya*, 29; this is based on Ramananda Chatterji's description in 'Kashtipathar', *Prabashi* (November–December, 1932) (Agrahayan, 1339).

[30] Sister Nivedita, born Margaret Noble, of an Irish family, became a disciple of Swami Vivekananda and came to India in 1898. She was a social worker and was active in the Ramakrishna Mission. Bose remained in close contact with her till her death in 1911.

[31] *Ibid.*, 18.

Simultaneously, while sharing with Bose his scientific hobbies, Abala encouraged him to enter serious scholarship and, when he actually did so, took an active interest in his social as well as academic needs. Interesting light is thrown on Bose's adult personality by the nature of his conjugal relationship and the role which Abala, by all accounts, played in his life. Patrick Geddes, who knew them first hand, says

> . . . hers has been no simple housewife's life, . . . not only appreciating her husband's many scientific problems and tasks, and hospitality to his students and friends, but sharing all his cares and difficulties. . . . For his impassioned temperament—in younger days doubtless fiery, and still excitable enough—her strong serenity and persistently cheerful courage have been an invaluable and ever active support. . . .[32]

Bose's nephew also speaks of Abala's 'calm strength' and 'unruffled temper', while ministering to the temperamental scientist, and of her 'tact and serenity' which were of 'great help in easing her husband's contacts' with other sceptical scholars.[33] One source of Abala's strength would therefore seem to be her serenity in a charged situation and her ability to accept and modulate Bose's basic combativeness—'like the fly-wheel steadily maintaining and regulating the throbbing energies of the steam-engine.'[34]

This ability in her possibly referred to Bose's prehistory: his nuclear conflicts, centring around themes of distance and hostility, that characterized much of his relationship with his mother. By being a nurturing mother to Jagadis, his relatives and his friends, and part seriously, part playfully taking the role of a strict religious maternal authority, Abala was invoking a pattern of relationship that found its bearings also in the 'socializing' phantasies of his people—in the rich, earthy tradition of mother-image-dominated Bengali myths.[35] Here was a nonthreatening controllable mother, predictably calm, ego-supportive and nurturant, more convincing by virtue of being also a firm independent, self-sufficient individual.[36] The two faces of his inner mother at last showed signs of becoming one in this sensitive, humane, determined woman.

This interpersonal system received support from three other develop-

[32] P. Geddes, *The Life and Works of Sir Jagadish C. Bose* (London: Longmans, 1920), 218–19.

[33] D. M. Bose, 'Abala Bose, Her Life and Times', *Modern Review* (June 1966), 441–56 *passim*; see particularly 445, 454.

[34] Geddes, *op. cit.*, 219. Also Roy and Bhattacharya, *Acharya*, 18.

[35] For a detailed discussion of this, see A. Nandy, 'Authority and Defiance of Authority in a Traditional Society: The Case of Rammohan Roy', (forthcoming paper).

[36] The maternal role played by Abala is described by almost every biographer of Bose. For a brief account see Gupta, *Bose*, 85–7. The pattern was also confirmed by the nurturant motherly women Bose assembled around himself, particularly Ole Bull and Nivedita (both incidentally were Westerners who had opted for the Indian way of life).

ments. Firstly, the continuous illness in Bose's brother-in-law's home which required the intervention of Abala from 1897 onwards. At the beginning, it was only partial responsibility that she had to bear but, afterwards, she had to take charge almost fully, so much so that the children of the family came to look upon her as 'a second mother'. Whether this long contact with the ailing family deepened her 'maternal instincts', as D. M. Bose believes,[37] or not, it surely confirmed an existing pattern. Secondly, Abala's sensitivity to, and empathy with, Bose's succorance needs increased their mutual dependence. To give a very revealing illustration of this, Bose used to ask children who visited him to declare the amount of love they had for him. He would not be satisfied till they extended their hands backwards to the fullest to indicate their total love for the scientist. Abala knew this and would encourage some of her grandchildren to visit Bose by rewarding them with cookies. The death of their only child in infancy (1902)—'their one great common sorrow'—further reinforced the pattern by making Bose the locus of Abala's attempts to cope with her frustrated nurturance needs, and making them 'more completely at one'.[38] Symbolic maternity and motherliness now became more critical for her, and the deep needs for succour of her husband, more than ever, constituted a viable behaviour system, defining roles for both partners. Within this system, Bose's infantile phantasy of being able to appease and get love from a maternal source by compulsive orderliness and purity and by searching for and discovering a universal all-embracing order attained greater and greater importance. Gaining and holding of love through finicky neatness and order in scientific thought, imaginal productions, and in day-to-day behaviour (for example in dress, food, work-routine and housekeeping), now became a matter of internal order and even compulsion. Evidently here was the bridge between the disorganized, defiant, angry, once wayward youth and the proponent of a unifying theory of life. 'The present', Bose had said in 1894 in the first sentence of his first publication, was 'made of the past', and he often found them 'separated by an inescapable barrier'.[39] A few sentences later he had to correct himself; in the fresco of a mother nurturing her baby he discovered 'the bridge between the past and the present, built on nurturance and motherly fondness'.[40]

Absolute order, however, can be costly for a scientist, because it is only a short step from order to ritualization. The psychological relationship between orderliness and compulsion of rituals, by drawing our attention to

[37] D. D. Bose , *op cit.*, 445.
[38] Geddes, *op. cit.*, quoted in Home, *Jagadis Chandra*, 38.
[39] Bose, *Abyakto*, 1.
[40] *Ibid.*, 3.

the uncertainties underlying the latter, only warns us against being seduced by the pseudo-certainty of the former. One can thus trace one's steps backwards, and examine each ritual anew as a specific attempt to impose order and claim certainty where forces of disorganization and uncertainty are the most powerful and harassing. The magnificently rigid certainty that we find in the later Bose was therefore not only a part of a long sequence of uncertainty and deeper-lying fears of these two forces, but also of a continuing attempt to cope with them both.

V

Bose's father died in 1892, his mother in 1894. We have no record of how the son reacted to these deaths. One suspects that, given the content of the mother–son relations, it was the second death which aroused more intense feelings of guilt and fear of his own destructive wishes. In any case, 'a great change occured to Jagadis Chandra at this time',[41] and he started his researches in that same year. The turning point was his birthday (30 November, 1894) when he vowed, persuaded by Abala, to take to scientific research seriously and to further new knowledge by unravelling the mysteries of nature.[42] He was now to study mysteries of nature, of *prakriti,* as both nature and the ultimate reality of feminine principle are called in Sanskrit and Bengali. His sensitive nephew thinks that this marked a more or less permanent truce with the inner conflicts 'which had been going on in the subconscious region of his mind'.[43]

Thus, through his motherly wife, Bose the wayward child and confused adolescent was reborn—it was his birthday—into a new life where work identification and a truer professional identity could be built on a rearrangement of earlier identifications. The fight against the temptation to perceive science as hobby—his father's hobby—was joined with the newly-found weapon of single-minded complete professionalization of his scientific career. But not before a new intimate motherliness had helped him partly to accept his rejected identification with his mother, so as to search for evidence of 'motherliness in the steel frame of inexorable orderliness' of ruthless *prakriti.*[44] In 1894 he wrote,

Everybody cannot see mother's love in the heart of nature. What we perceive

[41] D. M. Bose, *op. cit.*, 446.
[42] Home, *Jagadis Chandra*, 7; Gupta, *Bose*, 23; Roy and Bhattacharya, *Acharya*, 32–3.
[43] D. M. Bose, *op. cit.*, 446.
[44] Bose, *Abyakto*, 3, 133.

is only the projection of our minds. The things on which our eyes rest are merely the pretexts.[45]

Some semblance of search was still to continue for another five years, but the first breakthrough towards serious orderliness—his mother's orderliness —had been made. Though he was to tread for some time yet what he later felt to be the 'safe' path of research in electrical waves, he had located his personal projective medium in scientific research—a medium that would be true to him, in response to his own fidelity to his deepest identifications.

Bose always looked upon the first five years of his research as a preparatory stage—a professional prehistory characterized by the discovery of instruments, rather than by daring theorisations. This view partly overlaps the analysis of D. M. Bose and Home, who have recently divided Bose's research career into three rough phases :

—1894–1899 : Production of the shortest possible electro-magnetic waves (up to 5 mm) and verification of their quasi-optical properties.
—1899–1902 : Study of the properties of coherers leading to the discovery of some similarity in responses in the living and the non-living.
—1903–1933 : Study of response phenomena in plants, the complexity of whose responses lies intermediate between those of inorganic matter and of animals.[46]

I am not competent to evaluate Bose as a scientist, and it is difficult to get a comparative assessment of these three periods from scientists who are no longer so interested in Bose as to devote themselves to all his works with equal seriousness. D. M. Bose, a rare exception to this trend, seems to believe that it is the first phase that has surest scientific relevance to present-day physical and biological knowledge, followed by the third and the second phases in that order. Others make approximately similar assessments. Bose himself obviously considered the second phase most important. After completing his book *Response in the Living and the Nonliving* in 1902, he wrote :

My task is more or less complete; in future I shall merely have to sit idly in an atmosphere of uncertainty.[47]

It seems that while Bose himself, and his Indian and western admirers,

[45] *Ibid.*, 4.
[46] D. M. Bose, 'Jagadish Chandra Bose (1858–1937)', *Transactions of Bose Research Institute,* **22** (1958), v–xv, see also Home, *Jagadish Chandra,* Part 1.
[47] Roy and Bhattacharya, *Acharya,* 95.

valued the second, third and first phases in that order, some of his contemporary western scientists' evaluations were not substantially different from the present-day assessments of both Indian and western scientists. The virulence of his detractors notwithstanding, this seems to make the point that his personal belief in the anti-Indian parochialism and conspiracy of western scientists was drawn, not merely from a realistic perception of outer hostility, but also from his and his society's mood. Both probably sought, in the perceived hostility of the West, a justification of their own growing hatred of the British.[48]

In sum, the researches of the first phase were well received. He was awarded a DSc by London University for his contributions to physics (1896) and was deputed to England by the Government of India on a lecture tour. There his speeches on electrical microwaves at the advanced British centres of learning were applauded by some of the best known physicists of his time, including Kelvin, Lister and Ramsay. Some of the most sedate dailies and periodicals, like *The Times* and *The Spectator*, also found his work 'strikingly original', and even 'sensational'.[49] These successes were followed by lecture-demonstrations at numerous learned societies and universities of the Continent. Bose apparently was well set to become a celebrated physicist, if not an outstandingly creative one.

