THE BRITISH COLONIAL FOREST POLICY IN SOUTH INDIA, A MALADAPTED POLICY?

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The Controversy

Most of the historical research on the management of natural resources has attempted to assess the degree to which colonial policy has to account for the destruction of the tropical environment. Colonisation is perceived as a period of serious ecological disruption, the consequences of which are neither well-known, nor to any great extent studied. A number of American historians have undertaken to assess the impact on contemporary ecosystems of the integration of colonies into the economic and commercial network of the British and other empires. Over-exploitation of tropical forest resources for the supply of the mother countries and the development of the colonies can perhaps explain, to some extent, contemporary deficiencies and imbalances of now independent countries (1).

My research on colonial forest policy (1800-1947) in the district of North Canara (today part of Karnataka state in South India) attempted to trace the evolution of the colonial forest policy, and to evaluate its social economic and ecological consequences (2). Contrary to common beliefs, the results showed that the forestry was not as ecologically destructive as pictured, but more inadapted and therefore socially and economically disruptive.

While looking at the links between sciences and colonial management of the forest, this paper argues that the question of whether British forestry in India was scientific not only cannot be answered in an absolute way but also is not appropriate. While forestry of a scientific nature does not necessarily entail a balanced management, an unbalanced management by no means implies that forestry is not governed by scientific laws. Science embodies an ensemble of objective knowledge resulting from diverse experiences, whereas forest development is an ensemble of decisions and choices resulting from a combination of factors (economic, political, etc.) which regulate forest activities (felling, sowing, etc.). This distinction, although obvious, is unfortunately not always recognised.

The scientific character of forestry in the nineteenth century is often incorrectly questioned in terms of the gaps in the knowledge existing at that time, which today have



Map I: Location of North Canara District in India

been filled by advances made in contemporary research. The fact that the foresters were for such a long time more concerned with trees than the forest, or with the elements rather than the system, demonstrates a stage of knowledge which has in the meantime been to an extent surpassed, but does not represent an absence of reflection.

Using the district of North Canara as a case study, I shall try to highlight the characteristics of a "rational" management rather than a "scientific" one in the various areas of the forest policy, as well as to identify where they were socially and possibly ecologically inappropriate for the Indian context.

A. THE CONTEXT AND THE JUSTIFICATION

A Favourable Environment

The district of North Canara, facing the Arabian Sea, covers an area of 10,300 km², and is situated at the border of the territory of Goa. The succession of three geographical areas, moving eastwards from the sea to the Deccan plateau, characterised by an elevation in altitude and very high rainfall in the coastal and hilly parts, has favoured the development of a rich flora.

Four different broad vegetation types are found throughout the district:

- evergreen forest type, found mainly in Sirsi, Siddapur and the hilly eastern regions of Honavar, Kumta, Ankola, Karwar taluks;
- semi deciduous forest type, found on the slopes of Ankola, Kumta, Karwar, Honavar, Siddapur, Sirsi taluks;
- deciduous forest type, found in Haliyal, Supa, Mundgod taluks;
- humid deciduous type, scattered through Ankola, Bhatkal, Yellapur, west Karwar, and the coastal region of Kumta taluk.

The Canara forests were rich in teak (*Tectona grandis*), as well as in other species, classified as jungle wood species, such as rosewood (*Dalbergia latifolia*) Nandi, (*Lagerstroemia microcarpa*), various terminalias like Matti (*T. tomentosa*), and Kindal (*T. paniculata*), Honne (*Pterocarpus marsupium*) and Dindal (*Anogeissus latifolia*). The main evergreen species, Hebbalasu (*Artocarpus hirsutus*) and Halasu (Jack tree, *A. integrifolia*), Jambul (*Syzygium cumin*) and the Sago palm (*Cariota urens*), widely used by the local population were commonly found too.

The wealth of the forests on the west coast and, above all, the market value represented by teak, by far the most coveted species, did not escape the notice of the first British to settle in South India (3). But for a long time wood extraction was limited to the forests on the Malabar coast which had easier access and where trees were of "enormous size" (4). Teak was particularly important for shipbuilding. During the first half of the nineteenth century, the main concern of the Revenue and Marine Departments was to secure a continuous teak supply to the Bombay dockyards (5). Later on, teak, along with some jungle woods, (mainly terminalias), was extensively used for the railway sleepers. With the development of the railway network, the pressure on Indian forests including the Canara forests increased (6).

Despite very steep, sometimes inaccessible hills and the proximity of the sea on



Map II: North Canara District

one side and the Plateau on the other, opportunities for extracting wood products relatively easily were provided by major rivers: Kali, Gangavali, Aghnahini and Sharavati.

With rich forest and natural transport facilities, the Canara forests were to become one of the major forestry sources of Southern India.

The Ideology of the Forest Policy

Although there was no forest establishment in its own right before the appointment of Brandis in 1864 as the first Inspector General of Forests, the forest policy began as soon as the first British officers started to extract timber. Right from the beginning, and throughout the colonial period, there was a concern to develop a professional body and legislative structures in support of the implementation of the forest policy. It is not appropriate to describe in detail the various stages of this construction, but the whole enfolding of policy was built on economic concepts favouring higher efficiency, increased control over the people and the resource, and centralisation of power.

In 1805, the Court of Directors of the East India Company in London charged the Bombay government to conduct an inquiry into the teak forests, ascertaining their composition and extent, as well as determining the status of proprietary rights. In 1806, the control of the Canara forests, including the regions of Supa and Sonda, was transferred to the Bombay Presidency (7) (previously under the Madras Presidency's jurisdiction), and, as of 25 April of the same year, all private extraction of wood became an offence punishable by law (8). On 10 November 1806, Captain Watson was appointed as the first Conservator of Forests, responsible for the forests of Malabar and Travancore (9). At that time, the Court of Directors was concerned only about the supply of timber, which it thought possible to procure from forests not held in ownership. Accordingly, the question of intervention in private domains had not as yet arisen (10).

