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WORKING PLAN

FOR THE FORESTS OF THE

JUBBULPORE FOREST DIVISION,

NORTHERN CIRCLE, CENTRAL PROVINCES,

FOR THE PERIOD

1899-1900 to 1928-29.

Allahabad

PRINTED AT THE PIONEER PRESS

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Central Provinces, India, Forest dept.

WORKING PLAN

FOR THE FORESTS OF THE

JUBBULPORE FOREST DIVISION,

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WORKING PLAN

FOR THE FORESTS OF THE

AMERICAN FOREST DIVISION

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**Correction Slips Nos. 66 to 69 to the Working Plan Report for the
Forests of the Jubbulpore Division.**

No. 66.

Page 4, paragraph 31—

Against Block No. 31 (Umarpani)	...	For	7,786	acres	read	7,800
" " " 32 (Deogawan)	...	"	1,162	"	"	1,164
" " Total	...	"	60,707	"	"	60,723
" Grand Total for district	...	"	218,049	"	"	218,065

No. 67.

Page 7, paragraph 34—

Against Sihora Range	...	For	60,278	acres	read	60,294
" Total of Column 2	...	"	215,435	"	"	215,451
" Total of Sihora Column 4	...	"	60,707	"	"	60,723
" Total of Column 4	...	"	218,049	"	"	218,065

No. 68.

Page 24, paragraph 91—

Against Block No. 31 (Umarpani)	...	For	7,786	acres	read	7,800
" " " 32 (Deogawan)	...	"	1,162	"	"	1,164
" Total	...	"	25,103	"	"	25,119
" Grand Total for district	...	"	61,683	"	"	61,699

No. 69.

Page 35, paragraph 107—

Against Block No. 31, Coupe 1	...	For	1,576	acres	read	1,590
" Total in the last column	...	"	7,786	"	"	7,800
" Block No. 32, Coupe 1	...	"	269	"	"	271
" Total in the last column	...	"	1,162	"	"	1,164
" Total of Coupe 1	...	"	5,202	"	"	5,218
" " of the last column	...	"	25,103	"	"	25,119
" Grand Total under Coupe 1.	"	"	12,922	"	"	12,938
" " of last column	...	"	61,683	"	"	61,699

A. ST. V. BEECHY,
Offg. Conservator of Forests,
Northern Circle.

23rd October 1918.

READ—

Working-plan Report for the forests of the Jubbulpore Forest Division.

READ ALSO—

Letter No. 112-W. P., dated the 15th August 1900, from the Inspector-General of Forests, to the Government of India.

R E S O L U T I O N .

This Working-plan deals with all the forests in the Jubbulpore Forest Division, it having been found necessary to abandon, after a short trial, the usual procedure of one Working-plan for each Range or block of forests. These forests constitute the Murwara, Sihora, Jubbulpore, Bargi and Dhanwahi Ranges, and cover an area of 536 square miles, the general character of which is rugged and hilly, except for a small tract of country to the east of the Mahanadi, which is a more or less level plain. The soil varies in character from a loose sand to a stiff black soil, but with a fairly fertile sandy loam predominating in the low-lying localities. The climate is on the whole favourable to forest growth, though in the cold weather night frosts occasionally do considerable damage to young trees in low-lying localities.

2. The forests may be classed under four main types consisting chiefly of (1) Sal (*Sheora robusta*), (2) Teak (*Tectona grandis*), (3) Mixed forests, and (4) Bamboo (*Dandrocalamus strictus*). The sal is here at its western limit and is confined to the Gondwana sandstone area; it seldom exceeds 5 feet in girth and generally begins to decay after reaching a girth of 4 feet; its reproduction is very poor, due to the fact that but few seedlings survive the cold weather frosts. The teak is here at its northern limit and is confined to a few scattered localities where the soil and climate is favourable to its growth. It usually attains to a girth of about $3\frac{1}{2}$ feet, after which it dies off rapidly. Reproduction is extremely backward. The mixed forests are by far the most widely distributed, and the reproduction is abundant wherever a sufficient depth of soil is met with. The bamboo, though classed separately, actually occurs intermixed in the teak and mixed forests, but in well defined lines. Its reproduction is all that could be desired.

3. In addition to the Great Indian Peninsula, East Indian, Indian Midland and Bengal-Nagpur Railways and the metalled roads radiating from Jubbulpore to Mirzapur, Damoh, Seoni, Mandla and Kundam, the district is served by several other metalled and fair-weather roads, which afford ample facilities for the transport of forest produce. The existence of the Public Works Department Toll-station on the ferry and fair-weather bridge at Gwarighat, no doubt adds to the cost of moving forest produce to Jubbulpore along the road from Seoni, but no general exemption from tolls can be made in favour of forest produce and the whole question of the revision of rates will be considered separately. Other lines of transport are the Mahanadi, Nerbudda and Gaur Rivers; but so far the Nerbudda is the only one down which timber, &c., is rafted. Every effort will be made fully to develop the facilities for transport afforded by these waterways, and launching and catching stations will be established at convenient centres. Something in the way of removing obstructions will also be attempted; but no very costly operations are to be undertaken. For the removal of forest produce temporary fair-weather roads connecting the interior of the forests with one or other of the main lines of transport, will also be constructed as required.

4. Gwarighat, the only large timber mart in the district, is practically the port of receipt for Jubbulpore, whence large quantities of harra are exported to Bombay, the Jubbulpore myrabolams being a special line in the London market. Firewood, timber and bamboos, besides lac and harra, find a ready sale in the larger towns, no less than 1,000,000 maunds of firewood being consumed in Murwara alone. Charcoal was formerly largely used in Jubbulpore and in the iron-smelting industry; and should the present endeavours to revive the industry prove successful, there will be a demand for all the fuel the forests in the Division can produce.

5. The surrounding population is essentially agricultural and of Aryan extraction, with Gonds, Kols, Bharias and other aborigines intermixed. Their requirements are for the most part met from the extensive malguzari forests, and their demands on the Government forests, except for grazing, are very small.

6. The principal object of the present plan is to improve the forests, which until 1893 had been badly managed and considerably overcut. The whole area will be divided into four Working-circles, in which the system of treatment will be an improvement or selection felling, and in places, a coppice with standard felling, according to the nature and density of the forest. In the sal areas, the treatment will ultimately be jardinage. Areas capable of producing large timber, such as the Machmacha, Khitoli, Sutri and Karela blocks, comprising an area of 32 square miles, will be worked exclusively for such timber.