But, he knew, 'success could be cheap and failure great', and his—a Brahmo's—'goddess lifted her children to her bosom only when they returned to her defeated'.[50] Failures therefore were to some extent cushioned :

> What are you afraid of? That you will not reach your goal even at the cost of your entire life? Do you not have the slightest of courage? Even a gambler stakes his life's earning on a throw of dice. Can you not stake your life for a grander game? Either you win or you lose ![51]

Thus in 1899, the vision of a grand defeat and what could be a 'paradoxical fear of negative success',[52] made Bose cross the conventional western boundaries of scientific disciplines to go over to botany, a subject he had formally studied only in his undergraduate days. Though he later reveal-

[48] See section VI for a description of the favourable western reception of his ideas and section VII for a description of the possible causes which might have alienated Bose from the West.

[49] See details in Home, *Jagadis Chandra, passim*; and Roy and Bhattacharya, *Acharya*, chapters 11–15, *passim*.

[50] Bose, *Abyakto*, 132, 158.

[51] *Ibid.*, 131.

[52] Erikson, *op. cit.*, 44.

ingly explained this change as being justified by the over-mathematization of modern physics, his belief that 'plant life was merely the shadow of human life' also probably had something to do with it.[53]

These trees: that they have a life like ours, that they eat and grow, I once did not know. . . . Now I can see that they also face poverty, sorrows and sufferings. This poverty may also induce them to steal and rob. . . . But they also help each other, develop friendships . . . sacrifice their lives for the sake of children.[54]

But beyond these reasons, there probably was a deeper motivating force. The following year he was to write to a friend:

I hear, from time to time, a call from the mother. Her servant will start with the dust of her feet as a benediction. You and all my friends must bless me, so that the servant can serve the mother with all his heart and soul; and his strength for work increases.[55]

This turning 'from the study of the inorganic to that of organized life', as he was later to describe it,[56] led primarily to the study of responses made by plants, animals and the nonliving to various types of mechanical and biochemical stimulae. It meant a sudden spurt in productivity too. One suspects that Bose became more sure of himself and his creative potential in this phase: we find that in the five years 1894-99 he published four papers, whereas in the three years 1899-1902, he published nine papers and a book. This pattern was to continue thereafter, which suggests that there was a consolidation of his work of the second period in the third, rather than the breaking of new grounds. The thematic continuity over these phases can also be inferred from the evocative titles of his papers communicating the results of his botanical and para-botanical researches.[57]

The dates of publication also indicate the continuity in the dominating themes of Bose's works. What was a new scientific idiom, and has sometimes been explained away as only an idiom, spilt over other sectors of

[53] Bose, *Abyakto*, 135.
[54] *Ibid.*
[55] Letter to R. N. Tagore, 23 June, 1900; cited in Gupta, *Bose*, 35.
[56] J. C. Bose, quoted in Home, *Jagadis Chandra*, 85.
[57] Such as 'Responses in the Living and the Non-living' (1903); 'How the Plants React to Pain and Pleasure' (1915); 'Testing the Sensibility of Plants' (1915); 'The Unity of Life' (1927); Is the Plant a Sentient Being?' (1929); 'Are Plants Like Animals?' (1931); 'Injured Plants', 'Inorganic and Organic Memory', etc. For a complete list see S. Balasubramanyan, 'Bibliography of Books On and By Jagadish Chandra Bose' (Calcutta: National Library, 1965) (mimeographed). See also bibliography in Home, *Jagadis Chandra*.

his work. In 1920 he published a collection of essays in Bengali which were thematically akin to his scientific publications.[58]

These titles suggest, though perhaps they fail to indicate fully, the extent to which Bose's fundamental research interests revolved around the search for similarities between the living and the nonliving and for a biological model that would explain physical phenomena. In 1901, for instance, he wrote:

I have invented an instrument in which any pulsation or response created by pinching would be recorded by itself. . . . And just as you feel the throb of life by feeling the pulse, similarly the throb of life in the inanimate object is recorded in my instrument. I am sending to you a very astonishing record. Please observe the normal coursing of the pulse, and then how it moves under the effect of poison. The poison was applied on an inanimate object.[59]

The credo of these studies of 'organized life' was somewhat as follows:

There is no break in the life-processes which characterize both the animate and the inanimate world. It is difficult to draw a line between these two aspects of life. It is of course possible to delineate a number of imaginary differences, as it is possible to find out similarities in terms of certain other general criteria. The latter approach is justified by the natural tendency of science towards seeking unity in diversity.[60]

The reaction of western scientists to such views was again varied. Some found the approach essentially magical and mystical, and hence worthless; others found it appealing for that very reason. When Bose demonstrated, at the Royal Institution in 1901, the death agony of a poisoned tinfoil, and cured another with the help of drugs, to some he merely took his interpretive biological model of physical phenomena (and also his physical model of biological phenomena), as both groups had expected, to its logical conclusion. No wonder that after his peroration, Robert Austen, the greatest living authority of the time on metals, 'was besides himself with joy'. He was reported to have said,

I have all my life studied the properties of metals. I am happy to think that

[58] Some examples: 'Birth and Death of Plants', 'Literature in Science', 'The Mute Life', 'Injured Plants', 'Gestures of Trees', etc. All the essays have now been reprinted in Bose, *Abyakto*.

[59] Part of a letter probably written to Lord Rayleigh or Sir James Dewer, 3 May, 1901, cited in Gupta, *Bose*, 41–2.

[60] Bose, *Abyakto*, 87.

they have life. . . . Can you tell me whether there is future life—what will become of me after my body dies?[61]

Progress of science, regrettably, has no special weakness for Indian metaphysics or for the needs of Indian nationalism. Consequently, more sophisticated, though duller, interpretations of some of Bose's data are today available. Even in his lifetime, in spite of their overt esoterism, the salient features of Bose's discoveries were being gradually integrated within the framework of formal scientific thought.[62] Bose, however, was never open to alternative explanations of his work. As with some pioneers, he had a hard core of fanaticism which was often hidden by his other-worldly manners. He was his obstinate mother's son who never gave in and, one must understand, could not give in. Like his idealized teacher, Ishwar Chandra Vidyasagar, and his concept of creative godhead, Shiva, he felt justified in combining softness with angry obstinacy,[63] and protectiveness with annihilating rage.[64] In any case, his impatience and temper tantrums were bywords among his acquaintances. He himself also knew his own anger well. For example, while appearing before the Royal Service Commission, he carried for his personal use a piece of paper with a Bengali inscription 'Do not get angry'.[65] But he had, within limits, found his berth. For the last twenty-five years of his life, he went on redefining and sharpening his concepts without ever substantially modifying them.

It is the middle-aged scientist that many remember best. A stout, chubby, short, impeccably dressed, irrascible man, he was found intolerably egoistic, impatient, abstruse and authoritarian by some of his students. The students also remember Bose as a reasonably good orator and conversationalist, an estimation Bose could never accept. His distrust of his orality was in some ways total. He spoke as little as he could and, when he had to lecture, took days to prepare himself for the delivery.

Bose's gradual drift towards authoritarianism, noticed by many at about this time, has been related at least by one observer to his increasingly greater exposure to the *guru-shisya* concepts of Ramakrishna Mission Ashramites, particularly Vivekananda and Nivedita. He now cultivated and enjoyed more and more his public image of a distant *acharya*—the traditional Sanskritic name for a religious preceptor cum professor. Those

[61] Gupta, *Bose*, 44. See section vii for an analysis of how Bose utilized the universal human anxiety about death to organize his identity.

[62] See D. M. Bose, 'Jagadish Chandra Bose', *op. cit.*, v–xv, for a brief account.

[63] C. C. Bhattacharya, 'Acharyadeb Smarane', *Vasudhara*, **2** (1958), 121–4. Also Gupta, *Bose*, 94.

[64] Bose, *Abyakto*, 220*d*.

[65] *Ibid.*, 79.

who are suspicious of sudden developments of well-organized character traits will see in these evidence of deeper identifications. In giving up the earlier egalitarian bonhomie with students, Bose was being true to a part of himself that had become important for him in the course of later years. Increasingly he used his collaborators as laboratory assistants: they handled the experiments and collected the data, having no say whatsoever in decisions regarding hypotheses, methods and interpretation of results.

By this time he had redecorated his house in fully Indian style and gave the pride of place in his living room to a famous painting of Mother India or Bengal[66] by Abanindranath, another Brahmo; the picture was patterned after the image of a traditional mother goddess of Bengal. He had also become tremendously finicky about food, overtly because of his diabetes, blood pressure and a 'nervous breakdown' in 1915.[67] But even before these, his growing rejection of food was obvious to many (part of Abala's heroic effort towards an integrated Bose was that after marriage she learned to cook very well). And he had become overly particular about other things, too. His lecture-demonstrations had become orderly well-rehearsed performances, in which nothing ever went wrong—'he would even use the same set of bricks to heighten his table every time', one of his students affirms.

For a short time, in his young adulthood, his friends had been numerous but, as the years went by, the radius of his inter-personal world shrank back to its original size. In addition to his lessening friendliness towards his students, he became a distant figure even for his intimate friends. For instance, while Tagore remained warm, expressive and protective towards Bose to the end, the latter reciprocated this emotional investment less and less. Similarly, he quarrelled with Dev Manikya and became cooler towards P. C. Roy. He also avoided participating in movements, large-scale organizations, and public functions.[68] These centrifugal emotional forces could be a result of Bose's increasing involvement in his work, but they could also be the reflections of a latent dynamic that played an important role in his more 'settled' years. Moreover, he had made new friends by then:

[66] Like all true-blooded Bengalees Bose did not, or could not, distinguish between the two; see section VIII.

[67] One wishes that something more was known about the breakdown: how for instance his body, if it *was* a matter of the body, spoke the language of his inner struggles and what, other than the strain of an international journey, precipitated the symptoms? Only one biographical account provides enough material for us to guess that Bose was in an acute anxiety state, and that it was at least partly a result of constantly preparing and delivering public lectures on his work during the trip. See S. C. Ganguli, *Acharya Jagadis Chandra* (Calcutta: Shri Bhoomi, no date), 141–3.

[68] Roy and Bhattacharya, *Acharya*, 231, 232.

