Colonialism and Professionalism: A German Forester in India

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SUMMARY

Professional German foresters played an important role in shaping the course of forest management in India during the last century. It is to Sir Dietrich Brandis that the credit for the introduction of scientific methods of management is given. Brandis introduced seriousness and professionalism into Indian forest administration. But in general for Brandis German forestry served as a model for the establishment of systematic forest management in India. When the above is viewed in the light of the further fact that in Brandis' time the knowledge of tropical forests was extremely limited in Germany, a number of problematic issues emerge. The paper explores Brandis' relation with the British government. From the evidence available, it appears that Brandis often felt constrained by the 'narrow mindedness' and the 'prejudice and ignorance' of the government. It is argued that the systematic forestry introduced in India by Brandis was along the lines of forestry developed in very different social and ecological conditions, and that its development was greatly constrained by colonial interests.

INTRODUCTION

On growing up, Mowgli, the wolf boy of Rudyard Kipling's *Jungle Book* fame meets in his forest the giant German called Muller. 'He was the Lord and Master of all the forests and woodlands of India, the chief Ranger whose domain stretched from Burma to Bombay. He was Terror personified, feared by all official agencies, but as a forester he had no peer.' The giant German was Sir Dietrich Brandis (Venzky, 1986: 37).

By the middle of the nineteenth century the depletion of the forests began to assume serious proportions in India. The British government was forced to recognise that the forests in India were after all not inexhaustible. Various

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officers were deputed from time to time to report on the forests of the different localities and all of them emphasised the need for conservation and improvement of the forests inspected by them. In 1827 Dr. Wallich and in 1845 Captain Gathin reported on the forest resources of Burma; in 1837 Dr. Helfer reported on those of Malabar; in 1847 Dr. Gibson was appointed Conservator of Forests in Bombay; and in 1856 Dr. Cleghorn occupied a similar post in Madras.[1] In the year 1855, a significant one in the history of forests in India, Lord Dalhousie laid down a definite forest policy: 'owing largely to the increasing difficulty of obtaining adequate supplies of timber for the great extension of railway lines then being undertaken, as a result of the systematic destruction of forest areas for cultivation, of uncontrolled felling and absence of all protection of forests, the Government of India were forced to take energetic steps to protect from further destruction the forests that still survived' (Smythies, 1924: 6-7).

It was around this time, in 1856, that Lord Dalhousie offered Brandis the appointment of Superintendent of the Pegu teak forests, an offer which he accepted. In 1863, Sir Charles Wood, the Secretary of State for India, showed keen interest in the organisation of the forest department in India and the preservation of the forests.[2] His recognition of the 'grave position of the accessible forests of the country, which were threatened with total annihilation', found expression in the appointment of Brandis in 1864 as the first Inspector General of forests to the government of India (Advani, 1927-28: 7). During his long term in office, Brandis worked tirelessly to establish the organisation and working of the department in all parts of India. He travelled extensively through the forest tracts of the country, which included visits to Sind forests in 1867, Berar forests in 1869, Bombay forests in 1870 and Madras forests in 1881, his last major assignment. The detailed accounts as well the suggestions and instructions embodied in the numerous Inspection Reports prepared during his many visits, bear testimony to his commitment and thoroughness. He is regarded as having laid the foundation of systematic forestry in India.

Significantly, England's own forests had long been devastated.Particularly serious inroads occurred in Henry VIII's time when he seized the church land for his own use and 'turned them into cash'. James I had fostered colonisation schemes, especially in Ireland, which reduced the forest area; and Charles I 'always in need of cash', alienated many of the crown forests. 'During the Revolution beginning in 1642, and during Cromwell's reign a licentious devastation of the confiscated or mortgaged noblemen's woods took place' (Fernow, 1907: 315). With oak forests vanishing in England, the need for suitable timber for the Royal Navy began to be felt, since as Stebbing put it 'the safety of the empire depended on its wooden walls' (Stebbing I, 1922: 63). This was a period of intense rivalry between the colonial powers and the Indian teak, suitable for shipbuilding, saved England during the war with Napoleon as well as the later maritime expansion. Ships were built from the teak imported from India and in the dockyards at Bombay and on the Malabar coast (Guha, 1983: 1883).

Despite some efforts after the mid-seventeenth century by the government to advance forestry in England, it had remained largely neglected. In 1885 England was almost the only country without a forest school. Such institutions existed in Prussia, Saxony, France, Switzerland, Austria, Sweden, Spain, Russia and in fact almost every other country (Brandis, 1885: 332). In 1907, it was observed, 'Altogether forest management and silvicultural practices are still nearly unknown in England, and until within a few years, the useful idea of working plans had not yet penetrated the minds of owners of estates' (Fernow, op. cit: 319).

In other words, England lacked an 'intelligent conception even, not to speak of application, of proper forest policy or forest economy' (Ibid.: 300). This apathy was, however, compensated for by abundance of coal and by large importations of timber. England was the largest wood importer in the world in the nineteenth century. In 1917, R.S. Troup, the assistant Inspector General of forests, wrote that 'Britain is still content to rely on foreign imports for the great bulk of her timber supply', adding that conservation of forest wealth had never been a special feature of her administration in the past (Troup, 1917: 1).

Therefore when the British government was confronted with a crisis situation in India, it turned to Germany for expertise in forestry. Germany and France had both made considerable progress in the field before the close of the eighteenth century. German foresters were the first to base the principles of forestry on observation and to treat it in a scientific manner. Hartig, Cotta and Hundeshagen were the founders of systematic forest management in Germany. By the end of the previous century, the German empire could boast of nine forest schools, ten periodicals and one general association of German foresters (*Indian Forester*, 1890: 307).

Brandis, although a trained botanist, had turned to forestry and represented the tradition of scientific forestry which had developed in Germany and for which he had great admiration. He was convinced of the superiority of forestry practice in Germany and energetically advocated its application, with some modifications, in other countries as well. 'As a matter of fact', he said 'the management of German forests, public as well as private, is excellent and is steadily improving' (Ibid.: 307), and that scientific forestry outside Germany must be based upon the progress previously made in Germany. The Indian forest officers, he argued, must be familiarised with the science and practice of forest management in Europe, and with the experience gained in forest administration in those countries 'where it is best understood', (Brandis, 1885: 463). In general, one may suggest, for Brandis German forestry served as a model for the establishment of systematic forest management in India. This is, of course, not to deny the sensitivity with which Brandis viewed and commented on the local conditions and made some extremely valuable suggestions. Nevertheless, when the above is viewed in the light of the further fact that in Brandis' time the knowledge of tropical forests was extremely limited in Germany, a number of problematic issues emerge.

