THE
MADRAS FORESTS

COMPILED IN THE
WORKING PLANS CIRCLE
MADRAS FOREST
DEPARTMENT

MADRAS
PRINTED BY THE SUPERINTENDENT
GOVERNMENT PRESS
1939

INTRODUCTION

PROPAGANDA is an ugly word, and the idea of it is distasteful to most of us. Yet in a pamphlet of this kind, which aims at giving in the briefest outline an idea of the activities, aims and problems of forest administration in Madras, it is hard to avoid a flavour of it. If this is there the reader is asked to be indulgent.

The writer wishes to acknowledge his indebtedness to Mr. Ford Robertson whose book on the forests of the United Provinces had much to do with the origin of this pamphlet.

W. G. DYSON.

THE MADRAS FORESTS

Chapter I.—The History of the Madras Forests.

There are people still living in the forests of Madras (as early man lived everywhere) who are as dependent upon the jungle as the beasts of the field themselves. They grow no crops; the forest supplies all their simple wants of food and shelter. With the precarious life they lead their numbers remain small. They can live indefinitely in equilibrium with the forest.

But with the advent of the first primitive form of cultivation an agency of destruction came into being which has brought about a worldwide devastation of forests. This is the practice of shifting cultivation known variously in Madras as podu, kumri, ponam or thakkal. A piece of virgin forest is felled and burnt, and on the rich forest soil, made richer by the burn, the cultivator raises a heavy crop with a minimum of effort. With luck, a second crop follows, less productive than the first. By the time that has been harvested the soil has lost its fertility. Often, indeed, most of the soil itself has been lost, washed away by rain from the exposed hill sides. So a fresh piece of forest is felled and treated in the same way, and every year or two the process is repeated. On the impoverished soil of the abandoned clearings a secondary growth appears, far inferior to the virgin forest; and after a lapse of time, perhaps twenty years, the soil has been restored sufficiently to tempt the cultivator to make a second clearing of the area. This time his crop is poorer and so is the regrowth that appears, for more soil has been exhausted or lost. And so the process goes on until denudation reaches a point at which an attempt at further cultivation is not worth the trouble.

When this stage is reached on all the easily accessible land the cultivator is forced to turn his attention to settled cultivation in the plains and valleys. This means a great social advance. It also means a new burden on the degraded forests left over from the era of shifting cultivation. The shifting cultivator needs few cattle. He does not plough, for surface scratching is all the forest soil needs to give him his crop; and he does not manure his clearing, for he moves on to fresh fields when the fertility of his *podu* patch begins to fail. But in the settled life of villages with permanent cultivation needing cattle for work and manure, as well as for milk and other dairy produce, herds multiply amazingly. Every village

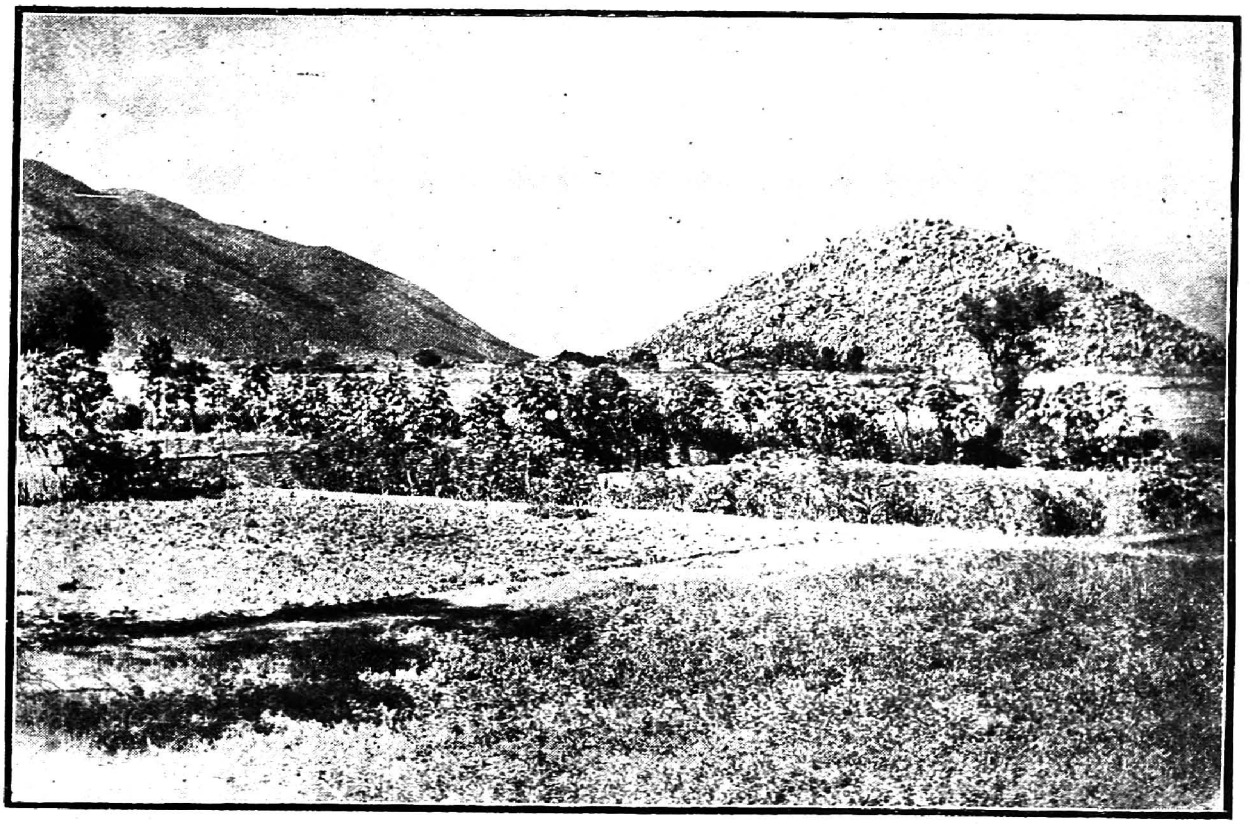
within reach sends its scores or hundreds of promiscuously-bred " scrub " cattle, nearly all useless for anything but the production of manure, to graze daily in the forest.