However, demand continued to increase and, when the forests in southern Malabar appeared to show signs of depletion, timber merchants turned to the forests of Canara. Some thought that: "there are good reasons to believe that the timber resources of these forests are adequately abundant to compensate for the insufficient supply from the forests in the south, above all as regards crooked wood which is utilised in the construction of warships, and that these forests hold the greatest promise among all those described in this region of India" (11). Nevertheless, the growth of forest exploitation gave rise to various obstacles and problems, and the need for regulations, restrictions and structures was thus more acutely felt. It gradually became evident that the state could not just allow anybody to extract wood as they wanted. Not only were contractors competing with the state without guaranteeing the supply of the dockyards, but also the State was losing a potential income by not having instituted a tax system. It was therefore necessary to design rules which would organise and regulate the timber extraction (12). Even though the Conservator post was abolished in 1823 (and not reopened until 1847) Navy and Revenue officers remained concerned about the sustainability of material supply as much for economic as for ecological reasons (13). As time went on, two questions were constantly raised:

" how is it possible to control efficiently the destruction of the forest, in absence of clear definitions of use and property rights?" (14).

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"how can one expect to see rules and regulations respected in absence of a forest establishment provided with authority?" (15).

It was important for the State to prepare written rules, which would limit other peoples' rights to the resources, and to develop a strong body of foresters which would be the guarantor of these rules. There was never any investigation into rights and definitions prior to the British colonisation (except for the fact that teak had been a royal monopoly for a long time) and it was clearly assumed that local populations had never followed any restrictive rules and moreover that they were by nature destructive and had to be stopped. The information on Indian private property over forest in the area is very scarce and unclear and it looks rather likely that the state gradually denied rights (16). Oral law is not recognised in a rational society, like Victorian Britain, and even written documents were not always accepted as genuine proofs (17).

The acceptance by the Bombay Presidency of the Indian Forest Act VII of 1878, sealed the dominant ideology of strong centralised powers. Although some officers in the Madras Presidency tried to argue the case of village forests (18) necessary to satisfy local needs, they were not listened to and the implementation of the act was a blow to the freedom of the local communities. The Forest Act divides the forest land into administrative categories to which communities have no or limited access, ascertains the property rights the state over land (supported by the Land Acquisition Act 1870 which allows expropriation), organises and regulates in detail forest exploitation (list of reserved species, fixing of diameter of exploitability, organisation of transport, imposition of taxes, etc.) and controls grazing. Local specific needs were later taken into account in the Kanara Protected Forest Rules (19) but the State did not relinquish an inch of power.

The Growth of the Forest Establishment

In the meantime, the Forest Department was gradually evolving and was winning the fight for control against the Revenue Department.

When the initial legislation appeared in the 1840s, forest personnel were still few in number and their duties were limited to locating full-grown trees ready for felling, along with a few improvement works such as pruning and the removal of dead trees (20). In 1864, as the economic stakes in the forest continued to grow, the Superintendent of the Revenue Department, while guaranteeing profitability, requested that the government double the number of forest personnel so as to ensure a continuous supply to the market and control over theft and black marketing (21).

Concurrently, the subordination of the Forest Department to the Revenue Department redefined the role of the Conservator of Forests. The latter, placed under the local responsibility of the Collector, saw his functions limited to those of an inspector and adviser, leaving to the revenue officers the executive role and fiscal responsibility (22). However, the Conservator assumed a discomfiting position because, as a consequence of the emergence of the new forest policy, the powers of the revenue officers were curtailed. In effect, at a time when the income from one acre of cultivated land amounted to that of several acres of forest, a Collector's competence was measured by the extent of forest land relinquished to agriculture (23).

When, in 1869, Brandis arrived in the Bombay Presidency with the objective of reorganising the Forest Department, he questioned the distribution of work and responsibilities between the two departments, emphasising the fact that the forest properly speaking must be managed by foresters, leaving to the Revenue Department grazing lands and *betta*^{24,25}. By basing the principle of administrative divisions of the forest on manageable blocks, he thus stressed protection as the major task of the forester (24). Parallel to these discussions, the personnel were increased, raising to twenty-seven the number of Indian Forest Service officers for the Presidency in 1883. Their number did not cease to grow, although it appears always to have been insufficient because, as late as 1918, Marjoribanks requested an augmentation of personnel, while stressing the technical incompetence of the forest workforce (25). In a note from 1906, the government announced to its Finance Department the raison d'être of the Forest Department, which consisted of the following points:

- to preserve forest lands from deforestation because of the regulating role which the forest assumed in the functioning of the eco-system;
- to prevent destructive actions of present generations;
- to provide timber, and fuel for the use of the Indian population, more particularly, those residing in the proximity of forests, and to ensure the availability of reserve grazing lands in periods of famine; and
- to administer the forests in such a manner as to increase their value and to generate growth in annual production rates, reducing the general tax burden (26).

Thus, a century of British presence was necessary, including more than half a century of practically uncontrolled forest exploitation, and innumerable debates and discussions as to the need of a forest staff and a forest policy, before the state asserted its support of the Forest Department and defined its functions more broadly, encompassing ecological, social and economic aspects.

The Foresters' Training

In order to compensate for an initial lack of competent personnel at all levels, the state called upon volunteers from other administrative services chosen on the basis of motivation and (where appropriate) prior professional forestry experience (27). At the same time, the question arose as to the type of training required for new foresters in the Indian Forest Service. Although Britain had a notable tradition in scientific study, especially in the field of botany, it was accustomed to managing degraded and artificial forest stands and did not have available a natural environment favourable to forestry studies. In Germany and France, on the other hand, long-standing forest tradition had favoured the concept of forest management, which was until then unknown, or at least not put into practice in England (28). "In no country in the world did the forest question receive so much attention from the state and the people as in France. There, the destruction of the forests and the reforestation of denuded hills were the objects of scientific observation and were scrupulously recorded at all stages of development" (29).

The forest conditions on the continent resembled, from the administrative perspective, those in India: the forests were also divided into private forests, communal and public forests; natural regeneration was commonly widespread, and during their

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education the students "come to realise that it is possible to protect and efficiently manage a non-enclosed forest subjected to the exercise of private rights and privileges, and learn to understand and respect the precepts of detailed working plans" (30).

Contemporary understanding in forest ecology would have shown that the natural conditions of the continental forest are far removed from those of tropical India. It is therefore interesting to note that some administrators and foresters had, at the time under discussion, already sensed that the natural forest could not be managed like a plantation and that a scientific education adapted to Indian conditions was indispensable.