In time, plants came to be his best friends. He loved them, reared them and treated them with tender care. He followed their life history and perhaps they also spoke to him. Pain and relief from pain in the plant became clear to him.[69]

In 1917 he established the Bose Institute. It is an ornate temple-like structure (the major architect was Bose) housing an advanced research centre 'to search for the ultimate unity which permeates in the universal order and cuts across the animal, plant and inanimate lives'.[70] Called the 'Bose Temple of Science', in Bengali, it had a special platform, or *vedi*, for its founder to meditate from regularly. As emblems of the temple Bose selected sculptured representations of the Sun-God (a symbolic pointer to the identification that had been his first bridge between *bhakti*, or devotion, and knowledge) and *vajra*, or thunderbolt (the mythical weapon of Sanskritic gods for fighting evil in the form of demons, and a traditional symbol of legitimate fury). The major grants for the institute's buildings and its subsequent researches came from—and had to come from—the British government. This was a result of the friendly relation the scientist had maintained with his temporal authorities for so many years. Some of his countrymen found this unpalatable. P. C. Roy, the illustrious professor of chemistry, was to express their reservations by privately calling Bose a 'basketholder', an English rendering of the colourful Bengali word for a sycophant.[71] While 'dedicating' the institute 'to the feet of God for bringing honour to India and happiness to the world', the ageing patriarch said,

> The excessive specialization in modern science has led to the danger of losing sight of the fundamental fact that there can be but one truth . . . India through her habit of mind is peculiarly fitted to realize the idea of unity, and to see in the phenomenal world an orderly universe. It was this trend of thought that led me unconsciously to the dividing frontiers of the different sciences and shaped the courses of my work in its constant alternations between the theoretical and the practical, from the investigation of the organic world to that of organized life and its multifarious activities of growth, of movement, and even of sensation.
>
> What I establish today is a temple, not merely a laboratory. Truths which can be sensed are determined by experiments; but there are some great truths which can be reached only through faith.[72]

[69] Gupta, *Bose*, 92. Roy and Bhattacharya (*Acharya*, 216) also report that Bose's neighbours believed that they saw the scientist conversing with plants at night.

[70] See note 72, below.

[71] Roy himself, however, had gone bankrupt as a researcher trying to be a national chemist and had become, in the process, solely a promoter of researchers.

[72] For the full speech, consult 'Nibedan' in Bose, *Abyakto*, 142–58. The first part of the quotation is an English rendering from Gupta, *Bose*, 134.

This is as near as Bose ever came to an explicit statement of his scientific faith.

Bose died in 1937, a renowned scientist and a venerated academician, surrounded by his loyal disciples. His gradual alienation from some of the newer currents of scientific thought was however already becoming apparent. Modern science, for its part, though not bypassing him, was 'undramatizing' his discoveries in a way which Bose, if he had cared to know of it, would have found, in the typical Western way, heartless.

VI

When science is universal, can there be in the arena of science an area which will remain vacant without an Indian devotee? There certainly is.[73]

To understand fully the identity Bose evolved as a creative Indian scientist, one should ideally examine the totality of the contemporary human experience as it was telescoped into the state of science in India. As this is beyond the scope of the present analysis, I hope to mark out a broad frame which may give some understanding of Bose as he lived and mediated the needs of his society, and of his personal history, through science.

The most conspicuous and consciously espoused theme was pithily summarized by Bose himself as a statement of his scientific faith:

The consciousness of the scientist and the poet both go out in the search of the inexpressible one. The difference lies in that the poet ignores the means, the scientist does not.[74]

If this was an offhand indirect reflection on his professional role (or on what he wanted it to be), the concluding remarks of his lecture-demonstration at the Royal Institution were a clearer proclamation of his professional identity as it mediated his self concept and his concept of 'true' Indianness:

I have shown you this evening the autographic records of the stress and strain in both the living and the non-living. How similar are the two sets of writing, so similar indeed that you cannot tell them one from the other? They show you the waxing and waning pulsations of life—and climax due to stimulants, the gradual decline in fatigue, the rapid setting in of death rigour from the toxic effect of poison. It was when I came on this mute witness of life and saw an all-pervading unity that binds together all things—it was then that for the

[73] Bose, *Abyakto*, 150.
[74] *Ibid.*, 87.

first time I understood the message proclaimed on the banks of the Ganges thirty centuries ago—'they who behold the One, in all the changing manifoldness of the universe, unto them belongs eternal truth, unto none else, unto none else'.[75]

This must have been hard for some of his Western listeners, steeped in an Aristotelian scientific culture, to swallow. But it electrified the contemporary Indian elites. In this resolute attempt to obliterate the differences between the external world and the self, they could see the synthesis of imported and indigenous strands of consciousness, a synthesis in which indigenous ideals of scientific thought and inquiry predominated. It not only made acceptable to them their then-conflictual Indian identifications, but also partly resolved their ambivalent attitude to Western science.

The backdrop to this was the persistent affirmation of unity in diversity in traditional Indian thought—a highly potent theme which had been often used to impose order on diversities, contradictions and oppositions, and which thus provided a possible design for a unified world-view in a fragmented society. The institutionalized emphases in India on social hierarchy, ethical plurality and segmentation of interpersonal relations had never outweighed—and in fact might have given an added weight to—the ideological concern with the oneness of existence and the singleness of experience. The consequent attempt to tame and transcend individualism, so as to instil in man the awareness of the ultimate unity between *brahman* (essence) and *atman* (essential reality of self), had often acted as the primary source and support of unity and originality in Indian theory of knowledge, and as a rationalization of dissent and reform. And at least one psychologist has felt it to be associated with easier acceptance of the process of change and of the new, the strange, and the different.[76] Of particular interest is the manner in which the monistic concept of an impersonal timeless absolute gave a special meaning to the concept of scholarliness: the scholar was traditionally expected not to extend the perimeters of empirical knowledge, but to facilitate fusion with a transcendental truth. The anti-materialist bias of Indian scholarship partly derives its authenticity from this equation between scholarly exploration and search for an abstract universal unity.[77]

[75] R. N. Tagore, 'Acharya Jagadisher Jaivarta', *Vasudhara, op. cit.*, 107–9.

[76] G. Murphy, *In the Minds of Men* (New York: Basic Books, 1953), 44, 268.

[77] Some indirect mentions of this can be found in N. C. Chaudhuri, The *Autobiography of an Unknown Indian* (London: Macmillan, 1951), 171–218; E. Shils, 'The Culture of the Indian Intellectual' (Chicago: University of Chicago Press, 1959, reprint series), and 'Influence and Withdrawal: The Intellectual in Indian Political Development', in D. Marvick (ed.), *Political Decision-makers* (Glencoe: Free Press, 1961), 24–9.

It is not surprising that this monistic stance was formalized by Bose into a meaningful scientific idiom and into a basic tenet of his research. Once he did this, a plethora of compatible concepts of scholarliness, unity of science, interdisciplinary methods, and the social role or obligations of a scientist became available to him. To a scientist who had moved from the hard-headedness of physics to the mysticism-grinding of his later cross-disciplinary works, this value became vital; only through it could he have gained a clearer and more positive self-image in a fluid scientific culture that was yet to generate culturally valid and personally meaningful symbols, and in a hostile scientific tradition that reflected the rigidity of the Victorian milieu within which it grew.

But this particular cultural strain probably also met deeper personality needs arising from deeper diversities. So that the 'multiform unity in a single ocean of being' and 'the great pulse that beats through the universe' became the symbols of a more profound personality integration towards which Bose constantly struggled.[78] This is evidenced by a recurring motif of his life : a personal myth which became, in two senses, a concrete design. The beginning of this motif was in his fascination with the rivulet which, originating from a hillock, flowed out from under a culvert near his childhood home and merged finally into the majesty of Padma, the eastern-most branch of Mother Ganges, flowing towards the placid grandness of the sea. This theme of origin from an elevation, a temperamental movement, and final merging into a calmer and more majestic oneness was to recur. While studying at St Xavier's School, he made a small garden in his hostel within which there was an artificial brooklet with a bridge over it. Again, in two of his houses and in the Bose Institute, Bose designed artificial streams originating from significant heights (from a pump or fountain for example) and flowing under bridges into the placidity of larger watersheds. In his Darjeeling house (he called it *Mayapuri* or fairy place, and it was the only place where he was not insomniac) the motif was not present in this form. But he had seen to it that the house was situated between two fountains which ended in noisy rivulets flowing down to their own quieter selves a few hundred feet below. But most revealing is his best-known literary essay, published in 1894, the year he took the vow of fidelity to research.[79] It describes his search for the origin of Bhagirathi or Ganges in a sacred

[78] Bose, in *The Golden Book of Tagore*, 16 (personal communication from P. B. Sen).

[79] Bose, *Abyakto*, 73–81. For the Bose Institute he also commissioned a mural which bore some relationship to the basic motif. It depicted, at his suggestion, the 'idol of knowledge' floating down the Ganges, with the eternal woman beside him—a representation, as a contemporary journal pointed out, of '*shakti* inspiring *purusha*'. See *ibid.*, 236.

fountain in the Himalayas, the shaky bridge over it near the place of its origin, its turbulent journey to the plains, and its final merging with the peaceful creativity of mother-goddess Ganges of the plains. In this expressive travelogue he discovers the critical origin in the Himalayas, the symbolic and not-so-symbolic equivalent of Mahadev (the mythical consort of the Mother of the Universe and the traditional personification of phallic creativity). In Mahadev's snaky matted hair-plaits Bose discovered the source of all streaming life, all movement, all progress.

These interrelated concepts of birth, beginning and creativity seem to illumine two basic phantasy elements: the emphasis on a male principle or authority (or its phallic representation) as the ultimate passive source of creation, and an active, changing, dynamic, *praakritic* principle split into two.[80] The split is indicated by the concept of a tempestuous, abrasively mobile motive force—and its paradigm in the identification with the repudiated mother—and, beyond it, by a secure, certain, uterine placidity representing ideal self and a symbiosis with the other mother within. Both were projections of Bose's fragmented self. It was as if he stood between 'the sly, cruel, crushing ruthlessness and the meditative affectionateness of mother nature', two images which were 'merely the projections of one's own mind',[81] to make his choice of a conflict-free stable self-definition. The concept of transcendence or control of impulses and impulsiveness was possibly implied in the omnipresent bridge symbolizing deliberate intervention, rising above and binding 'nature' to negate or harness its unpredictable natural abandon. These motifs had other aspects too: idealization of total fusion cannot but conceal beneath its defensive rigidities fundamental doubts about unity and fear of losing unity in diversity. To an individual with pronounced early diffusion of identifications which in youth became a long and aggravated crisis of ego identity, this concept of mergence could provide a communicable symbol in a culture where ethical and structural fragmentation of caste-specific *dharmas* and life-cycles constantly threatened, and in the process consolidated, the ideological concern with unity and fusion. The harmonizing concept of monistic universalism represented, therefore, a projection of the defensive manoeuvre to bind together a fragmented set of identifications, so as to forge a consistent sense of inner oneness out of diverse and conflicting material, at both the individual and the social level.

Against this one must estimate the impact of Brahmo monism on Bose.

[80] This was compatible with the Hindu concept of *purusha*, the ultimate male as a passive creator of the universe, and *prakriti* as the active participant in the process of creation.