A rotation of 30 years will generally be followed, though, as provided for in the plan, a rotation of 15 or 20 years will be adopted according as the grazing pressure or the nature of the forests dealt with requires. The Inspector-General of Forests has, however, brought to notice that in the cases of the Lakhapateri and Jalasur blocks, paragraph 94 of the plan, fixes the rotation at 30 years, while paragraph 106 gives it as 15 years. This should now be rectified.

7. These forests are used to a considerable extent for grazing. Under the provisions of the plan, at no time will the area closed to grazing exceed 86,800 acres, or 26 per cent. of the total area: 61,588 head of cattle are estimated to graze in them; and with the area open to grazing each year (303,172 acres), this gives an average for the Division of 4.9 acres per head of stock.

8. Several of the blocks dealt with in this Working-plan have been under special fire-protection for many years. In addition to these, each coupe as felled over will be closed to grazing and specially protected. Other areas that are essentially grazing grounds and incapable of being developed into timber forests, may well be systematically burnt over each year, especially as this will minimise the risk of fires spreading from them into other specially protected areas.

9. The plan also provides for the treatment of the bamboo forests in the Division. As all these forests flowered only 5 or 6 years ago, they cannot be worked for 6 to 8 years to come. But as the currency of the plan extends over this period, their exploitation has been provided for. Each Working-circle is divided into one or more felling series of a workable size, each of which will be felled over on a two years' rotation.

10. Other important products of these forests are harra and lac. An enumeration survey of all the harra trees in the Division will be made, and an estimate of the average yield will be framed on the lines indicated in paragraph 122 of the plan. Lac cultivation and its propagation also has been carefully considered. Another product of these forests is katha or tannin. A single Working-circle will be formed for this purpose, embodying all the forests in the Jubbulpore and Damoh Divisions, and, if necessary, those in the Saugor and Narsinghpur Divisions also.

11. The plan includes a scheme of forest roads to be constructed as funds allow at an aggregate cost of Rs. 22,650. Provision is also made for an expenditure of Rs. 52,500 on quarters for subordinates, officers, rest-houses and wells.

12. The revenue expected from the whole Division is estimated at Rs. 70,200, and the annual expenditure at Rs. 51,400. The Officiating Chief Commissioner now sanctions the plan, which will have effect from the 1st November 1899.

ORDER.—Ordered, that a copy of this Resolution be forwarded to the
 Conservator of Forests, Northern Circle, Central Provinces. Government of India in the
 Commissioner, Jubbulpore Division. Department of Revenue and
 Deputy Commissioner, Jubbulpore. Agriculture, for information and
 Reporter on Economic Products to the Government of India. transmission to the Inspector-
 General of Forests, and to the officers noted in the margin.

[True Extract.]

R. H. CRADDOCK,

Chief Secretary to the Chief Commissioner,

Central Provinces.

No. 112-W.-P., dated Simla, the 15th August 1900.

From—B. RIBBENTROP, Esq., C. I. E., Inspector-General of Forests to the Govt. of India,

To—The Secretary to the Honourable the Chief Commissioner, Central Provinces.

In accordance with Article 88 of the Forest Department Code, I have the honour to forward, for the orders of the Honourable the Chief Commissioner, a Working-Plan for the forests of the Jubbulpore Division, received from the Conservator, Northern Circle, under cover of his letter No. 3150, dated the 13th June 1900, a copy of which is appended. I approve of the proposals made for working these forests, and beg to recommend the plan for sanction with effect from the 1st November 1899.

2. A summary description of compartments would have made the report more complete and easier to follow, besides furnishing useful data for future comparison; but in view of the provision under paragraph 130 and what is said in paragraph 3 of the Conservator's forwarding letter the point may be waived.

3. *Paragraph 75.*—I beg to refer you to paragraph 3 of my letter No. 143-W.-P., dated the 23rd June 1897, and to say that the remarks therein made regarding the obstacle to forest trade apply equally as well to the present case.

4. The index map referred to in paragraph 30 does not accompany the plan.

5. It is observed that in paragraph 94 the rotation for the Lakhapateri and Jalasur Blocks of the Murwara Working-Circle is fixed at 30 years, whilst in paragraph 106 it is given as 15 years.

No. 3150, dated Jubbulpore, the 13th June 1900.

From—A. SMYTHIES, Esq., B. A., Offg. Conservator of Forests, Northern Circle,
Central Provinces.

To—The Inspector-General of Forests.

In continuation of correspondence resting with your letter No. 73-W. P., dated the 11th May 1900, and in accordance with Article 88 of the Forest Department Code, I have the honour to submit, herewith (in duplicate), for your remarks and for transmission to the Chief Commissioner, the Working-Plan for the forests of the Jubbulpore Division.

2. With reference to paragraph 3 of your letter quoted above, I beg to say that, with the exception of the Bargi Range, which I examined myself, the descriptions of compartments have been so prepared that they would all have to be completely re-written in order to adapt them for being printed, the compartments being in nearly every case portions of blocks. I have not the time to re-write them and in consequence of the famine relief operations, it will be impossible to spare any officer for the work until October next. To have waited until then before finally submitting the plan to you would have involved locking-up the type for four months longer. You were, however, pleased to raise no objection to the omission of the description of compartments in the case of the three plans already sanctioned for the Narsinghpur and Hoshangabad Divisions, and it was for this reason that the description was left out of the present plan also.

3. If you now consider a plan incomplete without the summary description of compartments, I will do my best to have the description for this plan prepared as soon as possible and submitted to you later on in print. But I beg to invite perusal of paragraph 130 of the plan, from which you will observe that it is proposed to gradually draw up a description of the forests, than which nothing could be more full and accurate, and I trust that you will agree to omit from the printed plans the rough descriptions made preliminary to the framing of the plans, subject to the condition that these preliminary descriptions are filed in my office for ready reference whenever required.

4. The defect pointed out in paragraph 2 of your letter could not be corrected except at the risk of dislocating the type of all the pages from 14 onwards. You will, however, permit me to respectfully submit that in my opinion all the details on pages 15 and 16 and 18 and 19 are extremely important and are necessary to the proper control of exploitation and export. Relegated to an appendix, they would escape notice or at least would not be referred to as often as their importance requires. The details on page 20 have been entered there, as I am hopeful that by giving them prominence, I may help towards the early removal of the restrictions which the toll stations on the Nerbudda and Hiran rivers place on the export of produce from the forests of the Bargi Range and from the Damoh District.

5. In compliance with paragraph 5 of your letter, I have printed the notifications in question as Appendix V, and in compliance with paragraph 6, all extracts from demi-official letters have been omitted from Appendix III.

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INTRODUCTION.