In 1877, in order for colonial foresters to be sent to the town of Nancy to follow a two-year programme at the school founded in that city in 1824, the candidates had to:

- have successfully passed examinations in theoretic selection (a preliminary course lasting eight months);
- be in good health (good eyesight and hearing) and active; and,
- have attained the required level to achieve maximum benefit from the training (31).

Having finally arrived in Bombay or Madras, the forester still had to undergo study in the vernacular language of the region to which he would be posted, while at the same time following a practical course in familiarisation with the vegetal habitat of the region (32).

Later, and until 1926, high-level administrators were trained in England under the direction of former colonial professionals. In 1922, only two Indians had been able to rise to the Indian Forest Service because, until 1913, knowledge of Latin was obligatory for admittance to the Forestry School at Oxford, just as only diplomas in science from British universities were recognised(33). As of 1922, 40% of the posts were reserved for Indians trained at the Dehra Dun Forest School.

The personnel of the Executive Service (subordinated to the Indian Forest Service). were trained in provincial schools, such as at Pune or Dehra Dun. Unfortunately, the training of the ground level staff was most often reduced to experience and knowledge of the terrain, which, although essential gualities, do not always enable a just interpretation of the law. Also, over a long period of time, the civil authorities in the villages, the Patels and Mamlutdars (34), were assigned the work of collecting tax on permits. The lack of competent personnel thus often resulted in the misuse of authority (35). corrupt practices (36) and entailed poor relations with the local people. Moreover, the discrepancies between training, duties and advantages fostered a climate of tension between members of the Indian Forest Service and locally recruited personnel (37). The highest ranking local staff, the Range Forest Officer had no prospect whatsoever of future promotion, and worked both in the field (inspection, felling authorisation, forest operations, etc.), as well as in the office (administration, personnel management, accounts, filing of reports, etc.). This blatant status distinction was one of the major reasons for frustration amongst a category of professionals who assumed a pivotal position between the inhabitants and day-to-day difficulties and an administrative corpus of privileges often far removed from reality.

The Indian Forest Service body had undergone a high standard of forestry training. It can be argued that the teaching of forestry was by contemporary standards "traditional", as the main priority was for it to be economically profitable (and did not involve local communities). The training also did not take enough into account the tropical specificity; silviculture designed for temperate forests was inappropriate for the diversity of Indian flora. But one cannot deny the existence of natural history knowledge, continuously growing during the colonial period, which contributed to the understanding of tropical ecology. The works of foresters like Schlich, Brandis, and Troup remain important and are the proof of systematic research.

B. THE PILLARS OF THE FOREST POLICY

The strengthening of the Forest Department, supported by its continuously growing economic success and the adoption of the Indian Forest Act of 1878, cleared the last hurdles to the imposition of the forest policy. The study of its evolution in the North Canara district supports the argument that the forest policy was based on three major pillars:

- the appropriation or control of the land, through the implementation of the Forest Settlement legalised by the Indian Forest Act, art. 3-13.
- the development of a quasi monopoly of hard timber extraction and the control of trade and markets,
- the preparation and implementation of working Plans.

The Forest Settlement

Although it had already appeared necessary to divide and demarcate the forest into zones or easily identifiable compartments during the initial management efforts at the beginning of the century, it was nevertheless not until after the Act of 1878 that the Forest Settlement became a systematic body with clear objectives and procedures of application precisely defined by law.

Its purpose was twofold (38):

- to assert and define the extent of the State's proprietary rights over forest lands and clearings, as well as over forest produce, as defined in the Act of 1878; and
- to inquire into and record the existence of possible private rights which interfered with those of the State and, subsequently, to negotiate the prerogative of the latter to enable that " the property would be managed in the general interest so as to obtain the best possible yield presently and in the future".

The assertion of State supremacy was a constant recurrence; but, for the foresters, the specification of the scope of their authority was also a priority. While the law accorded the local governments a certain operational margin at the time of the Forest Settlement, the government's responsibility to secure as firmly as possible the property rights of the State was again made clear(39). It was expected that private land rights recognised by the Forest Settlement Officer would be changed or exchanged so as not to impede the course of forest operations.

His functions entailed decisive responsibilities. Even though the officer was subordinate to the Revenue Department, it was he who demarcated the forest lands which were classified according to administrative categories. He was, furthermore, the sole judge as to the validity of private rights, and was responsible for the nature of the

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compensations. He for example chose the tracts of land which were allotted for such privileges as grazing, the extent of which corresponded to the size of the livestock (40). Many decisions were left to his discretion, a fact which, in certain respects, could have enabled the laws to be more suited to the realities of the land, but which also held the possibility of frequent misuse of power. It is therefore easily understandable that the foresters were concerned as to the competency of the officers. When recruiting a Forest Settlement Officer for the demarcation of reserves, even prior to the Act of 1878, the Conservator of Forests requested of the government, "an experienced officer, acquainted with the customs and needs of the local inhabitants as well as with those of the adjacent districts which depend on the forests of Kanara for their provision of timber and bamboo" (41).

Theoretically, a forest was "reserved" when the rights of the involved persons had been established and enumerated. A right, whether that of a private individual or of a group (village), could only be recognised by the Forest Settlement Officer when it had been legally established that this right had been regularly exercised in the past. Once again one enters the meanderings of legislative subtleties in which, quite certainly, only a documented right would be recognised. The rights which could be asserted were of three types (42):

- the right to landed property;
- the right to forest produce, including grazing; and,
- the right of passage or access to waterways.

The laws were immutably fixed and were not open to adaptation to new circumstances such as the prospect of expanding cultivation or increasing livestock. In section 13 of the Act of 1878, it is clearly indicated that a recorded right must specify the number of animals authorised to pasture, in like manner as the quantity of wood or other forest produce to be collected freely each year. The Forest Settlement Officer was also officially concerned with the privileges exercised in the forests which were not based upon rights, and he presented a list to the government, which alone could grant them (43).

The text describing the procedures to be followed at the time of the Forest Settlement not only confirmed the provisions as published in the Act of 1878, but also showed the extent to which it was an essential aspect in the application of forest policy. However, the text stressed the difference between the permanent character of "settlement" and forest management, which was itself modifiable according to the policies of the moment. This apparently clear and innocuous concept showed, in fact, that the Forest Settlement had also been conceived as a means of control and land appropriation, at least theoretically, irrespective of specific ecological characteristics. As a result, the Forest Settlement served two causes, but it is difficult to ascertain whether the appropriation of land or the application of forest policy exerted the greatest influence in the formation of the concept. Even if the two ideas are linked, one must bear in mind that the entire history of the forest and of its inhabitants came into play at the precise moment when the colonisers had decided that no forest policy would be effective without complete control over the land.