An overgrazed forest can only degenerate. On level ground the tread of cattle hardens the surface to the semblance of a beaten track on which no seedling can get a footing. On slopes the soil is disturbed, to be washed downhill by rain. Tender seedlings are eaten with the grass, or are sought out deliberately if grass is scarce, so that no young trees grow up to replace the old ones when they die. If goats graze too the situation becomes ten times worse, for they are browsers. Forests and goats *cannot* live together.

Madras can show very good instances of all these stages of forest destruction accompanying the advance of civilization. Little clans of Kadirs, Shola-naickens, Kurumbers and others still live in the heavy forests of the Western Ghats just as they did before agriculture was thought of. Shifting cultivation has been stopped or brought under control in nearly all Government forests, but in the " Agencies," in private forest in Malabar and elsewhere, on the " Badaga lands " of the Nilgiris, and (in a modified form) in South Kanara it still survives, with the usual disastrous results. Over the greater part of the rest of the Presidency these agencies of destruction have obliterated the forest altogether, or have reduced it to a poor scrub.

The long peace of the nineteenth century with its increase in population and the increased demands of a more complex civilization bore heavily on the forests all over India. In Madras local shortages made themselves felt quite early in the century. Difficulties encountered in meeting the demands of the Bombay Dockyards for teak led Mr. Conolly, the Collector of Malabar, to begin the teak plantations of Nilambur in the early forties. This earliest beginning of systematic forest management in India is also one of the most successful. Though teak lost its supreme importance in ship building long before Mr. Conolly's plantations came into bearing, the work has gone from strength to strength, and to-day the Nilambur plantations, still rapidly expanding, are among the most productive and valuable forest properties of their size in the world.

The period of railway construction was another time of heavy inroads upon the forests. By the early sixties serious anxiety regarding the dwindling forest resources in many parts of India caused the Government to undertake a general enquiry which resulted in the modest beginnings of the Indian Forest Service.



Photograph by H. G. Champion.

THE FINAL STAGE.

Complete denudation of the hill on the right which is surrounded by village lands. On the left the hills still carry enough vegetation to preserve the soil from erosion—Vellore Division.

Chapter II.—The Work of the Forest Department.

Forest Settlement.

The Madras Forest Act became law in 1882. From then until the early years of the twentieth century the main preoccupation of the department was the examination, often amounting to exploration, of blocks of forest for reservation, the fixing and demarcation of their boundaries and the settlement of claims.

No one would suggest that a country should be clothed with forest from end to end. *Every* country denuded beyond a certain point has found bitter cause to mourn the loss of its forests. Where then lies the happy mean? Experts have put it at 20 per cent of a country's total area, but the figure must obviously vary vastly with circumstances. For comparison with Madras the forest areas of other provinces are Burma 67 per cent, Assam 38 per cent, the Central Provinces 20 per cent, Bengal 14 per cent, Bombay 12 per cent and the United Provinces 5 per cent.

Those responsible for the Forest Settlement of Madras were able to set apart as reserved forest an area equal to about one-eighth (12 per cent) of the Presidency. There are, of course, other lands under forest, of a sort. There are the ordinary " unreserves " (Government waste lands) fast disappearing under expanding cultivation and degenerating through over-grazing, and privately owned forest land in Malabar and elsewhere. Practically none of the private forests is under any form of management other than a ruthless exploitation of anything worth having. Neither of these classes of land can be regarded as a permanent forest asset to the country, and of the 12 per cent of Madras which has been set apart as a permanent forest estate a large proportion is the poor scrub jungle of the drier districts. It will be conceded that Madras has not, at all events, *too much* land under forest, and that it is an urgent duty of the administration to preserve, protect and improve what it has.

Forest Protection.

A very large part of a forest officer's time is taken up in protecting his forests against the various dangers which threaten their existence. Of these dangers, damage and abuse by man, direct or indirect, is by far the most acute.