The other problematic area which this paper will attempt to explore is Brandis' relation with the British government. From the evidence available, it appears that Brandis, a thorough professional devoted to systematic forestry, often felt constrained by the 'narrow mindedness' and 'the prejudice and ignorance' of the government. The constant demand for surplus forest revenue made it difficult for Brandis to carry out measures in the long term interest of better forest management. His achievements, in his own words, such as the professional training of forest students in Europe, the system of fire protection, the scientific organisation of the staff, the proper control of forest accounts, the formation of reserved forests in many provinces, the establishment of the Dehra Dun School, were the outcome of 'interminable struggles'.

The paper does not attempt to evaluate Brandis' contribution to the establishment of systematic forest management in India; only a trained forester can do that. From all accounts it appears to have been substantial. It puts forth the argument that the systematic forestry introduced in India by Brandis was along the lines of forestry developed in very different social and ecological conditions and that its development was greatly constrained by colonial interests. These facts are important in that they raise questions about the very foundations of forestry in India, which even have implications for present trends.

FORESTRY IN GERMANY: THE HISTORICAL, ECOLOGICAL CONTEXT

Although the first sporadic and crude beginnings of a forest management in Germany may be traced back to the fourteenth and fifteenth centuries, it was not till much later that such management became common. Forest conditions are said to have deteriorated continuously in Germany until the end of the eighteenth century. Every forest ordinance began with complaints regarding the rapid forest devastation and predicted timber famine in view of the increasing population, increasing industry and commerce and hence increased wood consumption. Along the water routes, because transportation was easier, the available supplies were ruthlessly exploited.

Other causes of devastation were the Thirty Years War, the wars of the eighteenth century and the loss of interests in the forests by the peasants after the collapse of the 'Mark', the common property of the people. The peasants had often to steal what they needed and their depredations were increased by the desire to avenge themselves on the landed proprietors for the oppression to which they were subjected. The increase in game, which was fostered by the landed gentry did much damage to the young growths (Fernow, op.cit.: 45). To stave off a threatening timber famine, regulation in the use of wood was attempted by the forest ordinances, to the extent for example of forbidding the hanging out of green bush to designate a drinking hall. These restrictions were directed either

to practice in the exploitation of the forest or to use of the material. Attempts were made to reduce the use of building timber. Building inspectors were to approve building plans and inspect buildings to see that they were most economically constructed. Economies in charcoal burning, in potash manufacture for glass and in the turpentine industry were prescribed. Regulations also existed in order to secure a degree of orderly procedure in fellings (Ibid.: 46-47). With the beginning of the eighteenth century, besides prescriptions against wasteful use, definite forest policies had become quite general. These aimed at forest preservation and improvement of forest conditions, and also at providing wood at moderate prices.

Although sporadic attempts at sowing and planting are recorded as early as the beginning of the fourteenth century, extensive artificial reforestation did not begin until the middle of the eighteenth century. By that time planting methods were nearly fully developed. Among the hardwoods, oak was the first to receive special attention. By the middle of sixteenth century the forest ordinance gave instructions for planting oak. It was a practice in some regions to plant on special days, especially to celebrate the marriage day. In order to be married the bridegroom had to prove that he had planted a certain number of oaks besides fruit trees (Ibid.: 58). It was only towards the end of the eighteenth century that planting of pine was resorted to.

The fear of a timber famine and 'the apparent hopelessness of bringing improvement into the existing forest conditions created anxiety and a desire to plant rapid growers, such as birch, willow, aspen, alder; the planting of the White Birch became so general in the beginning of the eighteenth century that a regular betulomania is recorded' (Ibid.: 61). At that time, firewood was still the main concern, and these rapid growing species had some justification.

In spite, however, of the sporadic efforts which had been made to bring about the recuperation of forest areas during the eighteenth century, the condition of forests at the beginning of the nineteenth century were said to be 'most pitiable'. Export trade in wood had become brisk and the financial depression, a result of the French Wars, led to increased exploitation. With improvement in the means of transport, the exploitation spread to distant forest areas and enlarged the waste area. Around the year 1800, considerable literature on the threatening timber famine appeared, and the desire for rapidly growing species became once more prevalent. In many parts of Germany great efforts were made to replant the denuded areas with coniferous species, pine etc., by which, eventually, a great change in the forest type from the original mixed forest to the pure forest was effected (Ibid.: 91).

Along with the development of means of communication, the substitution of coal for firewood had the greatest influence on the use of forest land in Germany during the nineteenth century. The use of coal in Germany increased rapidly and displaced wood. The consequence of this development was a complete reversal of German forest management, from the production of fuelwood to the produc-

tion of industrial timber. By about 1850 only 20-30 per cent of the total wood produced in most of the German state forests was industrial timber and 70-80 per cent was fuelwood. By 1913 the ratio was reversed (Heske, 1938: 39). This reversal had other weighty consequences, tree species which produced 'valuable' timber were favoured as against those that produced mainly fuelwood. For this reason beech, for example, lost to spruce and pine. 'Unfortunately', observes a German forester, 'this tendency went too far in Germany. In order to increase profits, broadleaf or mixed conifer broadleaf stands were replaced by pure stands of the supposedly more profitable 'money trees' (Geldbaeume), especially spruce and pine' (Ibid.: 39). Nevertheless, a century of systematic forest management in Germany had transformed depleted and abused woods into well managed forests with increasing yields.

Significantly, there were reactions to these developments in what came to be known as the 'Back to Nature Movement' and the 'Dauerwald Movement'. The former school of thought was led by Johann Christian Karl Gayer, in the last quarter of the nineteenth century. It criticised the 'one-sided striving for normality and the mathematical calculations of profits'. Instead, it demanded that the forest be treated in accordance to biological laws, i.e. mixed forests instead of the pure stands; retention of the soil-improving broadleaf species, especially beech; natural regeneration instead of clear cutting with artificial seeding or planting and uneven aged form of forest in place of forests composed of schematically arranged even aged stands (Ibid.: 40). Gayer's ideas were, however, far more influential in Switzerland than in Germany. Closely connected with this movement was the Dauerwald movement (continuous forest). Professor Rossmaessler of Tharandt was the first to voice recognition of the fact that the forest was not merely an aggregate of individual trees but an integrated, organic unity comprising of all the innumerable living organisms, from the smallest soil microbe to the age-old tree. The doctrine demanded that clear cutting be strictly avoided, instead selection cutting be done in such a manner that the forest hardly notices it (Ibid.: 42).

These movements became more influential later than they were in their own times, although lip-service continued to be paid to the principle embodied in these doctrines. In the nineteenth century the dominant trend in forestry was in favour of fast-growing and economically profitable species and monocultures. The pioneer German foresters, it is observed, at the beginning of the nineteenth century clearly realised that the immediate problem was to establish an economically productive forest on the exhausted and deteriorated forest lands. It was necessary to do this as quickly as possible, by means of planting, in order to safeguard the timber supply of the nation. In many instances this was possible only by extensive planting of conifers on the old tired coppice areas and on broadleaf soils (Ibid.: 154). Although foresters liked to believe that the artificial forests which came to be were only the first stage in German forestry, a

transitional stage, that would finally be transformed into natural mixed forests, it remained merely at the level of an idea. In the latter half of the last century it was forgotten and deliberately pushed aside by the doctrine of 'soil rent' with its one-sided emphasis on profits.