[81] Bose, *Abyakto*, 3–4.

This monism was an important force in a family headed by a devout vedantist who, as the anxiety-free model of identification, had sought for himself and for Bose an antidote for his fragmented self, and for the multiplicity of his roles. Moreover, in Brahmo history itself there was a sanction for using reinterpreted *advaita* as a technique of legitimizing innovations and innovativeness—a technique of traditionalization to which Rammohan Roy, the first Brahmo, had introduced modern India. This wider subcultural strain became an immediate intimate actuality in the familiar, and familial, Brahmo: the father and the identification he represented. And if in the process the father combined, for himself and for his son, the theory of nature with the theory of living, this combination must have been further reinforced by the adolescent relationship with Father Lafont (and, to some extent, later with Lord Rayleigh), a relationship which replicated the earlier intimacy in almost all its aspects. In fact, the formal scholastic context of the second relationship could only have strengthened the earlier identification, against the background of the culturally determined connotations of scholasticism in India.

The Brahmo concern with 'cosmic unity' was, however, something different from the pure monism of *Vedanta.* Its monotheistic, rather than monistic, involvement with social ethics and social relations could not have encouraged the implicit pantheism which Bose made his own. Bose's pantheism was rather the monism of revivalism, which had its parochialized counterpart in the little culture's projective system: in rituals, myths, magics, folk-tales, sayings, theories of nature, interpretations of ill-health, demonology, and so on. It was in these areas that this universalism of pockets of Sanskritic elite culture became the tendency to apotheosize natural entities as not only endowed with life, but also with the ability to manipulate human behaviour and fate. The more abstract monism of the Ramakrishna Mission tapped the little culture's anthropomorphism in this sense. No doubt, it could reach beyond the perimeters of urban Bengal while Brahmoism started drowning in the blue blood of its elitist carriers. Thus, for the Bengali elites, monistic universalism, in addition to being a distal brahminical standard legitimizing the new and the strange, was also a proximal folk theme which, by being threateningly near, was perhaps too remote from the urban and urbane Brahmos. In the unfolding of Bose's creativity, it at last cut across cultural hierarchies to become a potent sociopolitical symbol. (It has been suggested that, to some extent, the ability to empathize through animation of the inanimates, or through anthropomorphizing, represents a basic characteristic of creative individuals. It allows them to seek and establish new relationships and a wider unity

among diverse units and is compatible with their greater sense of gestalt.[82] What is of interest here is the level or area of environment from which sanction for the 'sense of actual or potential organization' is sought, and how as a result the dynamic of the latter is vitally affected.)

This cultural norm linked the scientist's creative imagination to his cultural milieu not only as an internalized value, but also as a critical social press. Within such a frame of reference, the community could feed the knowledge of its acceptance back into Bose's sense of belonging, without making disruptive demands on his professional identity. A western contemporary of his would have been isolated or at least would have found acceptance dearer. Bose continually maintained his sense of rootedness in the scientific community, and was allowed by both his country and the West to maintain it, in spite of being wedded to a metaphysical stance that became not only a personal faith or personalized jargon, but also a part of the content of his research. These work symbols, derived from his understanding of India's uniqueness, could not have come from the western scientific culture. Yet, such were the latent needs of some sections of the West at that time, that he also became relevant to western intellectual elites. Let one westerner who opted for the Indian way of life, Nivedita, speak first:

> The book on responses in living and nonliving is now triumphant. I want a far greater work, such as only this Indian man of science is capable of writing on Molecular Physics, a book in which that same great Indian mind that surveyed all human knowledge in the era of the Upanishads and pronounced it one, shall again survey the vast accumulations of physical phenomena which the 19th century has observed and collected, and demonstrate to empirical, machine-worshipping, gold-seeking mind of the West that these also are one—appearing as many.[83]

No less eulogizing was Rolland:

> I hail the seer; he who by the light of his poetic and spiritual insight has penetrated into the very heart of Nature. . . . you have wrested from plants and stones the key of their enigma; you have made us hear their incessant monologue, that perpetual stream of soul, which flows through all beings from the humblest to the highest. . . . you have boldly added to the vast domain of Indian thought a hemisphere of the Being, which the ancient intuition of your ancient sages had already recognized—these innumerable people of the

[82] Phyllis Greenacre, 'The Childhood of the Artist: Libidinal Phase Development and Giftedness', *The Psychoanalytic Study of the Child* (New York: International Universities, 1957), vol. 12, 47–52.

[83] Letter to R. N. Tagore, 8 April 1903, quoted in Home, *Jagadis Chandra*, 50.

vegetable and the mineral world who surround humanity. . . . in the course of this century India without sacrificing anything of the richness of her profound soul, of that inner world which was bequeathed to her by centuries of thought, will add thereto the intellectual weapons of Europe. . . .[84]

Similar homages were delivered by Einstein, Shaw and Huxley. Shaw is known to have been particularly shaken on seeing Bose demonstrate the death paroxysms of a cabbage being roasted.[85] But most revealing is the following response of an anonymous westerner:

Centuries of men may point to Bose as a conveniently identifiable point from which to date the dawn of the new thought, just as today we put our finger on Socrates when we wish to focus our view of that new thought which inspired the West for centuries. . . .[86]

The acute problem of ethics, and of scientific ethics, in the inter-war years had apparently induced the West to look Eastwards for a plausible alternative life-style—harmonious, placid, secure and unitary. In 1919, even *The Times* was to write,

Whilst we in Europe were still steeped in the rude empiricism of barbaric life, the subtle Eastern had swept the whole universe into a synthesis and had seen the one in all its manifestations. . . . He is pursuing science not only for itself but for its application to the benefit of mankind.[87]

Haberlandt was more specific:

We saw that there is a sleep of plants in the true sense of the term; and finally realized that a man of genius can not only *hear* the corn grow, but also see it. . . . In Prof. Bose there lives and moves that ancient Indian spirit, which sees in every living organism a perceptive being endowed with sensitiveness.[88]

Bergson also felt that while 'in Darwin's theory of natural selection, conflict is the main theme; Jagadishchandra's research has thrown light on the continuities and on the beauties of consistency in nature and life'[89] It is clear that at least some sections of the West, terrorized by the devastations and death brought about by a science apparently gone rabid, were nostalgically looking back upon their own history—reflected in the

[84] Letter to J. C. Bose, September 1927, quoted in *ibid.*, 71–2.
[85] *Ibid.*, 25.
[86] Cited in *ibid.*, 67.
[87] *Ibid.*, 30.
[88] *Ibid.*, 32
[89] Reported in Roy and Bhattacharya, *Acharya*, 80.

missionary-scientist from India—when an ideologically pure, humane, contemplative scientific tradition aroused lesser conflicts of personal values and social ethics. With Tagore Vivekananda and Aurobindo, Bose also was to have his moments of glory in the West, only to be rejected, after a while, as counterfeit. It is mainly as a prophet that he was deified there and then later forgotten.

Its 'spiritual' needs notwithstanding, the West needed Bose also as a scientist. The natural and biological sciences were then still to woo their present heart-throb: interdisciplinary research. But the explosive growth of these disciplines had somehow brought about a recognition that such fence-breaking could lead these sciences towards more unified perspectives. This was at least the understanding that prompted J. A. Thompson to say,

> It is in accordance with the genius of India that the investigator should press further towards unity than we have yet hinted at, should seek to correlate responses and memory impressions in the living with their analogues in organic matter, and should see in anticipation the lines of physics, of physiology and of psychology converging.[90]

Bose's contempt, therefore, for the conventional boundaries of disciplines also symbolized a recognition by the sciences of some of their own methodological needs. It is only natural that this recognition found its most articulate spokesman in a scientist to whom the formalized divisions amongst scientific disciplines were merely an instance of academic factionalism.[91] Uncompromising universalism, in both its cultural and personal aspects, thus became interlocked with the history of a society trying to traditionalize a still-fluid educational system, and with science trying to integrate an emerging methodology. In the absence of meaningful symbols and values in the imported system, for one who had not wholly disowned his Indianness, the native scientist had to lean upon institutionalized norms of indigenous academic thought. The identity that Bose evolved showed that, while trying to get sense out of the scientific tradition in this way, a particular Indian scientist could also make sense to it.

The validation which Bose received from Indian elite-groups confirmed these aspects of his professional self concept, and pressed him further towards a 'revelatory' concept of scientific research. These pressures came in various forms. The Calcutta elite, with some of whom he had abiding friendships, and who constituted his major reference group, continually reinforced his beliefs in public and private interchanges. For the most part,

[90] Home, *Jagadis Chandra*, 30. See also Roy and Bhattacharya, *Acharya*, *passim*.

[91] Bose, *Abyakto*, 84–5. See also Bose's letter of 5 October 1900 to R. N. Tagore on this subject, quoted in Gupta, *Bose*, 39-40.

the vocal among them found in Bose a vindication of the Indian way of life. For example, the Goethe-like Tagore, convinced that Bose's orderly universe justified his own universalism, affirmed,

European science is following the way of philosophy. This is the way of unity. One of the major obstacles which science has faced in forging this unity of experience is the difference between the living and the nonliving. Even after detailed research and experimentations, scholars such as Huxley could not transcend this barrier. Venturing this excuse biology has been maintaining this wide distance from physics. Acharya Jagadis has discovered the unifying bridge between the living and the nonliving with the help of electrical waves.[92]

Subhas Chandra Bose, increasingly a symbol of aggressive nationalism, was as explicit.

Discovery of life in inorganic matter points at the later trends in your research. Your research has provided direct empirical proof of the unity which the ancient sages of India had found in the varieties of life. . . . The magic touch of your genius has given life to that which seemed inert and insensate, it has generated a passion for a new awakening in the history of this country.[93]

Bose's students were no less starry eyed.

That inanimates have life, that plants have life, that both can be tired or excited . . . we find mentioned in many of the ancient texts of this country. . . . What we merely heard, the *acharya* has shown us.[94]

The rather euphoric rejection by Vivekananda of the scientific worth of an English botanist who had merely studied the life-cycle of a plant, while the pride-and-glory of Bengal was making 'the very flowerpots in which the plant grows respond to impulses', reveals something more than a band-wagon effect.[95] Such examples can be multiplied.[96] The patriotic fervour

[92] R. N. Tagore, *op. cit.*, 108.

[93] Roy and Bhattacharya, *Acharya*, 11.

[94] Hiren Dutta, 1915: reported in editorial notes, Bose, *Abyakto*, 234. The word *acharya* means teacher, but it also traditionally carries the connotation of a religious preceptor who interprets revealed knowledge. The other form of address used by Bose's disciples was *acharyadeb*, teacher-god. Bose sometimes lived up to this image the hard way: while inaugurating the Bose Institute, he wore the saffron cloak of a guru, complete with the ritual sandalwood marks and *tilak*.