Deliberate theft for profit is the least of his troubles. It is the sum total of innumerable petty offences, each trifling in itself, that causes the most serious direct damage—offences such as the pilfering of small timber, fuel and bamboos, and loppings for cattle fodder and green manure.

Indirect damage by man is a still more serious problem. It works through two agencies, fire and grazing. The two are inter-connected, for by far the most common cause of forest fires is the burning of dry grass by graziers to get a flush of fresh green grass early in the season; and it is precisely at this time, when early showers have loosened the exposed and almost bare soil on the burnt areas, that grazing is most harmful.

It is an obvious duty of the Forest Department to the public to arrange for a legitimate means of meeting local needs for forest produce wherever this can be done without violating the principles of forestry. The department is alive to its obligations in this respect and does its best to meet them. Quite apart from the moral obligation, it looks upon the arrangement of localized fellings, where exploitation can be controlled and supervised, and where the regeneration of the forest can be cared for, as the most effective means of protecting the forest as a whole against indiscriminate misuse. In the matter of lopping for leaf manure, and more especially as regards grazing, it is often necessary, for the present, to reach a compromise between the real needs of conservancy and questions of expediency.

Fire protection remains largely an unsolved problem. Limited areas can be, and are, successfully protected by a system of fire-lines and patrols. But in the huge forest blocks of the drier districts, the sea of tall grass and the long intense hot weather combine to make even the broadest fire lines of doubtful efficacy; and even if effective the cost of an adequate net-work of lines would be more than the department can afford. Recognizing the failure in such places of the old-fashioned measures of protection a system of " controlled " or " early " burning was in vogue for some years, and still persists in a modified form in some divisions. Its underlying idea is that a fire set purposely under departmental control early in the season when the grass is just dry enough to burn slowly is, compared with a late accidental or wilfully set conflagration, the lesser evil. This method was given a determined trial over a number of years. It is now out of favour : the practical difficulty of carrying it out in the ideal way is great, perhaps insuperable. In forests of this class there is little doubt that the ultimate solution of the fire problem depends upon the spread of education and the development of a sense of civic responsibility in forest matters.

Other aspects of forest protection are mainly of professional interest and need scarcely be mentioned here. They concern natural dangers such as wind and drought, animal enemies (porcupine, pig, deer, bison and elephants), insect pests and plant diseases.

Forest Management.

The last section tries to give an idea of some of the problems the Forest department encounters in the mere protection of the property entrusted to its care. But the management of a property does not end with its protection : it must be developed, used, and improved.

A fundamental principle of management is that a forest should be worked up to, but not beyond its " possibility " and that in doing so its productivity should in no way be impaired. In other words it should be worked for the maximum *sustained* yield. The capital represented by the standing forest and the soil it grows on, must not be encroached upon either by felling too much, or by felling in such a way as to endanger the soil's fertility. Only the " interest " (the annual increment in growth) is harvested each year. By observation, stock-mapping, enumeration and measurement, and by a consideration and analysis of all the facts available, the maximum permissible cut and the manner in which it can best be made, *without endangering the forest capital*, are determined. The urgent importance of avoiding overfelling and a reckless exposure of the soil is one reason why forest management may sometimes seem conservative and cautious to excess. A mistake in farming is usually not long in making itself evident, and at some expense it can usually be remedied; but in forestry a mistake in management may not become manifest for a generation, and the damage once done is often irreparable.

All these matters are considered and dealt with in the " Working Plan," a scheme governing the activities of a forest area (usually a district) for a ten-year period. The Working Plan discusses and lays down the object of management of the forest as a whole, or of its constituent parts; whether flood-control, timber production, sandalwood, bamboos or grazing should take priority. It lays down the quantities that may be removed, where they may be cut, where and how new crops are to be grown, and where thinning or other tending operations are to be done. It deals with problems of protection, provides for the exercise of rights and privileges, and (as far as it can) for the regulation of grazing. It also makes recommendations on such matters as roads and buildings, staff and the marketing of produce.

On the District Forest Officer, besides the general protection of his forests and administration of his division, falls the duty of giving effect to the provisions of the working plan. He arranges the marking, felling and extraction, and sale of timber, the working of fuel and bamboo coupes, the collection of minor forest produce, the control of grazing, the maintenance of roads and buildings and the construction of new ones. In the

chief timber districts he captures and trains elephants for work, and is responsible for the care and management of a number of working elephants. Not least among his duties is the protection of game.

A forest division usually has four or five ranges, each under a trained non-gazetted officer (Ranger), and each range is divided into a number of forest guards' beats. A beat is usually some ten square miles in extent. Each ranger has one or two, or sometimes several foresters to help him with special works. Foresters and forest guards are untrained men. Rangers are trained at the Madras Forest College at Coimbatore. Divisions are grouped into circles under Conservators. There are special branches under gazetted officers dealing with research, utilization and engineering.