The dangers of the German experience during the nineteenth century 'with a schematic system of forestry that placed too much reliance on mathematical calculations' came to be recognised later. Heske, a German forester, issued a note of caution that there was imminent danger of slipping into schematic forms of forest structure during the transition from virgin forests or from forests subject to unrestricted exploitation to forests under sustained yield management. 'Virgin forests, especially in the Tropics, contain innumerable trees of no present commercial value intermingled with a few that are highly valuable. It is only too easy to make the mistake of converting these mixed, uneven, virgin forests into uniform plantations of a single valuable species (Monokulturen)' (Ibid.: 40). Heske further observed that this mistake had been made repeatedly. Large areas were planted with even aged plantation of a single species, fast growing or economically valuable, without consideration for the biologic factors which characterise the forests. But Heske was writing only in 1938.

Brandis, as we have mentioned earlier, belonged to the mainstream development in forestry in Germany in the nineteenth century. He was extremely appreciative and even proud of the great advances made by German forestry, reflected in rational management of forests, efficient forest organisation and a vigorous forest education. It is with these ideas of how forestry ought to be undertaken that Brandis came to India to advise the British government on matters relating to forests. It is important to note that Brandis could not have had much actual knowledge of the nature of Indian forests, or for that matter, of tropical forest ecosystems. From all evidence available it appears that very little was known about tropical forests in nineteenth century Germany. It is against this background that Brandis' work in India may be viewed.

BRANDIS IN INDIA: EXPERIMENTS

Dietrich Brandis was born on April 1, 1824 in Bonn. He studied Natural Sciences in Gottingen, Bonn and Copenhagen and received his Doctor of Science for Botany in Bonn in 1848. Professor Liese remarks that his future was undeniably determined by the circumstance of his marriage in 1845 to an English lady, Rachel Marshman, sister-in-law of General Havelock who was stationed in India. Through his wife, Brandis became related to the then Viceroy of British India, Lord Dalhousie. (Liese, 1986: 640). When lower Burma became part of the British empire, Lord Dalhousie offered Brandis the position of the Superintendent of the forests for Pegu. Till then all teak forests in this province were

classified as 'king trees' and in possession of the king. The special task of Brandis was to study the nature and cultivation of the teak forests, which were being threatened by uncontrolled felling.

Within a year of joining, Brandis drew up new rules to bring the Pegu forests under regular conservancy and for preventing their destruction. His Linear Valuation Survey which he developed in order to undertake a preliminary enumeration of the number of teak trees in the forest became widely accepted. In 1857, the forests of the entire Burma province were brought under Brandis. His early attempt to bring the working of the forest under departmental control evoked a storm of opposition from all sides, particularly from mercantile firms engaged in the timber business. As soon as the merchants of Rangoon realised that the system introduced by Brandis in 1856 would limit the quantity of teak brought to market, they started 'a vigorous opposition against it' (Brandis, 1896: 10)

At that time the war of 1857 had saddled the government with enormous debt, and also diminished the public revenue. The merchants of Rangoon urged that all the mature timber standing in the forest be sold to them. Given the high market rates, it would produce a large revenue for the government. Seeing that Brandis remained firm, they went to Calcutta and 'backed by the influence of the large and powerful mercantile firms of Calcutta they succeeded in inducing the Government of India to order the commissioner to throw open the Pegu forests to private enterprise' (Ibid.: 11). This was Brandis' first experience of being let down by the government. He, however, drew comfort from the thought that the really valuable forests which had, by then, already come in the hands of the government, had been saved. And that the folly of the decision was amply recognised subsequently.

An important achievement attributed to Brandis is the utilisation of taungya cultivation, a form of shifting cultivation practised in Burma which destroyed teak forests, to in fact produce teak. As early as 1856 an attempt was made in Prome district to sow teak in regular rows, together with rice. Twenty years later this attempt had grown into a regular system, by which large areas were annually stocked with teak at a cost far below that of regular plantations (*Indian Forester*, 1884: 349). There is, however, another view which attributes the first attempt at toungya teak plantation to a Burmese. Blanford suggests that it is on record that actually the first plantation to be so made was formed by V. Panhee, a Karen in the Thonze forests, as a personal present to Brandis (Blanford, 1956: 13). However, this remains an open question.

The war of 1857 created a sense of urgency to develop better means of communication in the country for military reasons. Obtaining adequate supplies of timber for extension of railway lines, for both sleepers for laying the rails as well as fuel for the engines, was becoming increasingly difficult. To ensure a continuous supply of timber for the railways, for public works, to meet the needs

of the people as well as to check the alarming deterioration of forests in the various provinces, introduction of a regular system of forest conservancy for the country as a whole was deemed to be essential. As a step in that direction, the government appointed Brandis as the first Inspector General of Forests in 1864.[3] Brandis had been called away from Burma in 1862 and placed on special duty under the government to assist in organising forest administration in other provinces.

Brandis held the appointment for a long period of 19 years. During this period Brandis laboured to establish the forest department in the various provinces. He recognised the necessity of forest legislation which would provide protection to the forests as a whole by laying down the prescriptions for their management in clear terms. The officers of the newly established department would enjoy sufficient authority to carry out the prescriptions. Brandis advocated that officers from the military should be inducted into the higher levels of the forest service (Negi, 1991: 53). Brandis showed great regard, characteristic for a German, for the discipline which these officers could introduce into forest management. In 1865 the first Indian Forest Act was passed, which was amended in 1878 when a comprehensive law, the Indian Forest Law Act VII of 1878, came into force. Subsequently, the Burma Forest Act of 1881 and Madras Forest Act of 1882 were passed. The provision of this Act established a virtual state monopoly over the forests in a legal sense on the one hand, and attempted to establish that the customary use of forests by the villagers was not a 'right' but a 'privilege' which could be withdrawn at will, on the other. It must, however, be pointed out, that Brandis was associated with the preparation and enactment of the forestry legislation but probably, as it appears from his writing, only in a limited way. He later wrote, '... my business merely was to submit proposals, the acts were drafted and passed in the legislative council and the results were not always in accordance with the proposals which I had submitted. Forest legislation is an intricate business in all countries, and in India it is particularly difficult ...' (Brandis, 1897a: 51).