A FEW words are necessary to explain the genesis of this Working Plan. In 1894-95 measures were set on foot to regulate the management of the forests of the Jubbulpore Forest Division in accordance with working plans. Rangers, termed for the purpose Working Plan Assistants, were appointed to prepare the plans under the immediate direction of the Conservator. Plans for some of the forests were drafted and put at once into execution, but they were not submitted for the sanction of higher authority. In December 1896, it was found that the plans were too unpractical to be longer followed. They had parcelled out each forest on the maps (not on the ground) into strips and patches according to an ocular estimate of the density of the stocking made by walking once or twice through it, and only those plots were assigned to be worked, which were from three-quarters to fully cropped; all areas less densely stocked were not to be touched at all by the axe, but were to be perpetually grazed over. The result was that the patches of forest to be worked over were, as they appeared on the maps, mere islands surrounded by theoretically unworkable areas and on the ground it was impossible to separate them, for no one could say where the three-quarter crop ended and the half-crop began, especially as in nearly all our forests the density of the crop varies widely from point to point, often a dozen times within a single acre. Some coupes were sold standing at so much per workable acre, but disputes soon arose as to what portions of the coupes were workable in accordance with the working plan.

2. Another fatal objection to the working plans was that, as only patches here and there were worked over in each coupe, it was impossible to keep grazing out of them except by closing against cattle the entire coupe, *i.e.*, also the areas which it was prescribed should never be so closed. Thus in practice entire coupes were closed after exploitation. But this was not all. Every one of the felling series extended over an enormous area (the coupes being consequently very large) and as the coupes followed each other in unbroken successive order on the ground, whole groups of villages found themselves of a sudden left without any grazing grounds situated within practicable distance.

3. These drawbacks being represented to the Inspector-General of Forests, he gave his authority to set aside the working plans in question and to substitute for them new ones drawn up on an entirely different basis (see in Appendix).

4. The first plan taken in hand under these orders was that for the Bargi Range. The new plan was submitted in draft to the Inspector-General of Forests and after approval was printed off and was sent up by that officer to the Chief Commissioner. Experience, however, soon showed that with the classes of forests we have to deal with in these Provinces, it would be waste of time and labour, for the present at least, to have separate working plans for the several forests and even ranges of a Division, for save as respects the constitution of the felling series and coupes, one working plan would be bound to be a mere repetition of the rest. Accordingly, with the support of the Inspector-General of Forests, the Chief Commissioner's sanction was obtained to withdraw the Bargi Working Plan, which was still under consideration, and to prepare a single one for the entire Division.

5. Accordingly, during the rains of 1897, with the help of Mr. R. S. Hole, Assistant Conservator of Forests, who was placed on special duty for the purpose, a working plan was drawn up for all forests of the Jubbulpore Division. As these forests had never had a proper chance and we were only just emerging from the severe famine of 1896-97, it was impossible to tell whether the felling series and arrangement of coupes adopted were suited to the normal circumstances of the district. It was hence considered advisable to keep back the plan, but to put it forthwith into execution, so that its weak points might at once become manifest under the test of experience. In the rains of 1898 the plan was revised in the light of the experience gained, but it was again deemed safe to wait another year before submitting it. The open season of 1898-99 revealed a few defects which could not be detected after a single year's experience. These defects were removed during the spring and rains of 1899. The whole plan was rewritten with the co-operation of Mr. R. C. Thompson, Extra-Assistant Conservator, who was placed on special duty for the purpose. The figures and data have been worked out by Messrs. Hole, Witt and Thompson; for what pertains to the prescriptions I alone am responsible. In connection therewith I have to acknowledge valuable assistance and advice received from Mr. Hole, who is now the officer in charge of the Division.

6. The plan, as it stands, has been in operation from the commencement of the open season 1899-1900 and sanction is therefore solicited for starting it from 1st November 1899.

7. The opinions of the Commissioner and Deputy Commissioner on this working plan are printed as Appendix VIII.

E. E. FERNANDEZ,

Offg. Conservator of Forests,

Northern Circle, Central Provinces.

PART I.

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED.

CHAPTER I.—DESCRIPTION OF THE TRACT DEALT WITH.

ARTICLE I.—*Name and Situation.*

THIS report deals with all the forests of the Jubbulpore Forest Division, which consists of the Government forests not only of the Jubbulpore Civil district, but also of that part of the Mandla district which lies to the north-west of the Balai Naddi and is known as the Dhanwahi Range.

ARTICLE 2.—*Configuration of the Ground.*

2. Omitting the limited tract lying to the east of the Mahanaddi, which is open country, the general character of the surface, where the forests are situated, is hilly and rugged. The hills are usually flat-topped, with steep, often precipitous, slopes, this latter feature being especially characteristic of the eastern slopes of the hills of the Vindhyan region, forming the north-western portion of the district. A few details regarding the configuration of the tract comprising each range are given below.

3. *Murwara Range.*—The open country east of the Mahanaddi referred to above consists of an extensive, more or less level plain, in which Blocks Nos. 14, 15, 16, 17, 19, 20 and 21 are situated. On the eastern edge of this plain lies Block 18, which also extends for a little distance into the hilly ground beyond. In the tract between the Mahanaddi on the east and the Vindhyan region on the west, the hills run generally north and south and have a lateritic character, being flat-topped and forming wide and even extensive plateaux; Blocks Nos. 8, 9, 10, 11, 12 and 13 lie within this area. West of it and along the northern boundary of the district comes the Vindhyan region displaying its normal characteristic of extensive plateaux ending in abrupt slopes; here our forests stretch over the north-eastern corner of such a plateau.

4. *Sihora Range.*—South-east of the East Indian Railway line, where by far the larger mass of the forest area of the range is concentrated, the forests nearly all occupy well-defined hills with generally steep slopes. The six small blocks which lie on the other side of the railway are all scattered and only two of them are situated on hilly ground.

5. *Jubbulpore Range.*—The forests in this range are all situated on the confused mass of trap hills lying to the east of Jubbulpore.

6. *Bargi Range.*—The forests here occupy irregular-shaped trap hills traversing in a north-easterly direction the portion of the Jubbulpore district situated south of the Nerbudda.

7. *Dhanwahi Range.*—The configuration here is similiar in character to that of the two ranges just described, but the ground is more rugged and the average elevation above sea-level is about 300 feet higher.

ARTICLE 3.—*Underlying Rock and Soil.*

8. The principal formations met with in this district are (1) Alluvium, (2) Laterite, (3) Deccan Trap, (4) Lametas, (5) Upper Gondwanas, (6) Upper Vindhyan, and (7) Bijawars. To show at a glance the distribution of the various formations, a rough small-scale Geological map on which the position of the different forest blocks is shown, has been prepared and a copy is filed in both the Direction and Divisional offices.