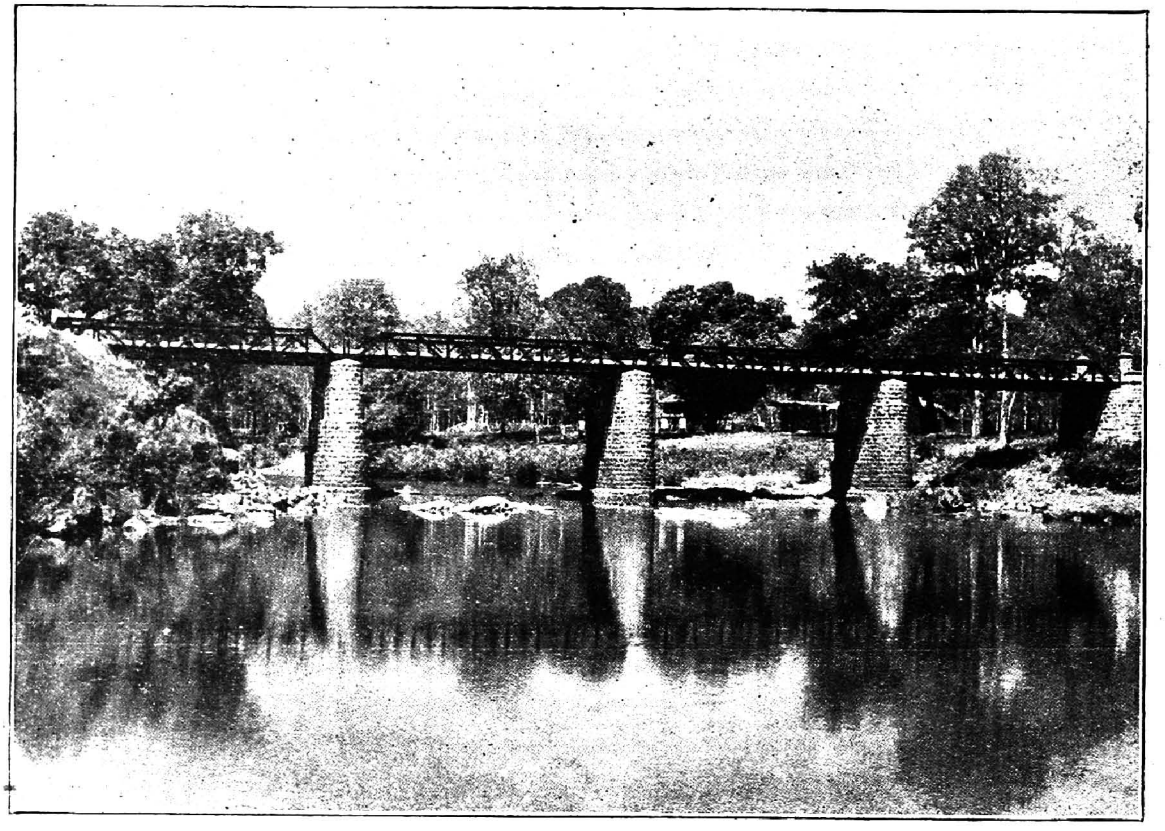
The head of the whole department is the Chief Conservator of Forests at Madras.

Chapter III.—The Forests and the People.

There are two quite separate and distinct aspects of this matter which it is well to bear in mind from the start—first, the relation between the forests and the people as a whole; and second, the forests in relation to the people who live in their immediate neighbourhood.

To the people at large a good, adequate and flourishing forest estate means plentiful, good and cheap timber, fuel and bamboos, and other produce that can bear the cost of transport. If the forests run at a profit it means, in addition, so much money in their pockets as taxpayers. These are the obvious and least essential benefits; the really important ones are indirect.

It is often loosely said that forests increase rainfall. This is not so: or at any rate the effect of forest growth, even over very large areas, on the quantity of precipitation has never been shown to be more than infinitesimal. What forests do is to hold up and regulate the flow off of the rain that does fall. A denuded hillside is a fair approximation to the roof of a house, and storm water shoots off it in much the same way. Instead of a blessing heavy rain becomes a menace, causing destruction and discomfort, danger to life, interruption of communications, silting of fields and tanks, damage to crops and general unpleasantness. With this compare what happens when rain falls on slopes clothed, for example, with the best protective forest, the tropical evergreen rain-forest of the Western Ghats. The heaviest deluge impinges first on the topmost canopy, high above the ground, where the large wind-driven drops are broken up into an all pervading mist or drizzle which trickles down the



Photograph by H. G. Champion.

NEDUNGAYAM BRIDGE, NILAMBUR DIVISION.
Built by Mr. E. Dawson, Forest Engineer, in 1933.