Brandis saw the value of state control over forests. As a rule, he felt, 'unless Government had stepped in and had reserved forest tracts, many districts would have become denuded and the people would have suffered' (Brandis, 1881: 23). He maintained that the government, as the guardian of public interest, had a duty to regulate the rights of the people to the forest, in order to ensure good management of the reserved forests in the interest of the country in general. He even suggested that the government was at liberty to extinguish these rights, if necessary, in a particular forest area, by paying liberal compensation of money or land. But then he clearly stated that in his opinion the customary uses ought to be regarded as a right. In a paper he read at the meeting of the British Association, Brighton, in 1872, he said, 'There has been much thoughtless talk, as if the natives of India, in burning the forests and destroying them by their

erratic clearings, were committing some grave offence.... Such rights, when the public benefit required it, must be extinguished; but the wild tribes of India have the same claim as the holder of prescriptive forest rights in Europe, to demand that provision be made for their reasonable wants and requirements' (Ibid.: 53). Some of his suggestions which would have taken better care of people's needs, remained neglected. We will discuss them later. For Brandis, the chief aim of forest management was to steadily improve the condition of forests and never to cut more than the annual production by natural or artificial means would justify. The essential conditions for success included effective protection; effective regeneration either naturally or artificially; development of good lines of communication to facilitate working of forests; and methodical plans of working (Ibid.: 11). Brandis expressed satisfaction with regard to the protection of forest by control of annual fires which caused great injury to the forests, In his words it was achieved through 'indomitable perseverance' and at the cost of 'great personal exertion' (Ibid.: 11).

It was also clear to Brandis that planting and other cultural operations were necessary not only to stock bare hillsides and plains with trees, 'but also to increase the proportion of the more valuable species in the forests'. As a rule, Brandis observed, it was expected that natural reproduction would be the most important method of regenerating forests in India but natural reproduction would have to be aided by cultural operations when it is intended to increase the proportion of more valuable kinds of trees; or when because of unfavourable conditions of climate, soil etc. the regeneration of a forest would otherwise be slow and imperfect. Again plantations would be necessary in order to form new forests in places where formerly no forests existed (Brandis, 1879a: 18). He found it a peculiarity of India that those trees, the timber of which was marketable often mixed with other kinds for which there was no demand. For example, the so called teak forests of Burma had only 10 per cent of teak trees. Therefore, Brandis observed, 'It is of utmost importance to plant teak[4] and otherwise to favour the growth of this tree at the expense of the less valuable kinds' (Brandis, 1884: 12). The protection of teak was to be ensured by, among other measures, girdling of such other trees as interfered with the growth of the young teak (Brandis, 1858: 4). Brandis proposed to gradually convert the favourable forest tracts into pure teak forests. This was to be achieved by the following means: one, gradually changing into pure teak forests those localities where teak formed a considerable portion of the forest by removing a portion of other trees and all underwood to give teak greater facility for multiplying itself, and two, by filling with young teak trees the spaces between different patches of teak forests and establishing teak nurseries and plantations (Brandis, 1860: 5,41; see also Brandis, 1858)

In Burma, up to 1883, 11,221 acres had been planted with teak and this was to be undertaken on a much larger scale. Bamboos, which formed extensive

forests in teak region, mostly flowered gregariously all at once over large tracts, and died. Attempts had been made to burn and clear these areas and plant teak, which Brandis hoped, might develop into a good system (Brandis, 1884:13). Altogether, in 1895, an area aggregating 43,296 acres had been planted, chiefly with teak, in lower Burma, and this area was being extended (Brandis, 1897a: 39).

Similar conditions existed in the forests of deodar (*Cedrus deodara*) in the North Western Himalayas and those of sal (*Shorea robusta*) and sissoo (*Dalbergia sissoo*) at the foot of the Himalayas stretching from Punjab to Assam. They did not form pure forests but were always mixed with a large number of trees which, Brandis observed, were either valueless or of little value. While deodar, sal and sissoo commanded a ready market, the demand for the other wood was extremely limited. Brandis noted that the efficient protection of forests which had been undertaken over large areas had had the effect of increasing production 'not only of the valuable forest produce, but equally so of that which is without value'. He pointed to the difficulty that not only is there 'no market for the less valuable kinds of timber, but chiefly that when teak, deodar, and the other more valuable trees are cut, the ground is taken up by trees, bamboos, and shrubs of no value, and that it is difficult to work a mixed forest so as to promote the production of the more valuable kinds' (Ibid.: 1). To him the most effective remedy was to increase the proportion of the more valuable kinds by sowing and planting, the cost of which, however, prohibited their extension over large areas. Therefore other measures were attempted in the mixed forests of different districts in order to secure preponderance of valuable timber, such as killing of less valuable kinds by barking or girdling. In this way progress was made to promote the growth of teak in Burma, sal in Kumaon and deodar in the north west Himalaya (Ibid.: 1; see Brandis, 1879c: 28-31). By silvicultural techniques of ringing and girdling and protection from fire many mixed oak-conifer forests in the Himalayas were successfully transformed into pure coniferous strands (see Guha, 1989: 50-51). Extensive plantations of sissoo had been formed mainly in the Punjab (Brandis, 1884:4). This trend continued after Brandis. It must be added that Brandis put forth two suggestions with regard to the simultaneous utilisation of the less valuable kinds of timber. One, to revive or establish afresh the industry of iron making with charcoal which would utilise inferior wood. Two, to make the inferior woods more durable and hence more valuable by impregnating them with antiseptic substance. To reduce the pressure on deodar and other timbers like teak and sal for railway purposes, Brandis and his men attempted from 1860 onwards to find inexpensive methods of creosoting other varieties of timber. But technical problems remained insurmountable and the pressure on hardwoods continued throughout the railway building period before World War I (Tucker, 1982: 117). On Brandis' first suggestion we will say more in the following section.

IMPORTANT RECOMMENDATIONS: BRANDIS' FARSIGHTEDNESS

It would be in order to consider some of the important suggestions which Brandis put forward and which remained largely neglected. While Brandis demonstrated the sensitivity and farsightedness of a professional, the colonial government was preoccupied with short term considerations, political and financial. Brandis advocated state control over forests but he also insisted that rights ought to be settled in a 'just and equitable manner'. In a debate that took place around the draft bill of 1869, which was drawn up to remedy the defects of the Forest Act of 1865, Brandis took the middle path when he recommended the constitution of village forests of the kind which existed in several countries of Europe including Germany. The two extreme positions were represented by Baden-Powell, on the one hand, who advocated greater control by the state, and the Madras government which believed that the state intervention should be minimal and favoured community forest management (Gadgil and Guha, 1993: 127-131). Based on the European model, Brandis proposed that three classes of forest property be created: state forests, village and community forests, and private forests (Brandis 1875: 2). Side by side with the efficient administration of state forests, Brandis observed, there existed an equally efficient administration of communal forest in France and in most states of Germany. Not only did these forests yield a permanent supply of wood and fodder to the people without any material expense to the state, they also contributed to the development of local self-government. In many parts of France, Germany and Italy, Brandis noted, the old communal forests were a source of wealth to the country. The income derived from them paid for the construction and maintenance of roads, bridges, churches, schools and other public buildings. There were many towns and villages where a large portion of the municipal expenditure was covered by the revenue derived from the forests belonging to them. In many instances a considerable part of the surplus remained available for distribution to the citizens over and above the wood fuel which they received without payment (Brandis, 1888: 5).