[95] Gupta, *Bose*, 131.

[96] The chorus included P. C. Roy, the foremost Indian chemist of the time, Ghandi, Gokhale, then a grand old man of Indian politics, Subhas Bose, the stormy young politician, N. R. Sarkar, a brilliant physician, R. C. Dutta, an eminent historian, Brajendra Nath Seal, philosopher and educationist who saw in Bose the 'culmination of the unifying principles of traditional Indian thought', Satyen Dutta, who versified his admiration for Bose's natural philosophy, Ramananda Chatterji, the doyen of Indian journalists, and Radhakishor Devamanikya, his chief patron.

of Bose, about which every biographer is so excited, was obviously a cross-fertilization in which responsible roles were played both by Bose and his admirers. Bose's discoveries had evidently acquired significance in the context of a desperate elite-specific search for some semblance of a new national identity that would not be totally devoid of historical rootedness.

VII

Bose's work derived its psychosocial structure also from his lifelong struggle with his own aggressive needs and with the anxiety they generated. In fact, his attachment to monism may have been partly due to the connotations it carried of impulse-control, and of mediation and conciliation. In his research attempts to reconcile, through science, the extremes of the living and the non-living, the alive and the dead, aggressive active life and peaceful quiet death—and, in particular, man the aggressor and the natural victims of his marauding nature—lay a possible clue to the content of this anxiety, and to the restitutive nature of his scientific concerns.[97] And here, too, the content of private phantasies merged with the structure of cultural needs: the polarities of his science were also the concerns of his people.

Within the greater Sanskritic culture, the interrelated taboos, in different areas of social functioning, on expressions of instinctual (and, particularly, aggressive) impulses seemed to provide the framework within which Bose coped with his aggressive self.[98] Specially relevant to him must have seemed the Hindu theory of creativity which conceptualizes creation as the control of his destructive self by the Creator, and ideal knowledge as the intuitive cognition of absolute reality obtained through suppression of all desires,

[97] For analyses of creativity as essentially restitution resulting from guilt of unconscious destructive phantasies, see Melanie Klein, 'Infantile Anxiety Situations Reflected in a Work of Art', *International Journal of Psychoanalysis*, **10** (1929), 436–44; Ella F. Sharpe, 'Certain Aspects of Sublimation and Delusion', *International Journal of Psychoanalysis*, **11** (1930), 22–3, and 'Similar and Divergent Unconscious Determinants Underlying the Sublimations of Pure Arts and Pure Science', *Collected Papers in Psychoanalysis*, (London: Hogarth Press, 1950), 137–54 (both abstracted in M. I. Stein and Shirley J. Heinze, *op. cit.*, 234–5; W. R. D. Fairburn, 'Prolegomena to a Psychology of Art', *British Journal of Psychology*, **28** (1938), 228–303; Harry B. Lee, 'Projective Features of Contemplative Artistic Experience', *The American Journal of Orthopsychiatry*, **19** (1949), 101–11, and 'The Values of Order and Vitality in Art', in G. Roheim (ed.), *Psychoanalysis and the Social Sciences* (New York: International Universities, 1950), vol. 2, 231–74.

[98] See S. Radhakrishnan, *Eastern Religions and Western Thought* (London: Oxford University Press, 1940); A. D. Riencourt, *The Soul of India* (London: Jonathan Cape, 1961); Joan Bondurant, *Conquest of Violence* (Princeton: Princeton University Press, 1958); D. E. Smith, *India as a Secular State* (Princeton: Princeton University Press, 1963); see also the review by W. Rowe, 'Values, Ideology and Behaviour of Emerging Indian Elites' (mimeographed monograph, 1964).

including animosity. Bose must also have been exposed to the contemporary translation of these emphases on aggression denial and pacifism into a new political idiom, which made frequent equations between self-discipline and unconditional *ahimsa* or non-violence on the one hand, and pursuit of power, self-government and creative social reform on the other.[99]

The historical reasons behind this stress on pacifism have sometimes been discussed.[100] But what prompted Bose to choose this as a major element of his idiom? Results of contemporary research on socialization in India, mostly based on data from the more traditional sectors of the society, may be extrapolated into history to answer this question. These results suggest that this overdetermined pacifism represents an attempt to cope with aggressive impulses, which remain untamed in their essentials, and 'do not have a chance to be patterned or shaped' in the modal Indian.[101] The plugging of all the gaps through which aggressive needs could be expressed in an anxiety-free manner, without the necessary slow training in childhood which could build up sublimated corollaries of these needs heightens the sensitivity to aggression, and the constant fear that ego controls will fail. The unpredictable, chaotic and irrational outbursts of violence in India—outwards as well as inwards—confirms these deep, persistent. immobilizing doubts. Apparently, the threatening proportions of these outbursts partly mirror the magnitude of the attempts to subjugate hatred alogether—particularly so in a culture where, for both the person and the group, the major institutionalized method of handling anger is by its total denial.[102]

It is against this background that one must search for the source of the scientific idiom that Bose and his school developed: the 'poisoning', 'wounding' and—the funnier parallels—'pinching' and 'tickling' of plants and metal foils, and the response these imageries invoked in the Indian intellectuals. The ancient pantheistic theme of protecting the conscious

[99] See Susanne H. Rudolph, 'Self-control and Political Potency: 'Ghandi's Asceticism', *The American Scholar*, **35** (1965–6), 79–97, for an interesting recent interpretation of the Ghandian equation between aggression control and political self-determination.

[100] *Ibid.* See also Joan Bondurant, *op. cit.*

[101] G. Murphy, *op. cit.*, 51.

[102] See J. T. Hitchcock and Leigh Mintern, 'The Rajputs of Khalapur', in Beatrice Whiting (ed.), *Six Cultures* (Cambridge, Mass.: Harvard University Press), 206–361; a review of research on the modal Indian's expression and control of aggressive impulses can be found in W. Rowe, *op cit.*, note 98. See also Susanne and Lloyd Rudolph on Ghandi in *Modernity of Tradition* (Chicago: Chicago University Press, 1967), and J. Elders, 'Industrialism in Hindu Society; A Case Study in Social Change' (unpublished PhD dissertation, Harvard University, 1959), for brief descriptions of traditional conflict resolution techniques. For more literary interpretations, see Nirad C. Chaudhuri, *The Continent of Circe* (London: Chatto and Windus, 1965), chapter 5, 97–119; Arthur Koestler, *The Lotus and the Robot* (London: Macmillan, 1960), *passim.*

plants and animate inanimates from the cruelty of those prone to lose control thus became another nexus stretching between Bose and his themes. Pains of a poisoned leaf, sufferings of a metal strip injured manually and cured medically—these were the data he worked with and these were the telltale descriptions he employed.[103] Evidently, he not only personified his subjects by equipping them with animate sensitivity, he also hurt them and also wanted to protect them from being hurt.

> What is the pull that removes every difference, brings the proximate nearer, makes us forget who is our own and who is not? Compassion is the pull; only the power to sympathize can reveal the real truths in our life. The ever-tolerant plant kingdom stands immovable in front of us. . . . They are being hurt by various powers, but no whimper rises from the wounded. I shall describe the heart-rending history of this extremely self-controlled, silent, tearless life.[104]

The consumers of his research became, in this sense, his accomplices, helping him to relieve his moral anxiety by sharing it.[105] Such themes ran through almost all of Bose's thematic products. Predictably, these were associated with themes of nurturance and power and attained salience whenever Bose referred to his personal research. An example:

> From a man's handwriting one can guess his weakness and his fatigue; I found the same signs in the responses of a machine. It was a matter of surprise that, after rest, the machine could recoup and respond again. When a stimulating drug was administered, his power to respond increased and the administration of poison made all his responses vanish.[106]

How far was this a strategy to reach the lay public, over the heads of his professional colleagues—to mobilize support and to secure sanction? How far was this the corollary of a deeper faith? We shall never know for sure. Members of the Bose family and Bose's students are, however, certain that these were something more than the fragments of a conscious strategy. Our case history also suggests that beyond the idiom lay a deep concern with fury and cruelty, a concern which had already attained a structured form when, for example, he was showing his deep fascination with his

[103] See for examples, Bose, *Abyakto,* 105–8, 162–81, 206–8. Also refer to note 69.

[104] *Ibid.*, 162.

[105] The mechanism of enlisting consumers of creative products as accomplices by inducing them to participate in the underlying phantasy, has been discussed by O. Fenichel, *The Psychoanalytic Theory of Neurosis* (New York: Norton, 1945), 703; and E. Bergler, 'Psychoanalysis of Writers and of Literary Productivity', in G. Roheim (ed.), *Psychoanalysis and the Social Sciences* (New York: International Universities, 1947), vol. 1, 247–96.

[106] *Ibid.*, 147.

dacoit-servant's tales of exploitation, cruelty, suffering and death. The nature of the fascination suggests that Bose's sympathies lay not so much with the victims of his friend's ambushes as with his friend.[107] This admiration for one who had saved him from certain death—a death whose breath Bose felt on his neck throughout life—point to something more than an ephemeral latency-period identification; in it one is tempted to postulate a decisive validation of earlier aggressive phantasies. (In latency, however, these phantasies were being used more explicitly for mastery over environment, for exploration, and for experimentation.[108]) Coping with one's fury by renouncing violence to protect its prospective victims (a theme that dominated Bose's world-view) might have become a strategic ego defence in latency, but its roots went deeper than the life-pattern of his friend. As he himself made clear, it was only 'step by step' that he gained a 'more sympathetic view of continuity in life and its diverse manifestations'.[109]

It is in this sense that the themes of aggression, unity of life, and fear of death were organised in Bose around his inner furies directed against his mother, against a *prakriti* who held the keys to survival and mortality. We must now examine this phantasy, in its social and personal aspects, as a possible clue to Bose's lifelong battle with his aggressiveness and to the reparations he made to an 'apparently sly, ruthlessly cruel' *prakriti*, the symbolic mother against whom he had aggressed so guiltily.[110]

Studies of socialization in India have traced to the phantasy of a distant, inconsistent, depriving and aggressive maternal source, the Indian's modal conflicts centring around aggressiveness and its control.[111] Whatever the results of a critical evaluation of this postulated relationship, the consistency between Bose's inner image of maternity and the mythical realities of Bengali folk culture is underscored by the persistent themes of maternal deprivation and nurturance that have given a semblance of organization to much of the Indian projective system and cultural and creative products. This convergence between cultural forces and personal patterns is substantiated by a phantasy-element that Bose borrowed conspicuously from his culture.