9. *Alluvium.*—Not much need be said under this head as only one small block (No. 15) and a very small portion of four other blocks (Nos. 36, 39, 43 and 44) fall within the limits of this formation, which is chiefly composed of stiff reddish, brownish or yellowish clays, with numerous intercalated bands of sand and gravel. Kankar is found throughout the deposit and pisolitic iron granules are of frequent occurrence in the argillaceous beds. The clay is frequently devoid of stratification, but it appears never to attain any great thickness without sandy layers intervening.

10. *Rock Laterite*.—This forms a cap to a group of beds, the lowest of which consists of a coarse ferruginous sandstone formed of rounded grains of quartz, sometimes as large as a pea, embedded in a hard ferruginous paste. Above this are some beds of fine ferruginous earthy sandstones containing badly-preserved leaf-impressions. Resting upon these, in some sections, are found several feet of a rich oolitic iron ore, covered by red, white and purple clays with bands of a coarse ferruginous sandstone interbedded. The rich limonitic iron ores of the district are derived from these beds. Blocks 8, 9, 10, 11, 12, 13, 14, 105, 106 and 113 are situated on this formation.

11. *Trap*.—Besides the varying forms of dolerite or basalt which generally characterize the Deccan trap, secondary minerals of various kinds such as agate, jasper, bloodstone, stilbite, apophyllite, calcite and others are here found in fair abundance. A considerable trade is carried on in them by local lapidaries. This formation occupies almost the whole of the Bargi and Dhanwahi ranges, as well as a fairly large portion of the Jubbulpore Range (the whole of Blocks 50 and 51 and parts of blocks 39, 40, 41A, 42, 43, 44, 45, and 46) and of the Sihora Range (parts of blocks 30, 31, 33 and 34 and the whole of blocks 35, 36, 37 and 38).

12. *Lametas*.—These comprise a small group of limestones, sandstones and clays, known as the Lametas from their occurrence at Lameta Ghat on the Nerbudda near Jubbulpore. The limestones are the most persistent and characteristic beds and are used on a considerable scale by lime-burners. The area occupied by the group in the district is comparatively small and it only occurs in small patches in about 15 forest blocks, *viz.*, Nos. 25, 30, 31, 32, 33, 34, 36, 37, 39, 40, 41, 41A, 43, 44 and 45.

13. *Upper Gondwanas*.—The Gondwana beds belong to the Jubbulpore group and consist of clays, shales and earthy sandstones, with some thin beds of coal. The clays and soft shales, which are the most characteristic beds of the formation, are pale-coloured, usually white, lavender gray or pale red. The sandstones are generally coarse and conglomeratic. Carbonaceous shales are sometimes met with, and occasionally one or more thin bands of jet-coal. Blocks 1, 2, 3, 4, 5, 6, 16, 17, 18, 19, 20 and 21 and portions of seven others (Nos. 25, 30, 31, 32, 33, 41 and 44) are situated on this group.

14. *Upper Vindhyan*s.—Bhander and Rewah sandstones predominate here, mixed with shales and limestones. The Bhander sandstones are the softer of the two and are very fine-grained. The shales are generally thin, flaggy and silicious, sometimes micaceous, with greenish or rusty tints. The limestones are generally impure and earthy, with grey, yellow or reddish tints; when pure, they are compact and even crystalline. All our forests west of the Jubbulpore-Murwara road in the Murwara Range (block 105 excepted), as well as blocks 100 and 101 in the Sihora Range, are situated on this series.

15. *Bijawars*.—The lowest strata are fine earthy slates of reddish tints, the upper beds being associated with the quartzite which underlies the limestone and is intercalated with it. Bedded trap occurs throughout the series. The rocks are in a high condition of metamorphism, the limestone being generally crystalline, the schists highly micaceous and hornblendic and the iron ore mostly a micaceous form of hematite. Blocks 22, 23, 24, 25, 26, 27, 28, 29, 99, 102, 103, 104, and portions of four others (Nos. 25, 32, 42 and 43) are situated on this series, which extends over a considerable area of the district.

16. The disintegration of the various rocks described above results in the formation of soils of widely different characteristics, ranging from the loose sands of the Upper Gondwanas to stiff black soil, with all intermediate grades represented. The prevailing class of soil, however, is a fairly fertile sandy loam, of some depth in low-lying localities, but shallow and sometimes entirely absent on the tops and sides of hills.

17. The importance of the iron industry for the district as well as for the forests would seem to require a special paragraph on the kinds of ore obtainable and their distribution; but as this subject is exhaustively treated in Vol. XVI, Part 2, of the Records of the Geological Survey of India, Mr. Mallet's Report printed therein should be read. The Geological map referred to in para. 8 above shows where the principal workings of these ores are situated.

ARTICLE 4.—*Climate*.

18. Broadly stated, the climate may be said to be dry and cool during the cold weather, hot and dry during the hot weather, and damp and steamy during the rains. The hot weather usually extends from about the end of March to about the beginning of June, and the rains from the beginning of June to about the middle of October. The cold weather is therefore comparatively long and sometimes severe, more particularly so in the north of the district, where night frosts do considerable damage to young forest growth in low-lying localities.

19. The mean shade-temperatures for the three months typical of the three seasons are given below:—

							Fah.
May	...	...	...	...	...	...	91°
July	...	...	...	...	...	...	81°
December	...	...	...	...	...	...	62°

The highest shade-temperature recorded is 112° Fah. and the lowest 41° Fah.

20. During the cold season east winds are prevalent. At the commencement of the hot season north winds are frequent, which later on veer round and become west winds. South-west winds prevail during the monsoon. During February and March hailstorms are not unusual.

21. The average rainfall at Jubbulpore up to the year 1886 was 52 inches. Most of the year's fall is received during the south-west monsoon, the winter rains being very variable and occasionally failing entirely. Accurate data concerning the rainfall of the 8 years since 1886 are given below :—

Rain=gauge station.			Average annual fall.	Maximum annual fall.	Minimum annual fall.	REMARKS.
Jubbulpore	...	...	63.85	76.63	47.12	In the case of Jubbulpore, Murwara and Bijeragogarh, the maximum and minimum rain-falls occurred in two consecutive years.
Sihora	...	...	55.28	71.87	36.32	
Murwara	...	—	53.54	65.16	37.84	
Bijeragogarh	...	...	47.82	65.46	34.56	

ARTICLE 5.—Agricultural Customs and Wants of the Population.