Brandis hoped that this experience would be replicated in India. He rightly foresaw that if would have far-reaching consequences. These forests could supply forest produce both to the villages to which they were attached as also to the inhabitants of other villages. The produce would include firewood for industrial and domestic use, wood for agricultural implements, bamboo and timber for building, leaves and branches for manure and grazing for cattle. Although speaking specifically about Mysore, Brandis had the rest of the country in mind. A village's forest whenever possible, he suggested, ought to be within the boundary of the village to which it was attached. It would consist, as a rule, of the jungle and grazing lands, attached to each village as far as they had not been taken up by the forest department as reserved forests. In many cases, however, it might be necessary, for purposes of management, to include in one block the forest area of several contiguous villages. The village forest, whenever possible,

ought to supply the requirements of the village, including the requirements of village industries such as sugar making, iron smelting, lime and brick burning and charcoal making (Brandis, 1868: 389).

Although Brandis strongly recommended the establishment of village forests he was clear that the control of such forests could not be left to the community, at least in the initial stage. Displaying faith in the state to work in the general interest of the people, Brandis advocated state control in a way it had been achieved in Germany. On the basis of his experience in Germany, he maintained that the preservation and improvement of such forests could only be 'secured by the intervention of Government whose officers, at the outset at all events must undertake the control and management of the village forests'. (Brandis, 1878: 48). In other words, the village forests could be protected and managed by the community but under the control of the state, for even in Europe it had become clear that 'the communal forests would often be worked in a wasteful manner, if their management were not controlled by the State' (Brandis, 1884 op. cit.: 35). Brandis feared that unless the communal forests were placed under management by professionally trained officers, they would 'neither be preserved nor improved, they will continue to deteriorate'. And the present 'apathy and ignorance' of the people in India with regard to the management of their common woodlands, and grazing grounds, and the utter neglect and consequent progressive denudation of these lands would continue (Brandis, 1878 op. cit.: 48). He hoped that the 'village authorities' would gradually acquire the knowledge which would enable them to share in the management of those lands. 'The benefits which they will reap as the production of grass and wood becomes more plentiful, and as the water supply in springs, streams and tanks become more regular and therefore more useful, must gradually awaken in them a lively interest in the improvement of their common lands' (Ibid.: 48).

In the specific case of Mysore, the suggestion was not considered favourably. The Governor General went by the opinion of the officers of the province who detected many difficulties in the implementation of the project of village forests. 'Supervision, they consider, would be difficult and the prejudices and rivalries of Natives might be excited if men of different classes and castes shared in the same forest' (Brandis, 1868 op. cit.: 393). They suggested that in order to meet the requirements of the communities, depots could be established where firewood and timber could be bought. Not only in Mysore but in the rest of the country as well the project was eventually unsuccessful. Brandis recognised this when he wrote, 'The formation of communal forests belonging to towns and villages has not made much progress in India and yet it is certain that few measures are more likely to promote the development of healthy self-government of towns and villages ...' (Brandis, 1888: 2).

Another suggestion made by Brandis which went unheeded concerned the revival of the old native iron industry. As mentioned earlier, Brandis pointed out that efficient management and protection of forests had resulted in the increased

production of both the valuable and the less valuable timbers. While the former found a ready market, the latter in many places only crowded the forest leaving little room for the valuable timber. From this point of view efforts were made by some foresters to revive and improve the old native iron industry which Brandis observed 'has produced and may still produce iron and steel of excellent quality' (Brandis, 1884: 30; see also Brandis 1894).

Steel and wrought iron 'of the very best description' had from time immemorial been made with charcoal in innumerable small furnaces (Brandis, 1897a: 56). The increased cost of charcoal, which necessarily resulted from the strict forest conservancy had probably been the chief cause of decline of the industry. And if the wood for charcoal became available, there would be a decrease in the cost of charcoal (1881: 3). The other two reasons for the decline of the old iron industry were that the imported iron was cheaper and that the forests had become depleted from excessive cutting.[5]

For Brandis the question of iron making by charcoal was 'one of great importance for the development of rational forest management in India' and if it succeeded, he observed, 'we shall have accomplished a task the importance of which for forest management in India and generally for the development of the resources of many naturally poor districts, can hardly be overrated' (Brandis, Ibid.: 2). Brandis recognised that the charcoal made steel and iron of India, even if the methods of manufacture were greatly improved, was not likely to be exported and might not be able to compete with the steel and iron imported from England. But for many purposes it was, even at the time, preferred by the people. Most important, of course, was the fact that it would make room for the more valuable species of trees. (Brandis, 1884: 31). In 1897 Brandis noted with dismay that no action had been taken on his proposals and that 'a great opportunity for contributing materially to the further development of India' might be lost (Brandis, 1897a: 58).

INDIGENOUS FORESTRY: SOME OBSERVATIONS

Before we go on to discuss Brandis' differences with the government, it might be of interest to record his observations with regard to the indigenous practices of forest management existing at the time. They are important in that they point to the existence of a kind of forest management before the British introduced it in India. He noted with appreciation the existence of sacred forests, which, he wrote, demonstrated a 'traditional form of forest preservation'. And although these practices never entered the formal discourse on scientific forestry, Brandis showed some interest in them.

Brandis toured through Rajputana in 1869-70 and witnessed 'some extensive woodlands' throughout Rajputna, 'it being the custom in most of the Native States to conserve certain tracts of jungle and grass, generally called "birs" to

furnish cover for game, and in order to give a supply of grass, firewood and small timber' (Brandis, 1876: 44). He reported that the 'dhao' jungles of the Raojee of Hamirghur were worked on a 'regular system of coppice, all the graduated ages being complete. These woods were preserved for shooting, and to furnish grass and wood. The clearances, Brandis remarked, had been made not arbitrarily, but blocks had been cut over successively in a rough kind of rotation, the coppice on the clearances was protected, and was springing up vigorously. 'It gave the Rao great pleasure', Brandis wrote, 'when I complimented him upon his attempt at regular management' (Brandis, 1897a: 16).

Game preserves had been established and maintained by the local chiefs in many parts of India. The most extensive of these were the forests of Babul (*Acacia arabic*a) in lower Sind. They were established by the Amirs of Sind. In Rajuptna, too, in the states of Bharatpur, Jaipur, Mewar, Kishangarh, Pratabgarh, Banswara, as well as on the estates of feudal nobles in some of these territories, large areas of forests and grass lands were preserved to furnish cover for game and a permanent supply of grass, wood and timber. Under certain restrictions these preserves were generally open to the surrounding population. These restrictions varied in different localities, just as there was a great variety in the degree of protection given to these forests and in the means employed to secure this protection. In some instances, poor people made a regular living by collecting firewood and selling it in town. In Kishangarh for example, he found that during the years of famine and drought, cattle were allowed to graze in these preserves, and branches of certain trees were allowed to be cut for cattle fodder (Ibid.: 13-15).