The greater part of the Forest Settlement, was accomplished by various officers between 1888 and 1900. The most significant changes did not occur until the 1920s,

as a result of the inadequacies of the first settlement which were expressed by popular discontent. The initial tentative efforts to establish the Forest Settlement contributed to the emergence of a certain number of terms and classifications with unclear definitions (44) until 1897 with the following definitive classification:

- Reserved Forests
- Forest Proper
- Minor Forests
- Protected Forests
- Betta
- Kumri or Hakkal (45).

Simply stated, it can be said that the Forest Proper was closed to the public and that only rights of passage and access to water were tolerated. Minor Forests were zones subject to the exercise of privileges as stipulated in the "Kanara Forest Privileges Rules". However, these forests were not exclusively at the disposal of the inhabitants and could very well be temporarily closed for the sole use of the state.

"Betta" and "kumri" are categories specific to the local situation in the district.

In order to maintain the productivity of the areca-nut and spice gardens under conditions of high rainfall and soils of limited fertility, the areca-nut cultivators, (mostly the Havig Brahmin), procured manure and mulch from the forests in the form of tree branches and decomposable organic matter. The closure of the forest to free access obliged the state to take into consideration the specific needs of the peasants, and an area of forest proportional to the cultivated area, called "*Betta*" was allocated for each garden. The allocation of *Betta* at the time of the Forest Settlement did not proceed without difficulty and gave rise to numerous debates within the concerned administrations concerned.

In 1914 a Conservator named Bell, regretted that "the question of betta has troubled the district for nearly forty years, primarily because of the lack of a consistent policy" (46). It is, in fact, guite arduous to trace the precise evolution of the policy concerning betta. The question was apparently raised for the first time by Colonel Anderson in 1866, as he proposed betta allocations of eight acres for each acre (0.4 ha) of garden (47). A number of officers feared that these betta, portions of forests ceded to agricultural use, would within a very brief period be plundered as a result of peasant covetousness (48). Others thought that the peasant, knowing where his interests lay, would attend with care to his plot (49). MacGregor, another Conservator, also foresaw that in the case where gardens were extended, other betta would have to be allocated, to the extent of the complete disappearance of the reserved forest (50). For a period of three decades, the betta were progressively but insufficiently accorded, as at Yellapur where, " the principles of the laws on betta were not very well understood by the officers themselves", such that this first tentative step had favoured the most powerful peasants and given rise to social discrimination. Allocations throughout the district were unequal in forest guality and area, and allocations of the latter varied from one to another by twice to twelve times as much (51).

Numerous instances of alleged mismanagement of *betta* (52) emanating from the Forest Department, as well as the pronounced discontent among the peasants in the 1890s (53), led the government to reconsider its policy. The first noteworthy measure

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was to finance a report on the cultivation of areca-nut, which was submitted in 1899 by J. Mollisson, who gave his point of view regarding, among other matters, the *betta* areas necessary to maintain one acre of gardens (54). It was subsequently decided that, to satisfy various needs, nine acres of *betta* would be allocated for every acre of arecanut garden, and four acres for each acre of coconut plantation. The error was to allocate the *betta* areas *en bloc*, that is, to demarcate for a given village an area of forest while respecting only the average basic requirements.

Even though the first Forest Settlement Officers had strongly advised against this system, in which they could not perceive how to control management in the absence of veritable responsibilities, it was nevertheless retained, primarily on the basis of economic reasoning, and to preclude further survey costs. A decade was to pass during which the state of the *betta* went from bad to worse under the "*en bloc*" system, before the government revised anew its policy (55). The decision regarding the individual allocation of *betta* land stated that, subsequent to the agreement of the concerned parties, the *betta* were to be recorded and the peasants themselves were to carry out the demarcation, thus avoiding additional expenses which the government would have refused to cover (56). Old *betta* were converted to new, subject to the restrictive lease conditions.

Subsequently, when new concessions were granted to peasants regarding the collection of forest produce, no further change was made with respect to the *betta* areas, thereby restricting any prospective growth of garden areas.

Shifting cultivation, known by the term "kumri" in North Kanara, was sporadically practised across the district and competed in certain places with the economic viability of the forest policy. This practice was over the years alternately prohibited and tolerated in accordance with changing policy decisions. The allocation of fixed plots under regulated utilisation, entered in property records as "kumri" or "Hakkal", belonged to one of the plans to rehabilitate the involved inhabitants.

The final category to be noted is that comprised of "kans", remains of evergreen forests amidst stands of deciduous trees, most often located in ecologically strategic places (hill summits, steep slopes, etc.), where the importance of the regulation of the hydraulic system had been recognised. In certain areas, ecological importance was concomitant with religious disposition. And, although gathering activities were common in such areas, these tracts were protected as sacred forests by the people. In the confusion of the initial years of the Forest Settlement , during which time some wanted the kans to be classified as reserved forests (57), 1874 woods were recorded on the basis of individual rights pertaining to gathering, coffee cultivation (58), pepper cultivation and to the tapping of palm trees (59); whereas elsewhere, even the gathering of honey was prohibited (60). In 1880, the kans were registered as protected forests, and it was not until 1904, when a certain Sheshgirrao Islur decided to extract timber from his kans, that the authorities showed concern as to the status of these forests (61). In 1908, empowered by the "Land Acquisition Act", the State appropriated the kans, which thenceforth were conclusively closed to any private activity other than of a religious nature (62).

With the aid of numerical data found in the village registers, it was possible to assess

the results of the Forest Settlement at the scale of the district. The Forest Proper covers on average more than eighty-five per cent of the forest area in the Supa and Haliyal *taluks*, as well as on the crest of the Ghats. These are, of course, the forest zones richest in terms of commercial value, mainly composed of teak along with a few other species.

The Minor Forests are concentrated in the plains of the coastal *taluks*, in Karwar, Ankola, Kumta, Honavar and Bhatkal, which quite logically correspond to the highest population densities where rice-growing, coconut plantations and the cultivation of sugar cane are dominant.