22. The great majority of the population is essentially agricultural. About 40 per cent. are of Aryan extraction, the remainder consisting of Gonds, Kols, Bharias and other aborigines. The amount of forest produce required for their dwellings, agricultural implements, &c., is not large and is almost entirely supplied by the existing large areas of malguzari jungle, being for the most part obtained free under the ancient custom of *nistar*. The income obtained from agriculture is always supplemented by profits derived from cattle-farming on a more or less extensive scale and the supply of grazing therefore becomes for us a question of considerable importance.

23. The habitations of the people may be roughly divided into 3 classes, *viz.*, (a) those occupied by landowners and members of the trading and literary classes; (b) those inhabited by artisans and petty cultivators of Aryan stock; and (c) those which afford some sort of shelter to village menials and aborigines.

24. Houses of type (a), but few in number, consist of a main, often double-storied block forming one side of a quadrangle, the other three sides being enclosed by granaries and stabling. The walls are of masonry built up inside a timber frame-work. The front of the building often consists of a reception room for friends and visitors entered through an open verandah supported on carved teak posts. The entrance to the courtyard is through the front block and is closed by a massive iron-bound wooden door. The building is roofed with tiles laid on split bamboos resting on sawn rafters. The principal woods employed are teak, sal, saj, jamun and haldu. The value of timber used in such constructions often amounts to Rs.500.

25. Buildings of the second type (b), comprising quite nine-tenths of houses of the average village are never double-storied. They usually have substantial mud walls, concealing an interior timber frame-work and are roofed with tiles resting on split bamboo and round rafters. Every house has an open verandah supported on wooden posts, which are sometimes gaudily painted. Occasionally there is a small back-yard enclosed by a mud wall and sometimes a small garden is attached, fenced in with dead thorns or a quick hedge of small shrubs. Tiles are almost universal and thatch is rarely used. Cattle-pens are open to the sky and are usually fenced in with dead thorns. Timber of the inferior kinds is generally used in these houses, neither teak nor sal, as a rule, being within the means of the owners. A small house of this class would measure 12—15 feet $\times$ 7—8 feet, the walls usually being 5—7 feet in height. The almost round, curved central tie-beam (about 10 inches in diameter) rests on two uprights of 8—9 inches square section. Above this, supported by a sort of triple queen's post, comes the ridge pole, which consists of two round poles 6—7 inches in diameter and as many feet long, joined together over the queen's post and with their ends supported by 4 hip rafters of somewhat similar dimensions. The laths supporting the tiles are fastened to the ridge pole and hip rafters. The whole woodwork, including the single door, rarely costs more than a few rupees and lasts about 10—12 years.

26. Dwellings of the third type are usually squalid, one-roomed thatched huts, the walls of which consist of wattling, which is sometimes plastered over with a mixture of clay and cowdung. The posts are of seja, dhawa or ghiria and the thatch is laid over siharu, sometimes ningori, branches spread flat over a light bamboo trellis.

27. On the outskirts of the larger and more wealthy Aryan villages, enclosures of various sizes, called "khallians," are made for the purpose of threshing and storing newly garnered crops. These enclosures consist of a dead fence of seja, tendu or ghiria posts, against which are fixed branches of ber, khair or bamboos.

28. The poorer classes of agriculturists, when not engaged in field labour, frequently supplement their income by collecting and selling grass, bamboo, fuel, and other produce at the neighbouring towns or large villages.

29. For several months in the year the aboriginal population subsist almost entirely on edible forest products, and in the case of the mahua flower, the crop gathered at the beginning of the hot weather frequently forms their staple food till the early kharif crops are cut.

CHAPTER II.—COMPOSITION AND CONDITION OF THE FORESTS.

ARTICLE 1.—*Distribution and Area.*

30. The forests are, with a few exceptions, confined chiefly to the southern and eastern portions of the Division. The blocks, as a rule, are neither compact nor extensive. Being thus generally small and numerous, their distribution will be best understood by referring to the index trace on the scale of 1 inch = 4 miles. The blocks are numbered serially, one series being adopted for the whole Division.

31. A list of blocks of A class Forest (see para. 38 below for the meaning of this term), arranged according to ranges and sub-ranges, is given below. The serial numbers are serial for the whole Division. The areas of Forest villages, although included in A class Forest, are excluded from this statement and are, for the sake of convenience, given separately in para. 33 below :—

Range.	Sub-range.	BLOCK.		
		Serial No.	Name.	Acreage.
Murwara (87,514 acres)...	Bijeragogarh (21,378 acres).	1	Guraiya	Acres. 530
		2	Junwani	1,326
		4	Karreha	1,267
		5	Hardua	2,772
		6	Banjari	652
		7	Surma	1,174
		8	Jaiwara	1,672
		9	Ghugri	2,722
		10	Darori	1,545
		11	Majbgawan	1,438
		12	Bijori	2,297
		13	Gopalpur	3,983
	Khitoli (30,280 acres)...	3	Bara	1,070
		14	Khairani	1,106
		15	Jhiria	1,758
		16	Karondi	5,047
		17	Machmacha	8,707
		18	Khitoli	9,367
		19	Karela	386
		20	Sutri	2,498
		21	Salaiya	341
	Tilgawan (35,856 acres)	105	Lakhapateri	935
		106	Jalasur	568
		107	Pathrari	6,114
		108	Pathori	2,352
		109	Kenah	9,941
		110	Amdar	13,451
		111	Mamar	723
		112	Bilheri	1,285
		113	Bhainswahi	487

Range.	Sub-range.	Block.		
		Sérial No.	Name.	Acreage.
Sihora (61,309 acres) ...	Salimabad (22,933 acres)	22	Jhapi	Acres. 1,333
		23	Jorpahar	191
		24	Kudra	450
		25	Bijhota	15,107
		26	Katahi	4,339
		27	Chheolapani	1,508
	Kuan (5,284 acres) ...	28	Dhanwahi	575
		29	Hargarh	417
		99	Samasgarh	969
		100	Jamunia	345
		101	Mahgawan	684
		102	Amoch	470
		103	Kuan	1,028
		104	Jujawal	796
	Jhirna Piparia (33,092 acres).	30	Deogarh	7,968
		31	Umarpani	8,319
		32	Deogawan	1,315
		33	Karopani	4,287
		34	Kanbarpura	5,669
		35	Garhat	474
		36	Punwasa	2,044
		37	Daroli	607
		38	Patna	2,409
Jubbulpore (35,874 acres)	Bagraji (17,730 acres)	39	Kundwara	2,426
		40	Sonti or Budhari	1,664
		41	Taunri (part)	2,740
		41A	Pondi	3,362
		42	Bhaunraha	7,538
	Ker (7,459 acres) ...	41	Taunri (part)	2,943
		43	Sakri	1,114
		44	Chitri	2,944
		45	Bijapuri	458
	Kakartala (10,685 acres)	46	Lower Gaur	5,266
		50	Gangai	1,377
		51	Dasrathpur	4,042
Bargi (29,275 acres) ...	Sukri (17,982 acres) ...	83	Chhindwaha	554
		85	Khamkhera	289
		85A	Salaiwara	4,451
		86	Mankheri	347
		87	Khapa	365
		88	Silua	1,371
		89	Karanpathar	4,679
		90	Lohri	4,515
		91	Bargi	924
		92	Narainpur	487