On having entered the territory of the Thakur of Bednor, a feudatory to the Maharaja of Udaipur, Brandis noted '... the contrast in the appearance of the country greatly surprised me. In British territory the hills, which at one time had been covered by a fair Jungle of Khair (*Acacia catechu*) and Dhaukra (*Anogeissus pendula*) were denuded, the trees having been sold to charcoal contractors of the British Cantonment of Nasirabad ... As soon however as I entered the territory of Bednor, the hills were wooded, not a tree having been felled' (Ibid.: 16). The Thakur had refused the charcoal contractors, 'knowing well that the grass, which, even in dry seasons maintained itself under the shade of the trees, and the branches of the trees themselves, had saved the cattle of Bednor in years of drought, and more than this, that the water supply in those tanks, upon which the fertility of the country depended, was maintained by the forest growth upon the hills' (Ibid.: 16).

The value of these reserves, Brandis observed, was not to be measured by the revenue they produced, but by the 'increased production of cattle fodder and wood for the people, and by the effect which their protection would have in increasing the water supply in wells, tanks and springs' (Brandis, 1879b: 42). But he continued to maintain that there had been no organised and effective action to accomplish these objects. In fact, as a rule, he pointed out, if the government

had not stepped in and reserved forest tracts, many districts would have become denuded and people would have suffered (Brandis, 1884 op.cit.: 23).

He also mentioned the remarkable woodlands, known as 'kans', found in the moist districts of the Mysore state. These kans were patches of dense forest, consisting mainly of evergreen trees. They were mostly private property, paying land tax. The important products of these forests were sago palm, black pepper and jack fruit. In some kans, coffee trees were cultivated. Besides these products, the kans yielded fuel, wood for building, branches and leaves to manure paddy fields, areca nut and betel (Brandis, 1897a: 17-18). Brandis noted that although little had been published about sacred groves they were 'very numerous'. He wrote 'I have found them in nearly all provinces. As instances I may mention the Garo and Khasia hills which I visited in 1879, the Devara (Kadu or sacred groves) of Coorg ... and the hill ranges of the Salem district in Madras Presidency ... Well known are the Swami Shola on the Yelagiris, the sacred grove at Pudur on the Javadis and several sacred forests on the Shevaroys. These are situated in the moister parts of the country. In the dry regions sacred groves are particularly numerous in Rajputana' (Ibid.: 12). In Mewar they usually consisted of Dhaukra. In the southernmost states of Rajputna, in Pratabgarh and Banswara, the sacred groves called 'Malwan' consisted of a variety of trees including teak and bamboo. The sacred groves, Brandis observed, were more rigidly looked after by the Bheel chiefs. They were, as a rule, never touched by the axe, except when wood was wanted for the repair of religious buildings or in special cases for other purposes (Ibid.: 12).

He wrote about a remarkable little forest of sal (*Shorea robusta*) which he found near Gorakhpur in the Northwest provinces. Close by, there lived a Mohammedan holy man who maintained a perpetual fire fed with pieces of sal timber from the forest. The forest, Brandis observed, was in good condition and well protected. Nothing was allowed to be cut, except the wood required to feed the sacred fire, and this meant the cutting annually of a small number of trees 'which were carefully selected among those that showed signs of age and decay' (Ibid.: 13). Brandis found a similar forest in Merwara district. In an elevated valley between two ranges of rocky hills, there lived a holy man in a cave. Around his cave the forest had been preserved for many generations (Brandis, 1879b: 30).

BRANDIS AND THE BRITISH GOVERNMENT: CONFLICTING VIEWS

In a number of personal communications Brandis expressed his differences with the British government on matters relating to forestry. On many occasions during his long Indian career Brandis expected that the progress of forestry would either be 'throttled by its enemies' or that it would be led into a 'mistaken direction by its friends'. In a letter to W.R. Fisher, the editor of *The Indian Forester*, in

October 1884, Brandis wrote 'I never was able to go straight ahead and the leading thought was not to attain what was best, but to be satisfied with such progress as was possible' (Brandis to Fisher, 1884). He went on to write that achievements such as the professional training of forest students in Europe, the system of fire protection, the scientific organisation of the staff, the proper control of forest accounts, the formation of reserved forests in many provinces, and the establishment of the Dehra Dun forest school were the outcome of 'interminable struggles, and could only be accomplished slowly, watching favourable opportunities, and by rigidly maintaining the condition that these new measures should involve no material addition to the outlay' (Ibid.)

On issues pertaining to the bringing of a number of professionally trained foresters from Germany, to the organisation of a course of professional forestry training for young Englishmen in France and Germany, and to the establishment of a forest school in Dehra Dun, serious differences arose. While Brandis considered such measures necessary for the progress of forest conservancy in India, the colonial government looked at them merely as additional financial burdens. In a letter to an American forester in 1906, Brandis wrote, 'The surplus forest revenue, which by that time had commenced, fortunately enabled me, to carry my point against all opposition' (Brandis to Sargent, 1906). He explicitly stated that so great was the ignorance in these matters in Great Britain as well as among those well acquainted with India, that the real benefits which British India was deriving from good forest management were 'neither appreciated nor understood'. 'The only benefits really recognised as the result of forest conservancy in India, are the surplus forest revenue and the provision of 6-12 appointments a year for young Englishmen' (Ibid.).

Brandis was convinced about the necessity of establishing a national forest school in India. The area of demarcated forests for which the department was responsible was so extensive that the existing agency was no longer sufficient. The chief object of the training school was to prepare Indians for the executive charge of forest ranges. Therefore efficient arrangements for the teaching of forestry were called for. Brandis displayed farsightedness when he said, 'Forestry must cease to be a foreign introduction, it must become naturalised, before it can be regarded as built upon a safe and permanent basis' (Brandis, 1877: 1). He was strongly of the opinion that a central school of forestry with an instructive area of forests attached to it was needed. He proposed to set apart a number of forest districts in a central position, under a separate conservator, to serve as model forests to be utilised for the instruction of the candidates for appointment to the class of forest rangers and other superior grades of foresters. For a number of reasons, one of which was that the coniferous and oak forests resembled the forest in Europe, Dehra Dun and the adjoining division was selected.

Brandis succeeded after much effort and convincing that 'the necessary outlay would be covered within a few years by increased revenue produced under a stronger staff with more systematic management' (Bailey, 1887: 157). It was

a telling remark from Brandis that 'the establishment of the Forest School could only be purchased by abolishing for a time Deputy conservatorship on 900 Rupees' (Brandis to Fisher, 1884). It might be well to remember that lack of funds was a major problem of forest management in India. Even when the establishment of the forest department was under discussion in 1860s, fear was expressed that it would be a burden on the government exchequer. The department had to make efforts to show a profit. In 1897 Brandis wrote that as a rule men in position of power 'judge the value of forest administration only by the net annual revenue it produces. A diminished surplus is regarded as proof of bad management' (Brandis, 1897b: 336). E. P. Stebbing, a senior forest officer, later observed, that from its very inception the forest department's existence hinged on its ability to generate revenue. 'Through all the Despatches, Proceedings, Memoranda and Reports written during the last quarter of the past century runs the strong undercurrent that the Department was primarily maintained for the production of revenue'. (Stebbing III, 1926: 345). Brandis himself constantly reiterated the necessity of research in silviculture etc. (Ibid.: 145). But the staff was too small and too inadequately trained to undertake research work. The energies of the trained men were, much of the time, absorbed in revenue making. As a result little research was done up to the end of the century.