The *taluks* of Yellapur, Sirsi and Siddapur form the third zone where the forest appears to be divided between Minor Forests and *betta*. The fact that a certain indistinctness distinguishes this zone graphically from the others intimates that the situation there was more complicated and, perhaps, more difficult to regulate. Awareness of the specific character of the social system linked with the cultivation of areca-nut, which we shall consider later, reveals that this specificity was very well represented in the organisation of the Forest Settlement.

The priority in the objectives of the Forest Settlement was the imposition of a legal demarcation of the forest, specifying definitively for generations to come the rights of the State and the duties of the inhabitants, which explains the emphasis on village registers and maps. To this end, the chosen criteria were concerned with the accountancy of the system (areas, commercial values of forest stands, size of livestock, etc.), and were therefore not descriptive of it, which would have provided an idea of the real needs. Although officers were at times interested in such matters as, for example, the type of wood utilised for a specific purpose, pursuits of this nature were never systematic. In order to ensure control over the forests in North Kanara, all administrative effort went into legislating and recording land and collecting numerical data, in the best interests of forest exploitation. The foresters were aware that the dissatisfaction of needs posed a direct threat to the protection of the forest, and it was from this recognition that the "Kanara Forest Privileges Rules" developed towards a more satisfactory acknowledgement of local realities. However, in certain respects, the shortcomings of the settlement exhibit an audacious reckoning in which, somewhat paradoxically, the state, while claiming to take local conditions into consideration, ultimately only conceded the least it possibly could.

An Achieved Objective

At the beginning of the twentieth century, the first objective of the Forest Settlement was achieved: not a single square foot of forest in North Kanara had been overlooked or failed to appear in the records of the administration. In collaboration with the Revenue Department, all (or nearly all) people, animals, tools and the acreage of cultivated land figured in the registers. Each forest was categorised and plants had acquired a new status, relative to their economic importance; some species appeared on the so-called "reserved" list, while others became "minor produce", some of which were nevertheless still reserved.

The Forest Settlement, because it permanently specified the framework of a forest

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administration in the service of State control and in the interests of the colonial machinery, changed entirely the environment of the population who, because of their limited technical development and restricted capital and the prevailing social level, had only minimal possibilities of adaptation or change.

The Control of the Forest Economy

As has already been mentioned, the importance of securing the continuous flow of raw material, first for the dockyards, then for the railways, had been a major factor influencing the shape of the forest policy.

The reserved forests comprised the economically most valuable stands and received the particular attention of the administrators. Access to them was often entirely prohibited to the local population by the Indian Forest Act. Every time a new administrative division was required, it was to be publicly announced in the official gazette (sect. 4), and the population informed as to the consequences of the measure and accorded a time limit of three months to submit possible complaints (sect. 7). The rights recognised by the officer were to be recorded in a register and could not be further modified (sect. 13). All prohibitions were enunciated in section 25, together with the corresponding penalties in case of violation. The remainder of the forests, whether under government ownership or not, could at any time be declared as "reserved" (sect. 28).

Moreover, according to the prevailing market situation and the requirements of forest operations, such rights of usage as had been recognised at the time of survey could be momentarily waived (sect. 29). Sections 35 to 38 of chapter VI defined the extent of state control over those forests which did not belong to it. Thus, in a private forest, grazing could be prohibited, just as the Land Acquisition Act of 1870 allowed for immediate expropriation so as to safeguard public interest (sect. 37).

Chapters VII to IX refer to the regulation of the extraction of forest produce. It should be noted that in the preliminaries to chapter I an exhaustive definition of the concept of "forest produce" is given. Encompassing all produce designated as "minor", all plants and all minerals on or beneath the ground, the term extended to the least significant tree leaf.

All forest produce was taxed to the profit of the State which controlled all roads and forest drives. The trees to be felled had to be marked and the woodcutters provided with felling and transport passes. The route to be taken with the load was stipulated beforehand and could only be changed under pain of prosecution (sect. 41-44). The Forest Department could set the norms of transport means, mainly at the time of floating; it could decide upon the size of the timber float and the transport price (sect. 51). The logs run aground or adrift were to be confiscated (sect. 45). Subsequent to official notification of the distraint, (legal seizure of goods to enforce payment), the owner could claim his wood, presenting satisfactory proof that the produce exactly corresponded to the description which had been made thereof by the foresters. However, the officer in charge was the sole judge as to the good faith of the applicant, and could therefore refuse to return the produce (sect. 46 to 48).

Chapter X prescribes penalties and judicial procedures. In the case of fraud, the officer could confiscate the merchandise and tools, in addition to a fine to be paid or

imprisonment, which could be extended to as long as six months (sect. 52-54), and the forest produce became the property of the state. The straying of domestic animals in a reserved or temporarily closed forest was an offence punishable by fine, the amount of which decreased from elephants to goats (sect. 70). Foresters were vested by the local government with the authority to enter and demarcate private property, as well as with juridical powers, including the authority to issue arrest warrants and to conduct inquiries in the case of violations (sect. 71 and 72).

On the other hand, contrary to the first forest laws in force at the beginning of the century, the foresters were not subject to any juridical proceedings as long as their good faith was proved (sect. 73)! These powers could, in certain circumstances, be modified by local decision (sect. 75).

Any person working in the forest on his own account, or in the employment of another, as well as any inhabitant of a village located in or within proximity of a forest was obliged to provide information to the officer during the course of inquiry, to collaborate in the repression of fraud and assist in the prevention and combat of fires (sect. 78).

The collection of Minor Forest Products was allowed only for domestic consumption and the trade of any of this produce by local people was banned.

In 1865, when the forest policy had taken a more clearly defined form, the system of state-controlled exploitation (*departmental system*), which conferred on the Forest Department the practical responsibility of exploitation, appeared to be the most efficient, the most profitable for the State, as well as the best safeguard against destructive exploitation (63). With the implementation of the Act of 1878, controlled exploitation developed more and more, and state control over the forest economy was secured. For the Conservator, the benefits of the system were evident when he declared that, "the system of state control protects the poor people of the Ghats, assures our security (i.e., that of the Department) from year to year without our having to concern ourselves with rights, and in addition guarantees us the power to carry out the policy of conservation and improvement along the slopes and on the crest of the Ghats" (64).