This was the hankering after personal immortality, to which Bose gave the defensive garb of a major normative emphasis.[112] All themes of immor-

[107] See Roy and Bhattacharya, *Acharya*, 10.
[108] Phyllis Greenacre, *op. cit.*
[109] *The Golden Book of Tagore*, *op. cit.*, 16.
[110] Bose, *Abyakto*, 133.
[111] See G. M. Carstairs, *The Twice-born* (London: Hogarth Press, 1957); J. T. Hitchcock and Leigh T. Mintern, *op. cit.*; Leigh Mintern and W. W. Lambert, *Mothers in Six Cultures* (New York: Wiley, 1964).
[112] Bose, *Abyakto*, 13–15

tality are themes of mortality too, and Bose's version also contained, within it, its inverse: a primitive infantile fear of death. To Bose, his creativity was not only a positive affirmation of eternity and discovery of life-processes, but also a virulent denial of lifelessness and inertness. Gradually these became intertwined with his concepts of personal achievement, academic advancement and national uniqueness.

It was a woman in Vedic time, who when asked to take her choice of the wealth that would be hers for the asking, inquired whether that would win for her deathlessness. What would she do with it if it did not raise her above death? This has always been the cry of the soul of India, not for addition of material bondage, but to work out through struggle her self-chosen destiny and win immortality. . . . There is, however, another element which finds its incarnation in matter, yet transcends its transmutation and apparent destruction: that is the burning flame born of thought which has been handed down through fleeting generations.[113]

Within his universe, which Bose always perceived as a system of power relations, only power, or *shakti,* was indestructible.[114] But for survival, man needed a special kind of power.

Can you not see? Every moment so many lives are being crushed, as if they were specks of dust, as if they were worms. Do you fear the threatening speed of the wheel of life? . . . Brighten the divine perspective within you. You will find the universe alive, not a mass of dead matter. The humblest speck of dust is not wasted, the smallest force is not destroyed; life is also possibly imperishable. Mental force represents the ultimate triumph of life. It is by power of this force that this holy land survives.[115]

Survival therefore seemed equal to the maintenance of intellectual potency: 'The destruction of intellectual power is real death, hopelessly final and eternal'.[116]

[113] J. C. Bose, cited in Home, *Jagadis Chandra,* 66–7.

[114] Elsewhere Bose also expresses his belief that the 'world has no beginning and no end' (*Abyakto,* 7), and power is what ultimately survives in it—'power is indestructible' (*ibid.,* 14; also 123). It is this potency which he sought for himself and his people (see also note 119). Particularly so because 'mother nature is unwilling to bear the burden of inefficient lives' (*ibid.,* 133). Therefore: 'Our only concerns should be how we can give up the whines of the weak, effeminite touchiness and unjust demands, and how we can shape our destiny with our own power as befits men' (*ibid.,* 123). For a description of a high *n* power as a characteristic of traditional societies and men, see David C. McClelland, *The Achieving Society* (New York: Van Nostrand, 1961), and 'Motivational Patterns in South East Asia, with special reference to the Chinese Case', *Journal of Social Issues,* **19** (1963), 6–19.

[115] Bose, *Abyakto,* 160.

[116] *Ibid.,* 129. See also *ibid.,* 15–16, where Bose relates his concept of immortality to the traditional concept of rebirth: '. . . every life has two aspects. One does not age and is undying; the temporal body covers this aspect. This cover of body remains behind. The undying speck of life builds new houses in every birth.'

This theme, by sustaining his faith in his own work and by partly defining the pattern of sublimations available to him in scientific research, revealed to him the symbolic significance of his role as a scientific thinker. Between the Indian who had helped maintain the continuity of Indian identity over the generations, and the man who maintained the continuity of his personal identity over the years, lay again, as a crucial link, his professional identity.

Tagore, it is said, was bewildered by the scientist's immobilizing concern about death and after-life when he, more or less of the same age, was scarcely worried about these. He did not see that age had little to do with a fear that was concerned more with the beginning than with the end. Bose's fear of his own rage directed against the first woman, and of the retaliatory murderous anger of a goddess provoked, could only be bound by the reparative concern with the 'undecaying' and with 'those beyond the reach of death'. As he affirmed towards the end of his life, the 'efflorescence of life is the supreme gift of a place and its associations';[117] the way one could pay back the debt is by containing one's destructive self, and thus avoiding the wrath of the mother and—her surrogates—motherland and *prakriti*.

The tremendous anxiety which surrounded this counterphobic theme of immortality points to the important role played in this pattern by Bose's attempts to control his own aggressiveness and his fear of a provoked cosmic mother. It is as if nurturing life and locating its presence in non-life were simultaneously an attempt to fortify his identification with an aspect of the split motherhood within himself, and to disown the other, by protective mothering of aspects of humbler life and aspects of the *prakriti*, and by tenaciously holding in lease the aggressor within. To this extent, it was therefore something more than choosing between two available role-models, and between the egalitarianism of his earlier years and the structured dogmatic authoritarianism of his middle age; it represented a struggle to establish internal order amongst conflicting identifications, through creative atonements.

VIII

On many an occasion, I write without thinking. . . . on some occasions thoughts crop up in my mind without effort, and I am surprised. It is my past which is pouring these messages into my ears. The root of my heart is in India.[118]

117 J. C. Bose, cited in Home, *Jagadis Chandra*, 85.
118 J. C. Bose, cited in Gupta, *Bose*, 64.

As the adult Bose came full circle by building an important aspect of his identity on a hitherto rejected identification, his past got more deeply involved with the past of his people torn between the pulls of tradition and modernity as these ramified both within men and outside.

The end of the nineteenth century had found the urban elites of India, and particularly the *bhadraloks* of greater Calcutta, searching desperately for a semblance of self-esteem that could serve as the common core of intersecting personal, regional and national identities. Participating in this search, Bose felt the need for 'equipping Bengalees with an ideal which would make the dying race confident of its own power'.[119] But for him, given the idiom of his time, it also had to take a special form: he perceived everyone as wanting 'to see Mother Bengal on a high throne',[120] and the language of the Calcutta intellectuals became for him the call of his mother:

> In the encouragement given by you all I hear my mother's voice. Behind all of you I can always see a poor, humbly clad figure. With you, I take shelter in her lap.[121]

The struggle for a new national image that would counter personal feelings of inferiority (and for a self-image that, by having national reference, would be more than privately valid) had apparently found its reflection in Bose's attempts to build stable psychological bulwarks against his deeper-lying phantasies of maternal neglect and acceptance. Bose was now willing to use his science to get the love of his motherland, a 'fiery mother who ruthlessly threw her children into the cruel workshop of life' and accepted them back 'only when they won in battle fame, courage and manliness'.[122] On the other hand, acceptance by his motherland became the major criterion of scientific success to him. He had, he felt, met her standards of excellence and had earned his share of nurturance from a mother whose ruthlessness he could rationalize, on the basis of his own experience, as essentially the protectiveness of a mother-goddess.[123]

> After spending a long time in foreign lands, I have come back to the lap of the loving mother, drawing my courage from the hope that she has accepted

[119] Discussion with D. L. Roy, reported in Roy and Bhattacharya, *Acharya*, 237.

[120] Bose, *Abyakto*, 136.

[121] Letter to R. N. Tagore, quoted in Roy and Bhattacharya, *Acharya*, 233–4; the phrase 'in your encouragements I hear the voice of my mother' recurred in his letters to his friends. See letter to R. N. Tagore, 2 November 1900, *ibid.*, 56–223; see also Gupta, *Bose*, 40.

[122] Bose, *Abyakto*, 21.

[123] *Ibid.*, 133–9.

my *puja*. O mother, your blessings have secured for me recognition as a servant of Bengal and India.[124]

This was not merely a way of speaking. From London Bose had written to Tagore of a 'strange unscientific event'. This referred to a rather striking vision he had been through and which, he felt, strengthened his love for his motherland:

All of a sudden I saw a shadowy figure, wearing the dress of a widow; I could see only one side of the face. That very sickly, very unhappy woman's shadow said 'I have come to accept'; then, within a moment, the whole thing disappeared.[125]

Alas, every other acceptance thus became to him, a scientist, secondary.

It is not clear why the search for self-esteem and national parity attained salience among Indian elites exactly at that point of time—why, for instance, Bose felt prompted to say: 'Now the time has arrived; we must spend our entire energy in glorifying our Motherland'.[126] We only know that the scientist worked in an atmosphere when the early Indian intellectual and elitist hopes of changing Indian society through the intervention of alien ideas and instruments of power had started giving way to a greater consciousness of Indian exclusiveness. Actually, the climate of *Swadeshi*, or 'sticking to the indigenous', within which Bose spent his middle years, was a development older than the movement which dramatically gave it substance after 1905.[127]

One is tempted to hypothesize that, as is generally the case with such exclusivism, underlying this search for parity was a growing awareness of personal and national inadequacies. In Bose at least this awareness was clearly present:

O *abhimaninee* woman . . . what is the status in this world of him on whose glory your own glory is built? . . . will he, on whom you depend, be able to save you from terrible humiliations in these bad days? . . . who will strengthen his arms, keep the courage of his heart indomitable and make him fearless of death.[128]

[124] *Ibid.*, 122; written in 1915.
[125] Letter to Tagore; quoted in Roy and Bhattacharya, *Acharya*, 234.
[126] Bose, *Abyakto*, 229.
[127] S. N. Hay, *op. cit.*, *passim*; N. K. Bose, *Culture and Society in India* (Bombay: Asia, 1967), 263–80.
[128] Bose, *Abyakto*, 141. The word *abhimaninee* is difficult to translate. In Bengali it connotes a women who is angry and hurt, while retaining her affection towards the source of anger.

In more private moments, these doubts about his countrymen became self-doubts too.

> Some day surely India will see better days, but one fails to keep this in mind constantly. Imprint on my mind that this is true. I lose my power without hope.[129]

These could be partly a function of the widening gulf between the British and their subjects brought about by the rigidifying attitudes of the former who, impressed by the new scientific discoveries and the fast pace of industrialization in the West, had not only started perceiving the Indians (and particularly the lethargic sedentary Bengali eggheads) as an essentially inferior breed, but had also started communicating to the latter this perception.[130] In any case, the bonhomie between the ruling class and the subject elites, and the mutual respect that had characterized their relationship throughout the major part of the previous century, had broken down.