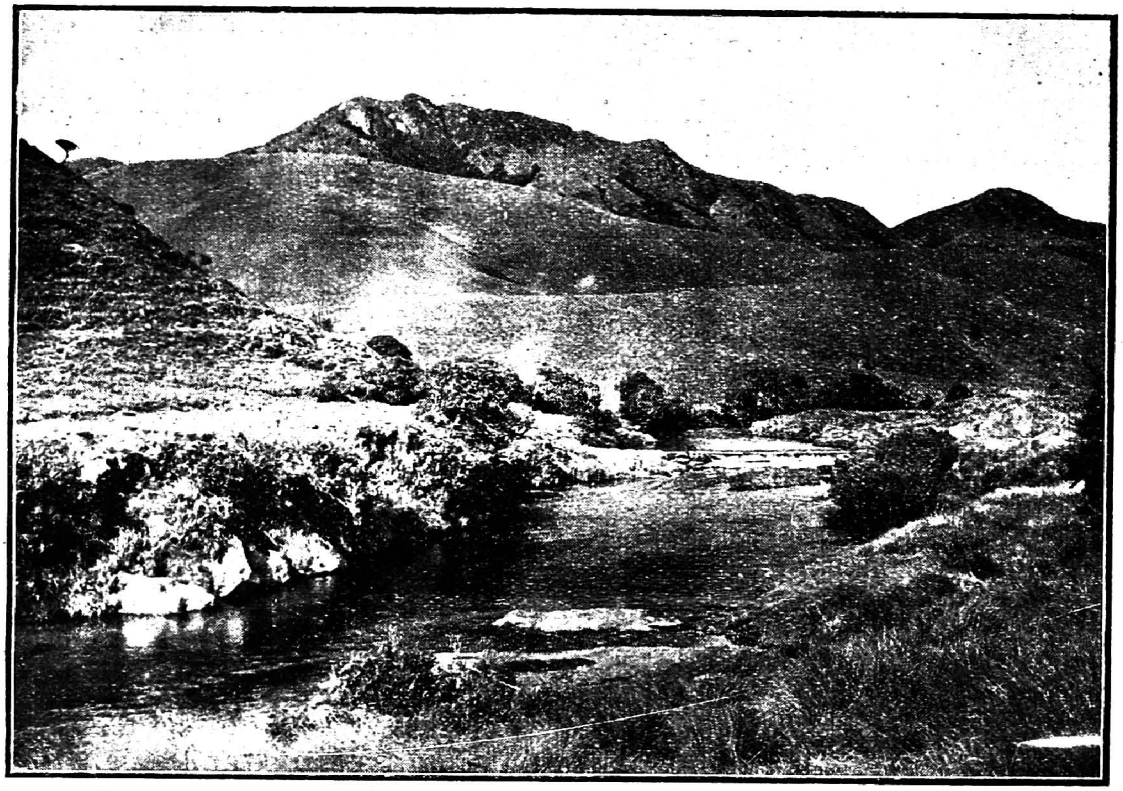
twigs and branches or falls gently from leaf to leaf to reach the ground, where it finds a thick layer of spongy leaf litter to absorb it. Slowly it saturates this, and only then can the surplus water find its way to sub-soil levels to feed the springs and maintain a steady and perennial flow of water in the streams.

These are extreme cases. They illustrate protective forest at its best, and what happens in its absence. Most of our forests fall far below the ideal, but any forest cover is better than none. It is the constant aim of forest management to conserve and improve the cover it finds on the ground.

If examples are wanted, take the valley of the Noyil river in the Coimbatore district, with its catchment of well-clothed hills and compare its prosperous cultivation with the arid conditions in the neighbouring Tadagam Valley whose stream sources have been denuded. Or compare the clear flow, even in spate, of the Nedungayam river near Nilambur, with the silt-laden flood water of any of the neighbouring streams rising in the degraded forests of the adjoining valleys. Consider also the progressive diminution of the area under wet cultivation in such districts as Cuddapah, which is without a doubt due to deterioration through fire of the forest cover in the catchment areas. Instances could be multiplied indefinitely all over the Presidency. Thousands of minor tanks and the hundred of thousands of acres of wet cultivation under them depend on the maintenance of forest cover on the distant upper waters of the streams which feed them.

So much for the people at large. Take now the case of villagers living in close contact with the forest—within, let us say, a distance of five miles from the reserve margin. They share the general benefits that have just been described and enjoy as well a great many direct advantages. They send their herds to graze at a nominal fee; fuel and small timber, bamboos and thorns for fencing are cheap and easy to obtain; grass in head-loads is theirs for the cutting; green leaf manure is often made available to them. Finally there is employment for them in the slack seasons of agricultural work. A large proportion of the expenditure of the forest department is paid in wages to the people of this zone for cutting and carting fuel and timber, clearing and burning lines, sowing, planting and tending, making and mending roads, buildings and wells.

On the other hand it is on the people of these marginal villages, *and on them alone*, that the inconveniences and irritations of forest restrictions fall : restrictions, let it be remembered, that are imposed in the interest of themselves and their posterity.



Photograph by M. V. Laurie.

HIGH-LEVEL PASTURES AND CATCHMENT AREA OF A BHAVANI RIVER AFFLUENT. AVALANCHE-NILGIRIS.

Take for example the grazing question. Not many years ago, the forests were divided into blocks and for grazing in any block a separate permit was needed—an imperfect arrangement, it is true, but one tending to spread the incidence of grazing over the pastures available. Now a single permit costing a few annas a year entitles the holder to graze his cattle throughout the forests of a division. Much has been heard of late about the improvement of cattle-breeds and everyone knows that one of the chief rural problems all over India is the immense number of uneconomic "scrub" cattle to be found wherever there are grazing grounds on which huge herds can be kept for next to nothing. These are the conditions which obtain to-day in the forests of Madras. A fee fixed far below the market value, with no power of limitation of the number of cattle grazed, or of the seasons of grazing, is unquestionably resulting in a serious degradation of many of the marginal forests, and in the perpetuation of the large herds of under-bred uneconomic cattle.