Range.	Sub-range.	BLOCK.				
		Serial No.	Name.			Acreage.
						Acres.
Dhanwahi (113,813 acres)	Bandiwarā (11,293 acres).	93	Semra	...	...	4,573
		94	Thengra	...	...	3,615
		96	Kulann	...	...	1,358
		97	Piparia	...	...	1,159
		98	Tontha	...	...	588
	Dobhi (21,853 acres) ...	47	Kumbhi	...	...	1,103
		48	Richhai	...	...	401
		49	Bamnhi Purwa	...	...	732
		78	Bilaikhapa	...	...	96
		79	Bijadoni	...	...	11,973
		80	Jamunia	...	...	1,603
		81	Dobhi	...	...	4,885
		82	Pararia	...	...	1,060
	Barangda (78,443 acres)	53	Dhala	...	...	699
		54	Bastara	...	...	16,399
		55	Pararia	...	...	15,504
		59	Barela	...	...	8,320
		61	Bhondi	...	...	2,083
		62	Kalpi	...	...	34,355
		63	Salaiya	...	...	492
		64	Chargawan	...	...	363
		65	Piparia	...	...	228
	Chargaon (13,517 acres)	67	Chutka	...	...	484
		68	Kunda	...	...	4,750
		69	Sahajpur	...	...	429
		72	Jamthar	...	...	1,537
		75	Chaonrai	...	...	3,898
		76	Niwar-Khapa	...	...	76
		77	Gumti	...	...	704
		84	Kathotia	...	...	1,639
		GRAND TOTAL FOR DIVISION				

32. The undernoted areas, all situated in the Dhanwahi Range, belong to class B I (see para. 38 below) and are entirely under the control of the Land Revenue Department for ryotwari settlement purposes. They aggregate 9,979 acres:—

Sub-range.		BLOCK.		RYOTWARI AREAS.	
		Serial No.	Name.	Name.	Acreage.
					Acres.
Barangda	...	52	Khairani	Khairani	58
		54	Bastara	Pondi	1,205
				Jangalia	1,435
				Dungaria	690
				Chhindgaon	954
				Dhana	965
		55	Pararia	Piparia	324
				Ponia	500
		56	Bhabera	Bhabera	582
		62	Kalpi	Boria	722
				Total	7,435
Chargaon	...	66	Bijapuri	Bijapuri	525
				Lawar Muria	445
		70	Pindrai	Pindrai	384
		71	Bhatadongri	Bhatadongri	782
		73	Chulia	Chulia	151
		74	Maneri	Maneri	257
				Total	2,544

33. The following Forest villages, the areas of which, although part of A class Forest, have for convenience sake been excluded from the acreages given in the statement under paragraph 31 above, belong to the Division :—

Range.	Block.	Name of village.	Acreage.	Total acreage in Range.
Jubbulpore	Kundwara	Kundwara	624	1,485
	Sakri	Keoghpora	502	
	Sonthi	Sonthi	360	
Sihora	Karopani	Karopani	210	429
	Patna	Patna	219	
Bargi	Khamkhera	Khamkhera	455	1,201
	Salaiwara	Gadha-Gorakhpur...	301	
	Semra	Semra	445	
Dhanwahi	Bastara	Pararia	910	2,248
		Karondi	330	
	Kalpi	Kalpi	623	
	Bijadoni	Moia Nala	385	
Total			...	5,364

34. The three preceding area statements are summarised below :—

Range.	A class Forests without Forest villages.	B I.	Forest villages.	Total.
Murwara	87,514	...	...	87,514
Sihora	61,309	...	429	61,738
Jubbulpore	35,874	...	1,486	37,360
Bargi	29,275	...	1,201	30,476
Dhanwahi	113,813	9,979	2,248	126,040
Total	327,785	9,979	5,364	343,128

ARTICLE 2.—*State of the Boundaries.*

35. The boundaries are defined by cleared lines 35—45 feet wide, at every angle of which a boundary mark has been placed, each visible from the next one on either side of it. In the case of blocks 17, 18 and 20 all the boundary marks are of pakka masonry. Elsewhere they are conical stone cairns having a basal diameter of 6—7 feet, with a wooden post rising up out of the apex and bearing the serial number of the boundary mark. Formerly the numbers used to be painted and had frequently to be renewed; great economy has now been secured by branding them into the wood. The decay of the central wooden post has sometimes necessitated the placing, in a conspicuous place on the cairn, of a stone slab on which the serial number is painted.

36. Where Government Forest marches with private land, half the width of the boundary line has been cut in Government Forest, half on the private land, the owner of which is also, by his Record of Rights, responsible for keeping his half clear of trees and shrubs.

37. The masonry boundary pillars are almost without exception in good repair and numbered accurately. Such is, however, far from being the case with the other boundary marks, many of which indeed do not occupy the positions shown for them on the Forest Survey Maps. It is certain that all these boundaries will have to be checked and duly corrected.

ARTICLE 3.—*Legal Position of the Forests.*

38. All the forests are Reserved Forests under Section 34 of the Indian Forest Act, and were declared such by Chief Commissioner's Notification Nos. 887 and 888 published in the *Central Provinces Gazette* of the 22nd February 1879. With the exception of the

limited areas listed in paragraph 32 above, which have been given up for ryotwari settlement and are hence called B I class Reserves, all the forests are A class Reserves, i.e., are intended to be kept up permanently as forest.

ARTICLE 4.—*Rights.*

39. There are no adverse rights or concessions of any kind in these forests.

ARTICLE 5.—*Composition and Condition of the Crop.*

40. As all foresters know, the distribution of species whereby various types of forest are formed is the combined result of several factors, viz., climate (average and extremes of temperature, especially during the growing season, rainfall, atmospheric humidity), locality (aspect, gradient, relative elevation and shelter), soil (depth, degree of division of component particles, retentiveness of moisture), and sub-soil (degree of permeability and facility of disaggregation). It is, therefore, not surprising that the very various geological formations which find a common meeting ground in this Division are not characterised by special types of forest, although, speaking negatively, teak is not found outside the trap and Vindhyan areas, nor sal outside the Gondwana sandstones, the one species requiring a hygroscopic soil and a sub-soil that is not too freely permeable, the other free drainage, but with a good rainfall and a prolonged cold weather. A list of trees and shrubs met with in the Division is given in Appendix II.