In effect, with this system, the Forest Department reserved its coupes for itself, allocated to itself the greater part of the harvests in terms of volume and value and determined the clauses of contracts and the amount of taxes to be paid by the few private contractors. The Forest Department, which managed the depots through which all logs necessarily passed and which organised auctions twice yearly, thus centralised the produce, controlled the market and prevented competition. While the State in this manner eliminated the greed and destructive practices of private enterprise, it also opened up employment opportunities for the local workforce. According to the foresters, this system would have liberated the *wuddars*, who were formerly subcontracted by *soucars*, that is large contractors (65). This system also extended to the collection of certain Minor Forest Products, such as the myrobalans (fruit of the *Terminalia chebula*), thus employing from November to May men, women and children who were assured a daily wage, while increasing threefold the revenues of the Department under the heading Minor Forest Products (66). But one can easily suspect that the Department may have had an interest in controlling a pool of a cheap labour force.

The analysis of the budget series of the Forest Department shows not only that teak

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and (later on) Terminalias were the major species exploited, but also that the state was the contractor for the extraction of these species. A comparative calculation of prices of wood extracted by the state and the private contractor shows that on average, one cubic metre of wood extracted by the State cost 10 times more than the same unit extracted by a private logger (67).

The Working Plans

It has been seen that British forestry in India stood in direct line with an essentially German continental tradition, which itself was based on knowledge acquired since the end of the eighteenth century. It was then that administration and foresters, alarmed by a dramatic impoverishment of forests which ieopardised future supplies and motivated by the development in methods of quantification, Kameralwissenschaften, altered their approach to the use of the forest environment (68). Collecting the greatest amount of quantitative data on trees and forests by developing methods of measuring and evaluating size, volume, etc., written accounts of forest stands were compiled so as to provide objective information prior to working the forest. The first handbooks on forest economy appeared in the 1760s and forestry was elevated to the rank of a science at the university (69). Results of field studies were compiled in tables of measurements and calculations, organising trees according to different categories and serving as an abacus for foresters in their silvicultural work. The categorisation of trees into types also dates from this period, as well as controlled sample plots and classes of height and diameter, all of which were concepts regularly included in forest surveys (70). From these data annual growths and quantities, theoretically exploitable without detriment to the permanence of the stands, were deduced. The fact that the German foresters of the eighteenth century had neglected to take the constraints of the environment into account when working out their tables of projected yields is certainly regrettable, but denotes more a lack of knowledge, than an unscientific approach.

A direct heir to this tradition, and himself German, Brandis, as a young forester in Burma, was the first to begin to gather systematic information on trees (height, class of diameter, frequency of species, etc.) on a given plot. The objective was to evaluate the annual growth of a stand and to extract therefrom each year without jeopardising the future of the forest.

Brandis' work was followed by that of Dr. Schlich, who viewed in the Working Plan a form of protection for the basic elements of a sound economy, which "should measure the production and adjust the working of a forest in a manner most advantageous for the proprietor" (71). He also emphasised that, according to circumstances, "interests" varied between the protection of the environment and economic profitability (72).

The Working Plans of North Canara used for this study were written between 1890 and 1945 and provide a rich source of information on the technical aspects of the forest policy (73). They seem to have been prepared to fulfil the major following objectives: 1) satisfy the economic demand, by directing timber production towards the export of

- hardwood species outside the district or the country. The Forest Department had to:
 - provide the railway (SMRC) with firewood;

- satisfy the demands of private persons and traders after fulfilment of the commitments vis-à-vis the railway; and,
- ensure the exercise of privileges as accorded by the "Kanara Privileges Rules" (74).

The construction of the railway network exerted a strong pressure on the forest, and undertakings of an economic nature were viewed as priorities.

In nineteen of the Working Plans studied, production of "timber" and "teak" were explicit objectives of the plans, while in seven others, "improvement of stands" had, in effect, the same goal. Increased revenue is mentioned in four instances, twice having been the sole objective. We have already referred to the historical importance of teak which, initially reserved for shipbuilding, was subsequently very much used for railway sleepers.

- 2) satisfy the local needs (which were nowhere identified or quantitatively estimated) most often limited to firewood and poles. Out of the ten plans pertaining to the production of firewood and Minor Forest Products, only three confined the trade of such produce to the district. Produce extracted for "the satisfaction of local needs" was, in fact, destined for the local market, sold and commercialised by the Forest Department. Other areas of the forest were temporarily opened for private and free collection. Zones within the provision of the Working Plans were also sometimes open to stock breeding.
- 3) to control stands, which is implicit to any Working Plan, is mentioned twelve times, either as "better management" or "improvement of stands". Generally speaking, the improvements were such as to enable better control of the zone (fire control, stock breeding management, etc.), greater efficiency of extraction (techniques, communication routes, etc.) and the application of silvicultural methods (artificial and natural regeneration, weeding, etc.).

The achievement of these objectives reflects the control of the trade and the markets imposed by the Forest Department. It was evidently more promising from the economic point of view to sell teak in Bombay, than to sell logs for the price received on the local market. The lack of concern exhibited in the Working Plans as regards the organisation of the production of Minor Forest Products (honey, spices, tannin, medicinal plants, etc.) indicates that the state, which reserved for itself the greater part of the profits from the exploitation of wood, made no effort whatsoever to organise or encourage a local economy around Minor Forest Products (and, as will be seen later, often even prevented its development). One is thus led to ask if the state had justly considered both local and general interests

The Working Plans designed the strategy to achieve these economic targets:

 to concentrate geographically the forest operation to certain zones while other zones were entirely neglected by the foresters. Quite naturally, profiting from easy access roads and low-cost means of transport, the Working Plans initially followed the openings offered by the valleys of the Kali, Gangavali, Aghnasini and Sharasvati Rivers. Similarly, the heading "depot", shows that these were concentrated, if not at the mouths, at least near the rivers (Kodibag, Karwar, Kadra, Kasarkod, Hattikeri,

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Honavar and Bhatkal), or else immediately besides the extraction sites in the mountains (Haliyal, Dandeli, Kirwatti, Londa and Castle Rock). Protected by steep slopes, the absence of communication routes and prohibitive extraction costs, the forests on the crest of the Ghats were spared, while the foresters were particularly interested in the upper zone, which was drier than Haliyal and Mundgod. These very easily accessible forests were rich in deciduous species valued on the market. Teak (*Tectona grandis*), rosewood (*Dalbergia sisso*), the terminalias (*Terminalia tomentosa* and *paniculata*), hone (*Pterocarpus marsupium*) and dindal (*Anogeissus latifolia*), commonly grouped under the term junglewood, are the main species classed under the heading "dominant species" in thirty-three of the thirty-seven Working Plans. Compared with the floristic abundance of forests in the Ghats, the range of species in demand was limited. To a certain extent, confining interest to only a few species could have limited the effects of abusive exploitation; however, as will be seen subsequently, the silvicultural methods chosen to favour these species were, in fact, detrimental to others.