Increasing attention has been given in recent years to the management of suitable forest lands as pasture, but with the present absence of regulation real progress is impossible. The only control the department has is the power of complete closure, where this is a silvicultural necessity; and that this power is sparingly used is shown by the fact that out of 16,000 square miles of reserved forest only an area of 2,000 square miles is closed to grazing. In these 2,000 square miles there are large areas where light grazing would be harmless or even beneficial, and had it the power the department would gladly open such areas to the grazing of limited numbers of cattle at specified seasons. But it dare not throw them open to unrestricted grazing, and to this, at present, the only alternative is complete closure.*

A conference representing the whole of India recently met in Madras to consider the question of forest grazing. The following is an extract from its report:—

> " . . . We desire also to emphasize the point that grazing grounds upon which unlimited numbers of livestock can be maintained at no, or entirely trivial, cost inevitably become a factor encouraging the deterioration of livestock. There can equally be no question that these same grounds, with proper management, should and could be a valuable factor in the improvement

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* Since this was written the Government of Madras have agreed to a form of regulated grazing in some of the forests of Kollegal, Coimbatore North and Chittoor.

> of the cattle of India . . . Control, involving limitation of numbers as may be necessary, over the cattle utilizing the grazing in forest lands is a crucial necessity without which proper management is impossible."

Enough has been said to show that concessions in grazing have gone as far as, and even beyond, the safety point. If grazing grounds are to be saved from further deterioration, and their quality and that of the cattle, ultimately improved, more and not fewer restrictions are inevitable.

As with grazing so with other bones of contention such as lopping for leaf manure. Concession has gone as far as it can : the restrictions that remain are essential. Nobody likes restrictions, but the blessings of forest conservancy cannot be enjoyed without some restraint.

As those directly concerned in imposing this restraint the lower ranks of the forest department come in for a good deal of adverse criticism. They are accused of being oppressive and corrupt. They are probably no better and no worse than the ordinary man of similar status in other walks of life. No one is more anxious to weed out the undesirable than his own superior; but in his attempts to do so he finds his efforts constantly frustrated by an attitude on the part of a section of the public that seems positively calculated to shield corruption. It is notoriously hard to bring home a charge of bribery. The ultimate remedy lies in the hands of the people themselves. The growth of a public opinion looking upon bribery with the contempt it deserves and willing to come into the open to condemn it, would very soon mean the end of it.

From time to time the department finds its policy the subject of criticism. Forest officials are no more immune than other specialists to the danger of taking a narrow view. Informed criticism and the airing of grievances are therefore to be welcomed. Unfortunately the criticisms cannot always be described as well informed. The popular leader who lends his support to an agitation for the relaxation of restrictions without a careful examination of both sides of the question, may earn a little easy local popularity, but runs the risk of doing his supporters and his country a real disservice.

This consideration leads back to the distinction drawn at the beginning of this chapter between the people as a whole, in their relation to the forests, and the people on the forest fringes. It has been shown that while the people as a whole derive direct and indirect benefits from forest

conservancy and suffer no inconvenience from the restrictions which are its corollary, the marginal villagers enjoy the same and added advantages, but on them falls the irksomeness of the restraints. This is a point which is often overlooked when forest grievances are discussed. It is apt to be assumed that *all* village cattle go to the forest for grazing, and that *every* ryot could (but for the restrictions) help himself to leaf manure from the reserves. The facts are these—there are 24 million head of cattle in Madras and of these 1½ million, or about 6 per cent are within reach of forest grazing. Corresponding figures for population have not been worked out but it is safe to say that far less than 10 per cent of the people of Madras live within the forest fringe. The point to be emphasized is that when a concession is made, say a reduction in the fee for grazing, a present is made to a small section of the people at the expense of the rest.

Before leaving this subject mention must be made of a bold step taken in 1924 when some 3,400 square miles of forest of mainly local value were transferred to the control of village panchayats. Some of these have taken their responsibilities seriously, but on the whole misgivings are felt. In its latest review of the management of these forests, the Board of Revenue remarks " Most of the Collectors report that the ordinary revenue staff has not been able to devote the requisite attention to the panchayats with the result that many of them are left to take care of themselves. The forest have in consequence deteriorated to some extent."

Chapter IV.—Products of the Madras Forests.

Timber.

The chief timber bearing forests are along the Western Ghats. They are of two types—evergreen and deciduous.

The function of the evergreen forests is mainly protective. They clothe the almost precipitous slopes of the hills in a rainfall zone of 200 to 300 inches a year, regulating the flow of water in all the West Coast streams and protecting the upper waters of many of the rivers flowing eastwards to irrigate wet lands in the dry districts. They must, therefore, be worked with the utmost caution to keep unimpaired their protective value. This is done by a system of very careful selection fellings with strict safeguards. The principal outturn is sleepers of *Mesua ferrea* and *Hopea parviflora*, sawn in the forest and supplied under a contract direct to the railways.