41. Before proceeding further it is necessary to draw attention to the fact that we are here at the northern limit of teak and the western limit of the Peninsular area of sal. This limiting line of teak enters the Division on the east in the neighbourhood of parallel of Latitude 23° 20' N., runs nearly due west across half the width of the Division and then turns up nearly due north to ultimately sweep round westwards into the Vindhyan area. As all foresters know, it is determined by the excessive cold and the frequency of severe night frosts immediately we step outside it. As regards the sal, the more porous nature of the Gondwana sandstones and the higher rainfall due to the impact of the moisture-laden south-west monsoon winds on the hills which fringe the eastern border of the Jubbulpore district, create the necessary conditions for the existence of that species where it is met with.

42. Leaving out the sal area, the forests in the Division are of the familiar general type characteristic of the dry hills of Central India, that is to say, low, usually open, for the most part almost scrubby forests, composed of a large variety of species, few of which, however, yield timber or attain large dimensions and the relative proportions of which vary greatly, even suddenly, with the locality (aspect, gradient and relative elevation) and the amount of foothold and moisture afforded by the soil. Naturally poor under the most favourable circumstances, their poverty has been exaggerated by centuries of irregular felling, unchecked forest fires and overgrazing, and, on level ground, also by wandering patch cultivation. Few of the stems rise up directly out of the ground, but stand on more or less high, malformed and unsound stools, while many have been irretrievably injured by pollarding or heavy lopping. With these circumstances added to the unfavourable conditions imposed by nature herself (so that few seeds germinate and of the few seedlings thus produced nearly all perish before the next season of vegetation) it is no wonder that seedling reproduction is extremely backward and in many places practically non-existent, for what to the uninitiated eye looks like, and has often been mistaken for, young seedlings are shoots from small stumps which may be as much as 10—20 years old.

These introductory remarks made, the principal types of forest, established from the point of view of the exploiter, will now be briefly described. These types are—(I) Sal forest, (II) Teak forest, (III) Mixed forest with practically no teak or sal, (IV) Bamboo forest.

43. (I) *Sal Forest*.—This type covers about half the area of blocks 17, 18, 19 and 20, and occurs in patches and strips of various sizes in blocks 15, 21, 25, 30, 31, 32 and 34. The sal nowhere exceeds 80 feet in height, its average stature being scarcely 60 feet, while, although a few stems may attain larger dimensions,* we cannot, as a rule, hope to obtain trees more than 5 feet in girth. Indeed the majority of the trees enter on the decline long before that size is reached and many are dead or in full decay before they can attain a girth of even 4 feet. An extraordinary fact, which cannot fail to strike the most casual observer, is the extreme poverty of the reproduction of the sal; the characteristic abundant advance growth, pushing up rapidly through the openings between the parent trees or ready to shoot up together and form a close thicket the moment they are uncovered, is seldom met with here. Neither grazing nor fire has anything to do with this failure of reproduction, for blocks 17, 18 and 20 have been closed to grazing and specially protected from fire ever since 1871, and yet young sal is not any more abundant there than in adjoining areas that have always been open to cattle and annual fires. In 1874, when Messrs. Fernandez and Smythies examined these blocks, and again in 1875, when the Inspector-General of Forests inspected them, numerous yearlings and older seedlings which, in the usual way of young seedlings of tree species, died down to the root-collum every year, were to be found in the midst of the grass in the then recently-abandoned fields scattered throughout

* As very exceptional cases may be instanced four trees. One cut in 1867, is said to have yielded 300 cubic feet of sound timber. Another, found lying in the forest in 1875, had a basal diameter of 4 feet. In this latter year also two standing trees were measured and girthed respectively 8 feet 9 inches and 9 feet 2 inches.

the sal area. Most of these seedlings have since been killed outright by frost and the few that have survived in scattered patches are now periodically cut back by the same cause, some even succumbing altogether. The resulting blackened stems with their shrivelled up branches have at a distance the appearance of having been scorched by fire. Thus, while the hard, poor grass-invaded soil is now responsible for the scarcity of young seedlings, severe frosts, occurring at intervals of only a few years, give but little chance to the few which may happen to come up out in the open.

44. (II) *Teak Forest*.—Being here, as said above in para. 41, at its northern limit, teak has but little extension, being confined to those scattered localities where the soil and underlying rock are favourable and night frosts are neither too frequent nor too severe. As said before in para. 40, it is entirely absent from the Gondwana and laterite formations and is almost wholly confined to the hilly portions of the trap and Vindhyan areas, attaining its largest dimensions and being most numerous on the trap. A few trees may exceptionally reach a height of 65 feet and a girth of 5 feet and even more, but the average dimensions attainable are a height of about 50 feet and a girth of $3\frac{1}{2}$ feet, for soon after, or even before, this girth is reached, the trees become topsore and die off rapidly. In the total absence of any cultivation of the soil, penetrated, as it is, throughout by a matted mass of grass roots, the reproduction of teak is extremely backward, seedlings being rarely met with.

45. (III) *Mixed Forest with practically no Teak or Sal*.—This is by far the most widely distributed of the four main types. The principal constituent species are dhawa, seja, saj, stunted khair, ghont, salai, tendu, tinsa, bija, aonla and Bauhinias; the first seven being the most common and abundant. Mahua is found scattered nearly everywhere. Numerous harra are met with in sandy soils and on hilly ground. The amount of reproduction is very variable, but wherever there is some depth of soil, it is abundant, especially on laterite and on rough, but easy slopes, whatever the soil or rock formation. On laterite and also on sandy soils, a dense undergrowth of siharu is a notable feature. This undergrowth covers up the ground within three years of a felling, without, however, doing any ultimate harm to the associated coppice of tree species, which does not take long to push its way up through it and overtop it.

It is needless to say that in those blocks which also contain the teak type, there is not clear line of demarcation between these two types.

46. (IV) *Bamboo Forest*.—The species of bamboo here being the *Dendrocalamus strictus*, it does not of course form pure forest, but runs through types II and III, thereby essentially modifying the character of these types and justifying the establishment of the mixture into a separate type. The bamboo flowered throughout the Division 5—6 years ago, so that very few of the old productive clumps are now left. The resulting reproduction has been all that could be desired and will begin to yield saleable culms in another 6—8 years.