There seems to have been a fixed idea on the part of the central and local governments that forest establishments should be kept at the lowest possible strength. Brandis proposed that the pay of the staff be upgraded so as to afford them better prospects. But, Stebbing noted, he did not materially increase its strength and thereby 'followed the line of least resistance which he invariably took in this matter' (Ibid.: 111). A number of valuable suggestions made by Brandis which might have produced scientific results of inestimable value could not be carried out simply because the staff was small and inadequately trained.

It was clear to Brandis that a thorough professional training, both practical and theoretical, was absolutely essential for young probationers to enter the Indian forest service. He had no doubt that under the circumstances the forests of Germany and France, particularly those of Germany, offered the best opportunities for such professional training (Brandis, 1890: 254). Both countries had training schools and colleges, their forest administration was carried on on a large scale and forestry there was considered a calling for young men. In 1866 while on sick leave in England, Brandis put the proposal to the Secretary of State for India, and it was accepted. But opposition to the proposal came from different quarters, the Highland and Agricultural Society of Scotland, the Royal Horticultural Society of England and some botanical experts who argued that it was possible to give the required training in Britain itself. However, Brandis succeeded in convincing the concerned authorities and this system of training partly in Germany and partly in France lasted till 1886 (Bachkheti 1986: 9-10).

That Brandis had to function within severe financial constraints is obvious from his letter to C.A. Schenck, a German forester who worked in the USA. In 1897 Brandis wrote to him, 'In reality I have had to get money from Germany of my own to enable me to cover the expense of my tours of inspection as Inspector General of forests, which in those days was a most expensive business' (Brandis to Schenck, 1897). He was stronger in his criticism when he wrote to Schenck in 1899, 'In their natural condition the Anglo Saxon as a race hate systematic forestry. To some extent I have succeeded in educating Anglo-Indian opinion in that direction, but you have seen yourself that the Coopers Hill forester the majority hate Forestry. What has to some extent educated them, has been the large net revenue, which we have been able to make' (Brandis to Schenck, 1899). And indeed Brandis was able to show good revenue. He was appreciated for the fact that he succeeded in raising the revenue from 35 lakhs of rupees in 1864 to 95 lakhs in 1883 (*Indian Forester*, 1883: 381). It was observed that Brandis held the 'balance between true economy and foresight and the demand for revenue. He knew that a fair balance sheet was, in the eyes of Government, almost our only raison d'être. That while he was careful to limit the fellings and to implement measures of conservation and reproduction, he never ceased to insist on making things pay. This he did by severe economy, careful attention to details, and by utilising every humble source of revenue' (*Indian Forester*, November 1884: 499)

That Brandis was greatly disillusioned with the British government is obvious from the letters he wrote to two scientists in 1906, a year before his death. To Joseph Hooker he wrote, 'I wish I had confidence in the steady progress of good forest management in India. The enemies are numerous and powerful' (Brandis to Hooker, 1906). To Schenck he wrote in the context of a much stronger lobby in favour of forest conservancy in the United States, 'Neither I nor my successors have been able to accomplish this in India. The men who are responsible for the good Government of the country, the Civilians as a rule, only value the forests in so far as they yield a considerable addition to the public revenue. Altogether forestry in India is as unpopular as ever while in the US the movement towards forest conservancy is decidedly popular' (Brandis to Schenck, 1906).

CONCLUDING REMARKS

Although an effort was made by one British official, Sir George Birdwood, to belittle the contributions of Sir Dietrich Brandis,[6] by and large, the significant role he played, both as an administrator and scientist, in laying the foundation of scientific forestry in India was widely acknowledged. He was said to have

accomplished a great deal by 1883, the year in which he retired. The vast forest area of British India had been brought under systematic protection and management, an all-India forest department was created, and a forest school was established in India; as a result of which the productiveness of the forests was increasing year by year and so was the revenue. Brandis was said to have compiled the first rainfall map of India which served to show the relation between the rainfall and vegetation in the several parts of India. During his career in India he wrote a large number of reports and scientific papers. In 1872-74 he interrupted his forest work to write the *Forest Flora of North-west and Central India*, a work so highly valued that he was elected Fellow of the Royal Society in 1875. The last eight years of his life were devoted to a book on trees, shrubs, climbers and palms commonly cultivated in the British Indian empire. The book was published in 1906 under the title of *Indian Trees* and was seen as a culmination of his life's work in the field of forest botany. The monumental work continued to be the standard book of reference for subsequent generations (*Indian Forester*, 1907: 569-574).

On the occasion of his retirement the government of India acknowledged his services by granting him a special pension and a gratuity. He had been honoured with the title Companion of the Indian Empire in 1878, and was promoted to a Knight Commandership in 1887 for his work in India. Brandis, it is interesting to note, was also influential in the shaping of forest policy in the USA.

Brandis introduced seriousness, thoroughness and professionalism into Indian forestry administration. But he also brought with him the model of German forestry with all its strengths and weaknesses. In spite of the fact that the tropical forests were very different from those in his own country, with a bewildering vastness and variety of nearly 1500 trees, bamboos and climbers whereas only about 158 species were known in Europe (Brandis 1897a, op. cit.: 49), and that the social and cultural differences between the continents were enormous, he was certain about the value of applying the German forestry system for India. Others, however, were less certain. E. P. Stebbing later remarked, 'the rigid lines upon which the forestry was conducted, lines which modern German foresters now realise were not in all things in conformance with nature, did not afford sufficient elasticity for Indian requirements or, in its broad sense, for tropical forestry' (Stebbing III, 1926: 261). He expressed doubts whether a strict application of Germany's hard and fast methods based on 'axiomatic dicta and calculations had not its drawbacks in the case of Indian forests'. In fact, when Brandis made similar suggestions for the US, there was some resistance to the idea from the very persons who held Brandis in very high regard. For example, Gifford Pinchot, an American forester, who was very close to Brandis, pointed out, 'The authorities were wrong because they thought an intensive, all inclusive European training would be necessary to deal with American forests, and that European remedies would meet American needs.