2) to choose the most appropriate methods of silviculture.

The selection system, where the forester chooses to distribute felling and regeneration operations throughout the entire forest and to concentrate on small groups of trees, was retained in nineteen Working Plans. Selection systems provide, among other things, a flexible method adapted to stands diversified in the botanical sense, allowing for a progressive improvement of the timber stock by selection of individual trees and offering a diversified habitat for fauna. On the other hand, the working of such plots requires a greater technical proficiency and the costs of an exploitation which is distributed over a larger area are higher (75).

The coppice system takes advantage of the capacity of certain species (including teak) to throw out new shoots from the stump after felling. If shoots are thinned to favour the better stems, the system can be used to produce poles. The trees are thereby of the same age and are more frequently felled. The coppice with standard system combines trees of the same age, in the coppice, with an irregular selection forest resulting from stump-shoots spared during successive rotations (76). This method allows for a diversification of production (firewood, charcoal, poles, etc.) and income from the rotations is more frequent. The efficiency of the method depends on the length of the rotations. The new growth of copse-wood exerts a greater pressure on the soil, and overly frequent felling leads to its impoverishment. Operations are also more costly in terms of labour and mechanisation is difficult. Improvement felling is a silvicultural operation intended to eliminate individual trees or unwanted species by felling or poisoning in order to encourage the development of a few desired species. This method enables a gradual modification of the floristic composition.

Clear cutting, which consists of the felling of all trees in a given plot so as to develop an artificial regeneration (usually single-species, but not necessarily), although known to be ecologically disastrous on steep slopes, is economically attractive. However, not only does the elimination of all species followed by the artificial regeneration of a few targeted species (very often, only one) have traumatic effects on the environment, but quite frequently the soil, laid bare and exposed alternatively to strong solar radiation and torrential rains, is subjected to extensive erosion. Technically, this method permits a better control of the growth of new stands and allows mechanised exploitation. This operation, which was first implemented in Casuarina plantations (77), tended to be increasingly utilised during the 1920s (eight out of sixteen prescriptions) to transform selection forests to even-aged forests.

The analysis of the different silvicultural choices and the diachronic evolution from one Working Plan to another on a given plot shows the transition from a moderate silvicultural approach based on moderate interventions and with limited ecological consequences, characterised by the selection system, to a continual tightening of control and increased anthropic pressure of management, of which clear felling was the ultimate stage.

Until roughly 1916, the selection system and the coppice (simple or with standards) were the only methods employed, and the selection system was combined in twelve cases with natural regeneration (there were six cases of artificial regeneration). Clear felling was until then restricted to Casuarina plantations. In 1922, clear felling for the first time supplanted the selection system (78), as well as in 1925, 1927, 1932, 1937, 1945 (79). At the same time, natural regeneration was largely abandoned in favour of artificial regeneration (twelve cases of artificial regeneration, of which six were combined with direct sowing and only one case of natural regeneration).

An improved mastery of artificial regeneration methods for teak and an increasing growth in the demand for timber, linked with the chronic problem of labour shortage, no doubt explains the interest given to more efficient techniques.

3) to plan the felling rotations. Subsequent to a forest survey conducted on a sample plot chosen to represent the zone, the forester drew up tables which listed the number of trees of the species in demand, having classed them on the basis of diameter. The exploitable diameter, which could vary appreciably from species to species, was fixed for teak, at twenty-two to twenty-four inches. The forester calculated the number of years necessary for a tree to pass from a given class to exploitability. As the sampling gave the percentage of trees which failed to reach the required size, it sufficed to divide the number of trees having attained the exploitable diameter by the number of years necessary for a tree of lesser size to grow into that class, in order to obtain the number of stems available per year. On the basis of such an approach, management was not concerned with the surface of forest, but with the number of stems exploitable each year. Several indications reveal that the foresters' choice was dictated by economic considerations.

Because teak was, at the outset, the only species valued on the market, the tables with classes of diameter, as well as the organisation of felling cycles were only concerned with that species. Notwithstanding the fact that teak represented sometimes only ten per cent of all species, these stands were classified as "teak stands". The other species were therefore ignored in the plans, even though they were exploited during teak felling. Gradually, with the increasing diversification of the market, the Working Plans began to take note of a few new secondary species, but it was only in the 1930s that the

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Working Plans systematically integrated these species into the estimates. For two or three decades, terminalias were exploited without their growth characteristics having really been known.

During the initial period of the Working Plans, the foresters made regular measurements of the control trees (primarily teak) so as to learn the details of growth, in particular the number of years required to move from one diameter class to the next.

The number of exploitable trees was evaluated each year on the basis of diameter. The permissible diameter would be the greatest size attained by a tree at the age of maximum mean annual volume increment. According to the Working Plans, the exploitable size, which was more or less the same throughout the zone, was fixed at a circumference of between six and seven feet. Slight variations were due to local environmental conditions, or resulted from a specific market demand. In general, these figures varied only a little from the initial plan to its revision. There was only one note-worthy exception, in 1939, in the forest at Soppinhosalli where the diameters were reduced "so as to render the coupes more economical" (80). The new diameters for teak were fixed at twenty-one inches rather than twenty-five inches in 1910, at nine-teen inches in place of twenty-seven inches for the terminalias and at seventeen inches rather than twenty-one inches for other species. Here again, it appears that the limit of exploitability was determined not by objective botanical considerations, but in response to needs of the market. In other words, trees had to be of sufficient size to produce wood convertible into cash at the best possible profits (81).