One should take account of two other sources that might have heightened the anxiety of a poor self concept in Indians. First, it could be due to the internalization of values enshrined in imported institutions, values in terms of which self-assessment had started going consistently against the assessors. As a result, there could have been a shift from an impersonal relativistic perception of Indo-British differences or of Indian inferiority to more personalized feelings of Indian inferiority due to changes in personal values. Second, the anxiety could be a deeper phenomenon arising from working within a westernized frame of values, as opposed to a merely westernized form of occupation or education. At this level, the newly internalized values contradicted a part of traditional morality and the internal objects that constituted it. The acceptance of the new ego-ideal, therefore, also became the rejection of old identifications and inner authorities. Whatever its source, the anxiety successfully sabotaged the sense of competence of Indians *vis-à-vis* westerners, westernness and the various indigenous payoffs of the process of westernization. The Indian traditionalists of earlier generations, sure of their traditions and of their traditional selves, never sought to demonstrate the superiority of native practices or ideas over foreign ones. Even when they opposed westernization, they invoked the concept of an 'equal but different' Indianness. It was when the new values percolated into some sections of Indians, and when the gap between self

[129] Letter to Tagore; quoted in Roy and Bhattacharya, *op. cit.*, 233.

[130] See Susanne Rudolph, *op. cit.* for a brief description of this; see also R. C. Majumbdar, *Glimpses of Bengal in the Nineteenth Century* (Calcutta: Firma, K. L. Mukhopadyay, 1960), *passim.*

image and ego-ideal, and between ego-ideal and superego, started arousing crippling anxiety, that the all-round search for parity to contain personal feelings of inferiority began.

These feelings of inadequacy could probably be tackled more successfully in a climate of warmer Indo-British relations. But just when some Indians started accusing themselves for not being what they wanted to be or could have been, the substance of Indo-British relations required a more spirited affirmation by Indians of what they were or had previously been.

But the defeat of psychological forces is rarely total. And the latency-period and late-adolescent socialization in urban India, breaking sharply with early growth within the family, ensured that the strategy of identifying with westernness, and rejecting one's Indianness as a negative identification, remained an inner alternative to the newer strategy of total rejection of the West, and of westernized identifications. Notwithstanding the greater psychological effort that was required by the former approach, because of snowballing Indian self-doubts and British superciliousness, each individual had it before him as a latent vector. It is at this level that conflict between tradition and modernity had their internalized counterpart in Bose. For example, if to Bamasundari's son exclusivism was not unknown, Bhagwan Chandra's assimilationism was also to him a vital exposure. Similarly, if to the backyard man from East Bengal struggling for parity was a major subcultural 'inheritance', Brahmoism's synthetism was also to him a proximal subcultural force to be accounted for. It would, however, seem that the chauvinism of his contemporary society, the uncertainties of western intellectual elites (which had been communicated to the Indian intellectuals, though they were yet to percolate to the British Blimps and their Indian counterparts) and the haughtiness of the British in India, all combined with the changing basis of Bose's personality to encourage the exclusivist response to emerge as the dominant tone in the adult Bose. 'Who could be so base as to be untrue to his salt and the soil that nourished him?' Bose was to ask,[131] particularly when it was so easy to be a true son of the motherland: 'through social work, *bhakti* and knowledge one reached the same goal'.[132] Moreover, it is this mother who had given meaning to his adult attainments. Talking of his trips to the West, Bose once said:

> Nobody there waited for me with a garland of victory, rather my powerful opponents were present in a group to demonstrate my flaws. I was all alone; the only invisible help to me was the goddess of India's fate.[133]

[131] Bose, 1934, cited in Home, *Jagadis Chandra*, 85
[132] Bose, *Abyakto*, 160.
[133] *Ibid.*, 148.

Understandably, instead of taking his position with the grand synthetists, of whom on a smaller scale his father was an example, Bamasundari's son increasingly found relevant ego-ideals in those restorationists who spoke the language of his later self.

Though much of his later career was spent in looking doggedly for evidence of Indian greatness which could serve as life-saving straws for his contemporary elites—and in his identity there was a substantial quantum of such straws—his more important contributions to the culture of Indian science would seem to have been derived from his earlier synthetic perspective. The reason for this is clear. While the superciliousness of the West could be met by Indian superciliousness—though even this, one knows, was not always easy—it was more difficult to handle some of the specific forces the western impact let loose. Let us examine two instances of such synthetism paying off in the case of Bose.

When Bose entered his adulthood, the nativist response to westernization had bisected the Indian academic culture into two clear strands. A split between nationalist and foreign medicine had already taken place and the native medical system, *ayurveda*, had broken with the intruding western system—'allopathy', as it was then popularly known (although homeopathy, with its magical overtones, was trying to bring about a synthesis). Similarly the new Hindus were trying out a national religion and theology and a national philosophy that were considered separate from and superior to their western counterparts. Tagore and Aurobindo had already founded institutions that imparted 'national education', though conceived in less parochial terms. Lastly, politicians of all hues, by emphasising *dharmarajya* and *Ramarajya*, were working towards a similar exclusivism. In sum, in the various branches of knowledge, nationalism was trying to express the desperate Indian struggle for parity by denying the relevance of Western systems of thought, the professional role-models associated with them, and academic inclusiveness. In this context, Bose played a socially creative role by arresting compartmentalization at least in the natural sciences. By legitimizing his work in terms of traditions and then establishing its credentials in—and, as some saw it, supremacy over—the Western academic world, he obviated the need for an 'Indian' natural science for those looking, out of gnawing feelings of personal inferiority, for evidence of national greatness. India, he repeatedly affirmed, has a contribution to make to world science, not to a special Indian science.[134]

Another instance of such successful synthesis was the manner in which Bose went beyond the mere tolerance or acceptance of Western science. By

[134] See Bose, 1917, cited in Home, *Jagadis Chandra*, 66.

demonstrating the compatibility between some of the underlying values of modern science and of indigenous thought, he could be said to have delineated the crude outlines of a new commitment to science in his people. An excellent example of this are the achievement imageries which run through many of Bose's thematic writings. True to the history of Brahmoism and his contemporary technique of legitimation of the new, he borrowed these themes from the sacred texts of India, trying to base his criterion of the good on what was once the group's concept of goodness. This also is understandable. Social scientists who mourn the low concern with achievement in the phantasy behaviour of Indians, and see in this deficiency a possible cause of societal stagnation, have unfortunately not widened the scope of their empiricism to cover the nature, in addition to the degree, of achievement concerns that, at certain levels, are projected in certain types of cultural behaviour and products. The frequent presence of achievement imageries in theological texts, and the recurring ideological concern with individual salvation (*karma*), and with the lonely personal quest of godhead, may have been institutionalized over the centuries, by an ascriptive society, into the ritualistic and rigid concepts of caste-specific *dharmas*, with individual performance and fatalism, but this does not negate the possibility that at some points of history Hindu religious behaviour and thought have legitimized individualism, risk-taking, achievement orientation and competitiveness in an otherwise 'non-achieving' society.

Using Upanishadic constructs in scientific models could therefore be an unconscious attempt to justify the achievement criteria which westernized science education necessarily had to employ, and which had to serve as the normative assumptions of organised scientific research. Till then, the criteria must have seemed to an ascriptive society an arbitrary imposition, and in Bose, for the first time, the linkage between modern science and the group's once-institutionalized concepts of goodness became a possibility. The strategy was again borrowed from earlier Indian modernizers whose stress on reinterpreted *Vedanta* derived possibly from a vague comprehension that some aspects of brahminic thought were valid in the nascent industrial culture of which greater Calcutta was the epicentre. In them, as in Bose, the society tried to meet a newly perceived void: the low concern with achievement in different areas of social life had to be filled with achievement-like values, derived from limited areas of already-institutionalized ideology.[135] Its partial success in this attempt to sanctify new

[135] 'We must build a Western society with Indians' as even the particularist Vivekananda was to specify the task.

value-need structures in the sensitized urban elites probably served for a time as the basis of some aspects of modernization in India. In summary, if Bose was a representative individual trying out the role of a westernized scientist within an indigenous cultural frame, his science was, if not representative, at least an event that demonstrated that the trial could be successful.[136] That the society's success does not always coincide with scientific success is one of the smaller paradoxes of modernization which we must now examine.

To do so, one must remember that Brahmoism's synthetism, as Toynbee calls it, carried for Bose a load of anxiety, due to his own and his father's role confusions and failures within the compass of a westernized system, and due to the extremist climate of his adulthood. He was therefore ultimately led to the second form of Bengali nationalism, which utilized the powerful symbols of the traditional *shakti* cult, and its concepts of maternal authorities, to mobilize support and to create new political solidarities. It was represented not only by some elements of the *Swadeshi* movement, and the intellectual movement led by Vivekananda and Aurobindo, but also had its roots in the entrenched world-view of a peasant society.[137] No wonder, Bande Mataram ('glory to the Mother') became the motto of the Bose Institute, in addition to being the war cry of Indian nationalism.[138]

To this nationalism Bose was exposed overtly in his adulthood, but covertly, years earlier, by his mother's traditionalism. Its magical anthropomorphic overtones and its dependence on maternal principles, while giving a new meaning to his rejected self, could also give Bose something very near a personal religion.

> . . . Can a son imagine a distinction between motherland and mother? The sound of the names of mother and motherland has emerged spontaneously from heart and spread all over India. This is because that sound has touched the inner heart of India.[139]

Thus, while he scrupulously avoided conflicts with the British power and

[136] A generation later, another eminent Indian physicist could establish a similar mutuality with his society on a more restricted basis. He spurned his Indian self and embraced his professional and particularist identifications by declaring that it is only a Tamilian brahmin—which is what he is— that could make a good scientist. We must recognize that he is, in his own way, true to himself and *his* society.

[137] See a brief discussion of this in Nandy, *op. cit.*

[138] See Roy and Bhattacharya, *Acharya*, chapter 17, 231–47; Gupta, *Bose*, 204–6. 75–8, 84–92; also see Haridas and Uma Mukherji, *India's Fight for Freedom or the Swadeshi Movement* (Calcutta: Firma K. L. Mukhopadyay, 1958), *passim*, particularly 174–234.

[139] Letter to Subhas Chandra Bose, 1937, quoted in Roy and Bhattacharya, *Jagadis Chandra*, 237–8.

was overtly friendly with the more westernized section of Bengali elites, in the more critical sectors of his research Bose effectively utilized his early object-relations with his mother and the introjected feminine principle capable of dealing magically and ritually with reality and 'fate' on the one hand, and his anthropomorphic and often-magical conceptualization of the interrelated realities of his personal work and his adult 'goddesses'—mother, motherland, Abala and *prakriti*—on the other.[140] The conservative Indian women, the despair of social reformers and the delight of traditionalists, have evidently a dynamics more complex than either of them would happily admit.[141]

IX

These bits, garnered from a larger historical mosaic which we shall never know completely, seem to delineate a strategy that was available to an Indian scientist of an earlier generation to forge a workable life-style, as an Indian and as a scientist. Yet this was something more than a private strategy. The 'objective' scientific imagination which, within its limited sphere, interlinked personality, culture and history of science, was part of a larger social process. It is within the context of this process that we must now analyse how the cultural particulars could find a particular scientist, and *vice versa.*

India, science and Indian science—all needed Bose, it has been repeatedly affirmed. Others would like to reverse the relationship: Bose, they would say, needed a large enough canvas to write the history of his psychosocial crises upon. By itself, such a bifurcation of analytical perspective is probably fruitless. I hope this narrative has made clear that between the man and the canvas—and the first and the second perspective—there was a historically determined relationship. I shall now attempt to sketch the broad outline of one possible explanation of this relationship.