They imagined that economic and political practicabilities, national habits of thought and the conditions of success in Forestry were substantially the same on the two sides of the Atlantic – that the same training and the same measures would have the same results in Europe and America.... It was curious ... that Dr. Brandis should have made this mistake' (Pinchot, 1947: 20). Pinchot was certain that it was useless to bring European foresters to America, even if there was money to do so. 'To do the work we had to do', he wrote, 'a man must know about forests, of course, but he must also know how people think and how things are done in America' (Ibid.: 65). If one extends the argument to India one would say that the forester would have had to know the complex tropical forests and the people, a large number of whom depended on the forest for survival, as well as the mentality and the method of functioning of the colonial government. A sensitive German forester, Lutz Faehser, writing in 1989, finds it difficult to translate the European experience into useful information for the Indians, given the entirely different background of forests in Germany. He goes on to observe succinctly, 'My compatriot Dietrich Brandis obviously was less preoccupied in this regard when he agreed to become Inspector General of Forests in India for two decades in the 19th century. It is possible that many of the problems caused by the Forest Service in India go back to that period of German influence' (Faehser, 1989: 43).

That the Indian foresters of the time were somewhat distant from their own reality is evident in the forest literature produced by them, which referred largely to the continental forests of Europe. For example in the *Indian Forester*, the journal of the department, many more papers dealing with European continental forests rather than purely Indian forests appeared. 'At the end of nearly half a century's work the department knew but little of the sylviculture of even its principal trees', Stebbing observed (Stebbing II, op. cit.: 463). He was critical of the fact that the trained foresters continued the earlier practice of spending a part of their furlough visiting European forests. A closer and more detailed study of forests in other parts of India, he felt, would have more rapidly advanced the progress of Indian forestry rather than a persistent study of comparatively small areas and details on the continent of Europe (Ibid.: 604).

With its emphasis on monocultures of fast growing trees, and too much interference with nature, German forestry, admirable as it was, came in for some criticism. '… there was about it too much artificial finish, too much striving for detailed perfection ... everything regulated down to the minutest detail' (Pinchot, op.cit.: 17, 35). It is being recognised, as Faehser points out, that the European experience with these artificial systems over past 200 years and more has resulted in degradation of soil and productivity, increase of parasites and plant disease, instability of forest lands, negative influence on the surrounding environment, and has made little contribution to the needs of the rural population. The awareness that as far as forest management is concerned, the evaluation

of economic processes within a complex environment should include the components of economic efficiency, ecological effects and social and cultural compatibility, (Faehser, op.cit.: 43, 45) is a more recent phenomenon.

The creation of a large area of reserved forests in India under the control of the state, supervised and managed by the forest department resulted in the restriction of the customary rights of the forest communities, endangering their very survival. Brandis advocated the reservation in both the economic and ecological interest of the country. He assumed that the best protection and management of forests, in the general public interest, could be ensured only by the state. But the interest of the colonial state, he was forced to recognise, was more economic than ecological or social. As a result the social cost of the reservation of forests in India was borne by a large number of the agricultural and forest communities who suffered great hardships at the hands of forest officials who enforced the restrictions with great severity. The forest officials came to be hated by the peasants and were often the target of attack. Brandis was obviously out of touch with this reality when he wrote that the changes which the efficient protection and regular management of the forests have necessarily introduced into the habits of the people in and near the forests, have been made gradually, and as a rule with due regard to their feelings (Brandis, 18970: 54). A large amount of information is now available on the resistance and revolt of the rural communities against the forest regulations of the time.

Brandis showed rare sensitivity to local conditions and local needs but in general little regard was shown for the existing indigenous knowledge and the empirical methods employed by the people whose lives were closely connected with the forest. Given, however, the nature of the science at the time with its emphasis on theory, such knowledge which might have been of great practical value was unknown or ignored. The silence on the subject suggests that its value was not recognised, much less incorporated into scientific discourse. There was no space for indigenous knowledge and practices for management of the natural environment in the system of forestry as it had developed. As a corollary to this, it also meant that those who were not trained in the principles of forestry science, could not be its practitioners either. Forest management could not be left to the 'ignorant' and the 'apathetic'. But then considering this is largely the attitude prevalent among administrators and scientists today, it is understandable for the nineteenth century. And, undoubtedly, Sir Dietrich Brandis was a sincere administrator and scientist.

NOTES

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many stimulating discussions. Dr Lutz Faehser sensitised me to many issues related to forests and provided valuable insights into German forestry for which I am very grateful to him. However, I alone am responsible for the views expressed in this article.

[1] Richard Grove (1995) argues that the work of earlier scientists, who happened to belong to the medical profession, must not be underrated. Some of the important names that dominated the early debates on environmental protection and forest conservation were Alexander Gibson, Edward Balfour, Hugh Cleghorn, John Stocks and John McClelland. They addressed themselves to the larger problems related to the 'forest problem'. Famine, disease, water supply, climate and forest protection were inextricably linked in their minds. This concern for basic needs far outweighed more short term commercial considerations. By the time of the mutiny, Grove points out, the basic infrastructure of state forest conservation was already established in large parts of the country. The significance of this development, he feels, has perhaps been lost in much recent historical literature.

[2] It may be of interest to note that India was the first forest administration to be brought into force by the British in the Empire, the first outside Europe, and the first to introduce forest management into the tropical forest.

[3] The appointment of Inspector General of Forests was first made in order that the government of India might have an adviser to aid them in laying down the lines of a general forest policy for the country; as well as to organise a department to carry out this policy and manage the forests. The duties of Inspector General were gradually extended. By the end of 1900, he acted as professional adviser to the government of India and local governments, controlled the forest school of Dehra Dun, Forest Surveys and the Working Plans (E.P. Stebbing, *The Forests of India*, Vol. II, John Lane, The Bodley Head Ltd., London, 1923: 495).

[4] Brandis wrote about teak that it may justly be called the most valuable of all timbers. For use in tropical countries it has no equal, and for certain purposes it is preferable to other woods in temperate climates also. Its price is higher than that of any other timber, except perhaps mahogany. Great efforts have been made to find substitutes, but no timber has been brought to market in sufficient quantities combining the many valuable qualities which teak possesses. (D. Brandis, 'Teak', *Encyclopaedia Britannica* Vol xxiii, 1888: 103). He said, 'Teak is among woods what gold is among metals, it is not only exceedingly durable, but it works well, takes a fine polish, does not split or warp, and is neither very hard nor very heavy'. The high price of teak, Brandis pointed out, was due not only to its intrinsic value, but also to its limited area of supply. Burma was the chief source of teak timber for Europe (See D. Brandis, *Suggestions Regarding Forest Administration in British Burma*, Home, Revenue and Agricultural Department Press, Calcutta, 1881: 2).

[5] In 1889, W. Schlich remarked that the iron industry of India was almost non-existent, and that the bulk of iron and steel was imported. As a result, their use was much more restricted than in England, timber being, as a rule, used in their place (W. Schlich, *A Manual of Forestry*, Vol. I, Bradbury, Agnew and Co., London, 1889: 93-94).

[6] W. Schlich, Brandis' successor in India, noted with dismay that efforts were being made by Sir George Birdwood to belittle the great work done by Brandis in India. The purpose was to make out that his friend, the late General Michael, was the real founder of forest management in India. (Letter by W. Schlich to Lady Brandis, dated December 16, 1907, Oxford. Brandis Collection, Institut für Weltforstwirtschaft, Hamburg, Germany).

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