The protective value of the deciduous forests, though great, is not so vital as that of the evergreens, for they occur generally in more level country and in regions of less torrential rainfall. Partly for this reason and partly because their silvicultural management is better understood, a more intensive exploitation is permissible. The system in vogue is one of clear-felling suitable areas and replanting them, mainly with teak. The areas unsuitable for conversion into plantations are worked under conservative selection fellings. It is from these forests lying mainly in Malabar (Wynaad and Nilambur), in South Coimbatore (Anamalais) and in the Godavari district that the bulk of our timber comes.

The felled logs are usually dragged by the department's elephants to roadside or riverside depots, whence they are carted or floated to the main centres of consumption or distribution—Beypore, Pollachi, Mysore and Rajahmundry.

Teak is the outstanding timber of forests of this class. In value but not in quantity rosewood is nearly its equal. Vengai (*Pterocarpus marsupium*), Venteak (*Lagerstroemia lanceolata*), Karumarudu (*Terminalia tomentosa*), Pillamarudu (*Terminalia paniculata*) and Irul (*Xylia xylocarpa*) are the chief among the other trees which are marketable. There are other timbers, excellent in themselves, but at present "unfashionable." It can only be a question of time before many of these come into favour.

The potential value of this class of forest is being greatly increased under the present system of conversion. Mention has already been made of the deservedly famous Conolly teak plantations at Nilambur, now well into their second rotation. Similar series of plantations are being built up in many other parts of the Presidency; wherever, in fact, conditions are suitable. At Mount Stuart in the Anamalais, and in the Wynaad large areas have already been converted to pure teak. In all, the area under planted teak is being increased by about a thousand acres every year.

Sandalwood.

Sandalwood grows almost anywhere, even at sea level and in regions of heavy rainfall. But its typical home is in the dry forests bordering on Mysore at elevations between 2,000 and 3,500 feet. It is a root parasite—that is to say it can thrive only by attaching itself to the roots of another tree from which it extracts nourishment. In many places it is severely attacked by an insect-borne "virus" disease known, from a curious deformity it causes in the foliage, as "spike disease." Spike disease is incurable and always fatal. Its ravages have been so severe

since it made its first appearance at the beginning of this century that working is almost confined to the removal of dead trees. Fortunately sandal regenerates itself so freely that, in spite of the loss from spike there is little cause for anxiety about future supplies.

Sandalwood is so valuable that its extraction is governed by a most elaborate set of rules and accounts, and there are strict " transit rules " to regulate its transport from place to place. Every bit of the tree containing heartwood is marketed—roots, chips and even saw dust.

North Salem, North Coimbatore and West Vellore produce the bulk of the Presidency's outturn of sandal. After elaborate cleaning and grading the final product is sold in the depots at Satyamangalam and Tiruppattur, chiefly to Bombay merchants for export to Germany and America.

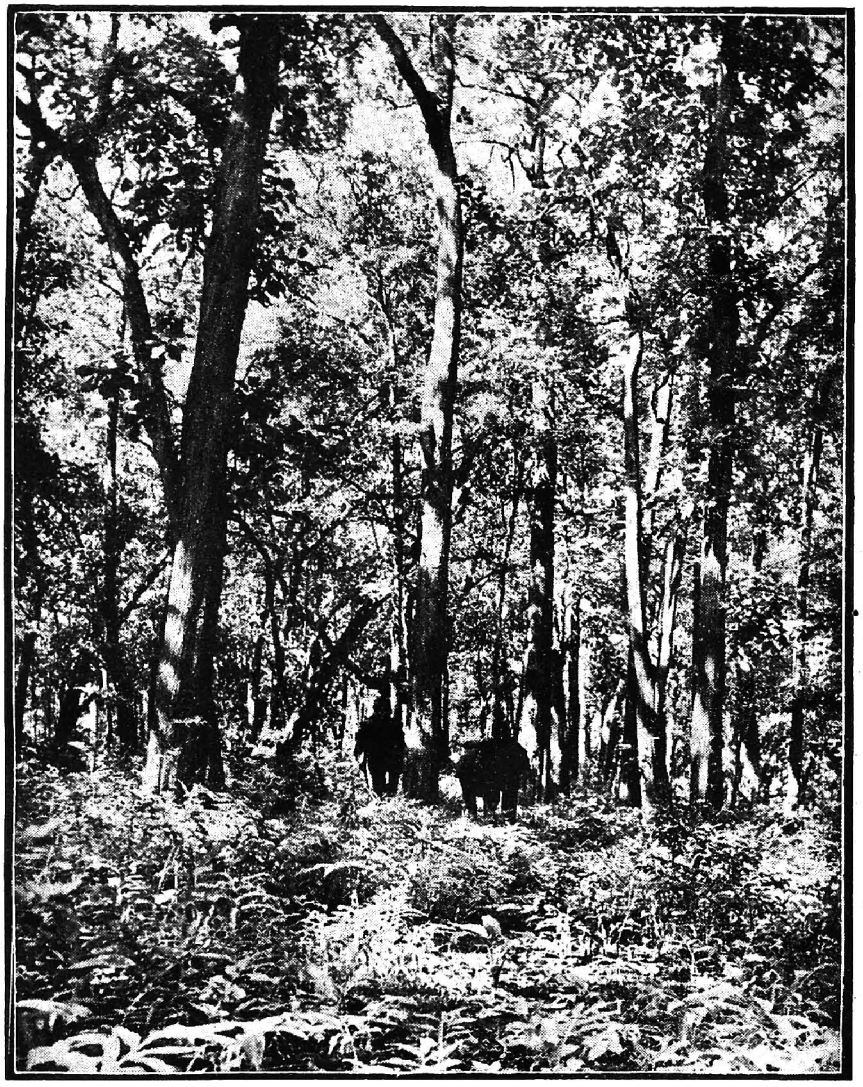
Fuel and Small Timber.