It is unfortunate that so little information is available concerning extraction techniques and their impact. The low degree of mechanisation would have limited wastage and environmental disturbances for a number of years; however, as several reports admit, the techniques were destructive (82). During extraction works, it was necessary to open exploitation paths and roads, and the contractors sometimes even installed a mobile sawmill or a temporary camp for the loggers. None of these aspects are mentioned.

Conclusion

Of interest today for both historians and foresters is to determine whether the colonial forest policy was ecologically and socially viable. Were the organisation of the Forest Settlement, the centralised forest economy and the design of the Working Plans adapted to the local situations and needs?

Theoretically, the allocation of lands was not a matter of chance, but followed established rules. In an extensively documented report on the gardens, J. Mollisson, Director of Agriculture, noted that it was "because the majority of officers considered that nine betta acres were sufficient to provide for the needs of one acre of garden, that this ratio was retained" (83). The Department of Agriculture had acquired an arecanut garden for the purpose of experimental studies; but, in 1904, the research had not yet begun (84). For stock breeding, two or three acres of pasture per head of cattle were allocated. As there is no indication whatsoever concerning the quantitative requirements for the maintenance of the gardens, the needs of livestock or the quality of the pasture lands and their potential, the figures have limited scientific value. Nor are there appraisals of social needs in fuel wood or other forest produce. Some attempt has

nevertheless been made to ascertain at random if these ratios were indeed respected in practice. A statistical analysis of the data for the *taluks* of Sirsi and Yellapur reveals a good correlation between the areas of gardens and those accorded as *betta*. It was also attempted to determine if there was a correlation between population and areas allocated for the Minor Forests, but the results obtained for the case of Yellapur were inconclusive. The lack of clear correlation between needs and area allocated might be explained by a variety of factors:

- No information is available regarding the quality of the forest stands allocated as Minor Forests; and, as the productivity of the plots is dependent upon the quality, the Forest Settlement Officer possibly took this into consideration when the plots were allocated (85). This would explain the great variability in area.
- 2) The numerical data required for a systematic analysis are lacking; in fact, the aggregate figures of human and animal populations per village for different years of the settlement are not available. We have whenever possible considered the figures nearest the year of settlement. Although this approximation might be questionable, the population differences on the village level must have been relatively small, except perhaps the animal populations which, affected by famines, could have varied significantly. It was, moreover, for this reason that the Forest Settlement Officer was counselled to increase, in certain cases, the theoretic needs in pasture lands so as to satisfy future demand (86).
- 3) Because the villages were grouped together and Minor Forests were allocated to each group, a calculation according to village would be of little meaning. Furthermore, a theoretic suitability for the population of a village-group does not necessarily signify a real adequacy. Take, for instance, the case of a village situated on the edge of a Minor forest belonging to another group which is supposed to collect its firewood or graze its livestock at a distance of more than ten kilometres in another Minor Forest. The villagers quite obviously sought to provide themselves as near as possible and at the least cost, at the risk of transgressing laws and evading plans.
- It should also be remembered that some parts of the Minor Forests could be temporarily closed to the public, which renders any precise evaluation more difficult.

Notwithstanding an evident concern to take agricultural needs into account, the settlement presents a certain number of shortcomings. Despite the enormous quantity of statistical series and reports, it was not possible to clearly determine *a posteriori* if the Forest Settlement was agriculturally viable. The inability to answer these questions is perhaps in part due to the fact that the criteria considered at that time were not the same as those which today are held to be essential for the understanding of a given situation.

As for the forest exploitation itself, little is ultimately known about what really took place and one cannot answer with certainty whether the economic management was compatible with a sound ecological management. Several administrative reports of the Forest Department make allusion to "exceptional" and destructive "war felling"; however, because there are no details as to location, one can only refer to the correspon-

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ding Working Plan. Considering the difficulty of the terrain, the lack of communication and the relative absence of high-performance machines, the context would allow one to infer that the damage was, in fact, comparatively limited.

On the other hand, the increased frequency of complete clearing after the 1930s would indicate an intensification of the pressure on the environment which was scarcely compatible with the notion of sustained management.

There is strong evidence from contemporary administrative reports and newspapers highlighting the unpopularity of the forest policy and the social resistance it inspired. Clearly, the combination of an authoritarian centralised administrative approach, the depossession of the land, the restriction of use and access to the resources, the imposition of written rules denying the oral customs, the prohibition of local trade in forest produce, the increases in taxation, and the prohibition of professional cattle raising and of shifting cultivation, could have only negative social and later on, ecological impacts. The remaining areas open to public use became overexploited and the sense of greed enhanced by the fact that what was not taken today might not be available tomorrow. This encouraged mismanagement, or at least discouraged a sense of communal management.

In the competition to use and manage the forest land and its wealth, the State won to the detriment of choked farming communities. The State then, inspired mistrust and later on corruption.

It is not so relevant to find out whether the forest policy was scientific, and where it took its roots. Modern concepts such as sustainability or biodiversity, even now remain to be clearly defined. Forest policy has to be looked at in the perspective of colonial history and in the same way that colonisation destroyed subsistence farming systems it also destroyed traditional ways of managing the forests.

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CHRONOLOGY

- 1799 Fall of Tipu Sultan North Kanara is placed under the administrative supervision of the Madras Presidency.
- 1806 The forests of North Kanara are supervised by the Bombay Presidency. Captain Watson, first appointed Conservator, is placed in charge of the forests of Malabar and Travancore.
- 1815 Publication of the first texts of forest legislation.
- 1823 Abolition of the post of Conservator.
- 1840 First teak plantation in the Karwar taluk.
- 1846 Report by Dr. Gibson on the state of the forests in Kanara.
- 1848 First restrictions on shifting cultivation.
- 1855 Lord Dalhousie Minute on the importance of forests.
- 1856 D.Brandis is appointed in Burma.
- 1862 North Kanara is included in the Bombay Presidency. Beginning of forest administration in India.
- 1864 D. Brandis is appointed Inspector General of Forest.
- 1865 Indian Forest Act of 1865.
- 1870 Land Acquistion Act.
- 1871 Cattle Trespassing Act.
- 1878 Indian Forest Act of 1878.
- 1892 Inception of the Forest Settlement.
- 1894 Government of India circular on forest policy.
- 1898 First Working Plan.
- 1901 Kanara Forest Protected Rules.
- 1921 Beginning of resettlement.

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ORSTOM Éditions

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