With the inroads made by the westernized economy and education in India, the confirmations that were available to the traditional socialization and modal personality were irrevocably lost to many. The imported struc-

[140] If we shift from individual change to changes in systematic thought, we shall find many analogies which, being beyond the scope of this analysis, can only be mentioned. Over the centuries, in traditional societies like India, mathematics has petrified into numerology, astronomy into astrology, and medicine into witchcraft. Each of these changes must have had their own psychodynamics, but the pattern and direction of ritualization have too frequently been similar.

[141] This may explain why many Indians found Bose more of a nationalist than his participation in politics would suggest. In a deeper sense he was as Indian as anyone could be. The logic of his work combined with the backlash of traditionalism to form the certainty he felt within. The world he had created made eminent sense to him.

tures rewarded skills and accomplishments which were not rooted in the traditional frame of reference, and failed to validate the parochially legitimate accomplishments and ascriptive status. The conflicts which western science generated were aspects of this wider confrontation. Those exposed to this disjunctive science, while accepting it as advantageous, did not feel it to be embedded in the existing culture-personality system. Within them, at certain levels, it did not make sense. This normative meaninglessness aroused incapacitating anxieties: when it did not seem to disrupt what was good and moral in them, it seemed to be threateningly amoral and irrelevant to the deep-seated concepts of goodness and rightness. (Within the new science education this may have created a limited normlessness that made science a screen on which could be projected the psychological crises of the people involved with it.) And yet this science seemed to work and was profitable—a recognition that must have only heightened anxiety by baring one's weakening faith in traditions and one's temptation to join the ranks of the 'renegades'. The chasm between profitable work preference and successful work identification—between acceptance and commitment—therefore tended to throw up into leadership individuals who could help sectors of the community, exposed to the full thrust of westernization, to integrate within their life-cycles the foreign ideas and foreign science, by making use of the meaninglessness associated with them.

Concurrently, the changing maintenance techniques were probably introducing radical permutations in family and child rearing (for example, the enforced nuclearization and mobility of some middle-class families) and in adolescent socialization (for example, the new social relationships and belief-value exposures provided by the Anglicized schools and colleges). As a result, deviant individuals, carrying the impact of deviant socialization within them (including the validating and invalidating experiences which brought the impact up to date), had to find a mirror in the changing social and professional problems to see their own faces. We have noted how the content and form of Bose's research mirrored his early object relations, his adult interpersonal skills and the defensive strategies available to his ego. Similarly, his ability to relate to British political authorities, combined with the commitment to Indian science and education, could be traced to the specifics of his early interpersonal relationships. These relationships became functional at a time when the closeness of westernized science education to the seats of power in India required someone who could blend a conflict-free relationship with political authorities with a culturally meaningful creative style, and thus legitimize the new science as a personally validating experience, rather than merely as a personally profitable occupation.

It would then seem that the social forces which were seeking new carriers were the ones which produced deviations in patterns of socialization. Here lay the social significance of Bose's life experiences and the historical role of his works. In trying to come to terms with himself, he made possible a new linkage between social needs and personal desires at the community level. By confirming traditional dogma, he on the one hand built up a viable core of self esteem in a group threatened by the patent supremacy and power of a foreign system. On the other hand, by transforming 'hostile' science into a domesticated element of the existing cultural system, he made it possible for a growing number of Indians to identify with the new science. And if he had not reached a dead end as a researcher, he could be said to have offered the Indian scientist a meaningful role and an enduring self-image.

The road to this dead end was paved with three distinctive features of Bose's scientific and social role. Firstly, his work, while leading to greater acceptance of western science, led to the popularization of a concept of research which negated a major evaluative assumption of modern science What he did was so obviously important and true to him that he started conceptualizing science as a means of experimentally demonstrating the truth of self-evident axiomatic general laws of nature. This stress on the revelatory in place of exploratory aspects of scientific inquiry made it difficult to turn out scientists whose acceptance of the forms of science education could flower into a commitment to its underlying psychological structures. Bose's allegiance to the scientific method unfortunately derived its strength from his identification with his mother's ritual orderliness. Like all rituals, therefore, it consolidated rather than explored.

Secondly, by carrying his concept of Indian uniqueness beyond the culture of science, into the very content of scientific knowledge, he denied the universality of scientific knowledge. It is with reference to this content that science can be said to have a universalist tradition and, again, it is with reference to this tendency that the later Bose became a parochial metaphysician.

Thirdly, Bose's commitment to the contemplative and individualistic tradition of science, combined with his later authoritarianism and promotion to *acharyahood,* did not allow him to develop an organizational base where he could be fed back the experiences of some of his talented but professionally neutralized Indian disciples. The Bose Institute was to some extent a cultish phenomenon in Bose's lifetime and the patriarchy within it was not conducive to the growth of an impersonal communication system which could help Bose's reality-testing.

All these features had historical implications. They had once been part of the western scientific tradition, too, but the latter had been seduced away from this contemplative tradition by the attractive promises of emerging empiricism. The unsure gait of this new empiricism, coupled with the conflicts which the new science generated at that time (for example, the aggression anxiety associated with science and technology among Western intellectuals then) made the West look back guiltily upon its own past, as reflected in the world-view which Bose's works implied—a world-view in which the romanticized past of a modernizing society and the ideological compulsions of a traditional society intersected. It is this older tradition of science which made sense to Bose and to his 'disciples' in the East as well as in the West. Therefore, what was a strength to him as an individual struggling for compatible scientific, national and personal identities, became a source of his weakness as a researcher: his cryptomysticism was also as much a result of his personality interacting with the parochial responses and pressures of his contemporaries.

But another logic of the change from a universalist to a particularist science, and from the 'cleverness' of his first researches to the deeper commitment of his later phases, could be found in Bose's sustained struggle for a personal identity. As the conflicts centring on the alternative identifications posed by his parents were resolved, in this commitment, into a relatively stable inner mean, Bose had to take into account the mother inside whom he had so strenuously rejected as part of his earlier self-definition. This Bose, with his measures against fears of killing and being killed, his over-compensations for feelings of neglect and deprivation of nurturance, his rigid orderliness and elements of authoritarianism, was more compatible with his later anti-science. Thus some aspects of the emerging culture of science—its achievement emphasis, its competitive egalitarianism, organizational assumptions, its material and mathematical base—contradicted part of the substance of which he was made, even though they could find a temporary haven in the residuals of his idyllic relationship with his father. While struggling for a personality integration where his first, most infantile, identification could find a place, he thus slipped from his father's nationalism to his mother's traditionalism. And what seems to us anti-science became, to him and to many others, the only possible science.

Bose's more persistent relevance to science and to India therefore lies elsewhere. While he sought and found a sanction for the human experience which at that time was called 'scientific creativity', he helped his times and his community to achieve a reaffirmation which they could have got

only from his kind. Simultaneously, by making his contributions synonymous with this reaffirmation, he paid back his debts to a culture which had tangibly intervened in his personal science—supporting, sanctioning and articulating it with his own needs and history. It is not surprising that Bose's universalism was, at another plane, a parochial concept of what science could and should do for India.

This then brings us back to the central problem which Indian science faced, in Bose, at that point of history: how it could reconcile the Bose, with all his spatial and temporal meanings, with the Bose as a space-and-time defying innovator. It is interesting that whatever evidence of such a reconciliation one finds in Bose's adult identity was only partly shaped by the formal structure of western science and Indian society. It was more crucially a result of the deeper ramifications these structures had in the cultural and individual dynamics generated by the interpenetration of Indian and Western systems. Without realizing this aspect of the consolidation of new social forces and its counterpart in an ego crisis which mirrored the general crisis of scientific identity of the time, one cannot hope to understand fully the traditional society's problem of organizing its motivational base for a new identity. This also implies that from the point of view of present-day social engineering, those who hope for a creative relationship between a young science and an old society to emerge from plans of institutional excellence and technically enriched training programmes—as well as those whose modernity rests on a precarious but compulsive denial of traditions and their crucial presence within each of us—may prevent the necessary reconciliation between the form of the culture of science and the substance of the social institutions which produce the scientists. Such approaches support a scientific knowledge which either fails to take root in the collective identity of the community or expresses a part of the latter which, disowned and banished from consciousness, takes weird and irrational shapes.

And yet, scientific creativity, like any other form of human creativity, presupposes the ability to utilize one's infantile primordial impulses and memory traces in an adaptive manoeuvre, functional to the community and ego-syntonic to the man. The innovator must regress; it is an essential exercise out of which come not only his sense of mission and the strength of his commitment but also his intuitive insights into concepts, relationships and operationalizations and the order which he imposes on his data.[142] It

[142] See discussion of creativity as regression in the service of the ego in E. Kris, *op. cit.* also, R. Schafer, 'Regression in the Service of the Ego, The Relevance of a Psychoanalytic Concept for Personality Assessment', in G. Lindzey, *Assessment of Human Motives* (New York: Holt, Rinehart and Winston, 1958), 119–48.

depends, to a great extent, on the society to prescribe to what he must regress to meet his developmental arrests, and where and when the empirical assessment and stock-taking of the resulting insights must begin. But the stabilizing forces within a society, while maintaining continuities within the system, often exploit this regression by leading the scientists away from the self-examination that must accompany each intuitive insight of any scientific worth. This is only to be expected because any such examination is also an inquiry into the psychological foundations of society and, like individuals, societies have built-in resistance to this self-awareness. In trying to build stable self-perpetuating solidarities, they frequently engender, during early socialization, irrational fears, hates, hopes and attachments which only they can satisfy in later stages of the individual life cycle. They are reluctant to recognize that this search for significant solidarities can degenerate into a subtle pressure on prospective innovators to settle for palliatives that would further sanction and sanctify their desires and antidesires.

It was this vicious circle, generated by the process of social consolidation, in which Bose was so cruelly caught. It is true that the 'area and the era' *had* shaped a part of creative Bose, and it was an important part. But it is also true that when in the end he failed science, in a deeper sense his society and his time had failed him too.