Nearly all forests bordering village cultivation of the plains are worked for fuel and small timber, the system being to lease " coupes " in rotation. The coupes are usually clear-felled, and for replacing the felled growth coppice regrowth from the cut stools is mainly relied upon. But of late much attention has aeen paid to supplementing this coppice regrowth by sowings.

Most of the big towns—Madura, Coimbatore and Rajahmundry, for example—depend very largely on forest reserves for their fuel. Madras draws large supplies from the forests of Chittoor and Cuddapah and from the Island of Sriharikota. The thriving casuarina plantations along the coast are now nearly all in private hands, an enterprise which one would like to see copied elsewhere. Ootacamund and Coonoor owe their cheap supplies of good firewood to the splendid Eucalyputs plantations started by the pioners of forestry in Madras to save the native sholas from destruction.

Bamboos.

Almost every forest division has its bamboo coupes. They are leased to contractors with safeguards designed to prevent over-exploitation of the more easily accessible areas. Generally speaking supply is far in excess of demand. The growing likelihood of the successful establishment of paper mills using bamboo as their chief raw material encourages the hope that before long our bamboo resources will be used more fully than they are at present.



Photograph by M. V. Laurie.

NATURAL TEAK FOREST.
Mt. Stuart Forests, South Coimbatore Division.

Minor Forest Produce.

This includes all kinds of things : barks and fruits for tanning ; grass, fibres and leaves (including leaves for beedi-making) ; canes ; edible and medicinal plants ; honey, wax and horns ; gums and resins and many others.

The right to collect them is almost always leased.

Recently the department has given much attention to a new activity—the cultivation of lac. The lac of commerce is refined from the gummy incrustation exuded by an insect which lives by sucking the sap of trees. Trees of the proper kind are first lopped to promote the growth of suitable sappy shoots. When these reach the right size they are " inoculated " with lac insects of the correct strain for the kind of tree in question, and in due course the incrustation is formed and harvested The department has a flourishing lac centre in the Madura district, a smaller one at Denkanikota in North Salem and many experimental centres elsewhere.

Revenue from the different products.

Timber contributes 30 per cent to the total forest revenue, futl 14 per cent, sandalwood, grazing and minor produce each about 12 per cent, bamboos 9 per cent and miscellaneous items make up the remaining 11 per cent.

Chapter V.—Financial Results.

For the past three years the Madras Forest Department has shown an average annual surplus of 5-1/3 lakhs on a total average annual expenditure of about 40 lakhs. In this connection the following considerations should be given due weight :—

(1) With sound management for *sustained* yield forestry is a safe investment from which sensational returns *in cash* are not to be expected. Nothing would be easier than for an irresponsible administration to show large surpluses *for a time.*

(2) Madras is less fortunate, from the financial point of view, than some Indian provinces, in that a high proportion of its forest, though essential for meeting local demands and for conserving water-supplies, is not (and is never likely to be) *directly* remunerative. And it is precisely this type of forest which is the most difficult and expensive to protect.

(3) Political considerations have led to the fixing of grazing fees at a point far below the market value of the facilities offered, and reluctance to admit regulation of grazing prevents the management of pasture lands to the best advantage. Run on purely commercial lines the revenue from grazing could easily be trebled.

(4) The department receives no credit for the value of produce given away as concessions and free grants—for example, free grazing; and timber and bamboos to rebuild burnt villages. The revenue foregone in this way is rather more than a lakh of rupees each year.

(5) The department's balance sheet leaves quite out of account the incalculable indirect benefits which the forests confer. The control of floods and the conservation of water, on which huge areas of wet cultivation (and the lives of countless people) depend, have no place in it. Not an anna is credited for preserving the streams feeding the Pykara Hydro-Electric Project with all its ramifications and its crores of invested capital.

Clearly, this property of the public should be managed to produce the greatest profit that it can, legitimately. But it is easy to attach undue importance to actual cash returns. The people of Madras possess a forest estate which it is an obvious duty of the State to preserve and develop, and which in time, with careful and conservative management, may become nearly equal to their needs. It pays its way and makes a modest contribution to the general revenues of the Province, and as past and future work begin to bear fruit this contribution will steadily increase.