ARTICLE 6.—*Injuries to which the Crop is liable.*

47. The chief sources of injury are (a) fire, (b) grazing, (c) night frosts and, in a minor degree, (d) climbers.

48. *Fires*.—None of the forests of the Division are in the slightest degree self-protected. Without special protective measures fires begin to rage, according to the species which form the crop and to the locality, between November and January, and the season for fires does not terminate until near the end of June, after the new grass is a few inches high and the soil has become sodden with rain. The extent of damage done by a forest fire obviously depends on the character of the forest growth. Where, in consequence of the absence of sufficient soil, the forest growth is naturally limited to a few scattered bushes and stunted trees, annual fires can do little harm, and may do some good by inducing an early and clean growth of grass.

49. *Grazing*.—A few blocks excepted, the average grazing pressure cannot be said to be excessive (see Appendix IV). As shown in the statement below, certain areas have, for various reasons that need not be specified here, been closed against cattle. But even after excluding these areas, the average incidence must be pronounced to be not excessive. Owing, however, to the unequal distribution of the forests as well as of the population and to the tendency of herdsmen to concentrate in certain localities, these are overgrazed, while others are scarcely frequented at all. As is to be expected, natural reproduction in the overgrazed areas is practically *nil*, and no improvement can be hoped for until the grazing is better regulated.

Year.	AREA IN SQUARE MILES.		
	Closed to all animals.	Closed to browsers.	Open to all animals.
1892-93	63	232	261
1893-94	62	168	304
1894-95	62	168	303
1895-96	83	320	129
1896-97	83	320	124
1897-98	63	...	471
1898-99	73	...	464

50. *Night-frosts*.—Severe night-frosts occur at intervals of a few years, doing considerable damage everywhere except on the higher slopes and hill-tops and plateaux. In exceptional years the tallest trees look, after a single night of frost, as if all their leaves and twigs had been scorched by fire. Many permanent grassy blanks of greater or less extent in low situations are the direct result of frost, whatever little forest growth that may put in an appearance being killed off almost as fast as it shows itself. It is necessary here to draw attention to the fact that nothing short of a complete or almost complete canopy of trees can serve as a protection to young growth; hence the futility of keeping standards as a safeguard against frost (see also paragraph 100 below).

51. *Climbers*.—Climbers are fairly common in places, especially Makor and Mahol, but the damage they do is inconsiderable and no special measure is required beyond cutting them down and pulling up by the roots the smaller individuals when the coupes containing them come to be felled.

CHAPTER III.—SYSTEM OF MANAGEMENT.

ARTICLE 1.—*Past and Present Systems of Management.*

52. This subject will be best considered under five distinct periods as follows:—
(i) Prior to 1862, (ii) 1862—71, (iii) 1871—87, (iv) 1887—93 and (v) from 1893 up to date.

53. *Prior to 1862* forests were considered a free gift of nature, that grew of themselves and required no conserving.

54. *1862—71*.—Soon after the first foundations of forest conservation in these provinces were laid in 1862 by the appointment of a Conservator of Forests, attention was attracted to blocks 17, 18 and 20 in the north-eastern corner of the Jubbulpore district. In these blocks operations were being carried on for the supply of sal, saj, kahu and rohin sleepers to the East Indian Railway. In March 1863, they were visited by the Inspector-General of Forests accompanied by the Conservator of Forests and were pronounced to be, on the whole, very favourable for the production of sal. It was, however, not until 1865 that the first effective move was made to bring them under some sort of protection and not until 1867 that they, together with block 59 in the Mandla district, were demarcated and formally reserved. In the meantime heavy fellings had been continued in them and nearly all the sal, saj, kahu and rohin trees that were considered capable of furnishing broad-gauge sleepers had been felled. In 1871, in accordance with the ideas of forest conservation then prevailing, they, as well as block 59, were closed to all cutting and grazing.

The forests which constitute the remainder of the present Jubbulpore Division were under no kind of management until they came, as Unreserved Forests, under the operation of the Forest Act (VII) of 1865. They were, however, placed under the control of the Deputy Commissioners. It was found convenient for revenue purposes to lease them out to annual farmers, on whom no restrictions were imposed except that they were bound to rigidly respect a few species, such as teak, sal, mahua, achar, &c.

After 1863 all the reserved forests that were situated within the limits of the present Jubbulpore Division, formed part of the Northern Division, which included all the reserved forests in the Mandla, Jubbulpore, Damoh and Saugor districts. As said above, the other State forests were administered by the Deputy Commissioners.

55. *1871—1887*.—The four Reserves (blocks 17, 18, 20 and 59) still forming a part of the Northern Division, continued to be closed to cattle and to the woodcutter, although several thousand dead and dying sal trees were extracted by departmental agency and sold for mine props to the Umaria Colliery from the first three blocks in 1886-87.

The Unreserved forests were, soon after the promulgation of the Indian Forest Act (VII) of 1878, declared Reserved Forests, but the farming system still remained in force.

56. *1887—93*.—In 1887 all the forests of the Jubbulpore district, together with the Singrampur Reserve, were constituted into a separate Forest Division under its present name and for the first time a superior Forest Officer was placed in charge of all the areas, the original as well as the later reserves of 1879 that had until then been under the control of the Deputy Commissioners unassisted by a professional officer. Singrampur was ultimately detached in 1891 when the Damoh Forest Division was formed. In 1891 the Dhanwahi Range of the Mandla Division was, with a view to administrative convenience, transferred to the Jubbulpore Division, thus completing the present constitution of this Division.

With the commencement of this period the farming system was abolished and replaced by the license system, under which a person provided with a license could go into any forest or forests named therein and cut and remove the produce thereunder purchased, selecting the trees himself and felling them in the manner most convenient to himself or to his woodcutters. This was unquestionably a long step in advance of the previous farming régime, but the straightest and most promising stems of the most valuable species continued to be cut as before, leaving in the forest nothing but unsaleable rubbish and unsightly pollards and rendering future improvement more and more difficult.

57. *1893 to date.*—In 1893 it was decided to stop indiscriminate cutting and to divide up the forests into annual coupes and confine the fellings in any particular year to the coupes assigned to that year, in other words, to introduce systematic exploitation according to working plans. The preparation of Working Plans was accordingly at once vigorously taken in hand, but the earlier plans were not practical and could not be followed and have had to be abandoned. Since 1897, the prescriptions of the present plan have been worked up to so far as the disturbing factors of recurring famine and agricultural distress have allowed.

Every endeavour is made to sell the coupes of the felling series standing. If no purchasers are forthcoming, work is undertaken departmentally where an effective demand exists; otherwise no felling takes place. All exploited coupes are closed to grazing for a period of 10 years, but the gleaning of dead and fallen wood is permitted everywhere.

Minor produce is exploited, as far as possible, by means of leases, which are given out by blocks or sub-ranges and which are, except in the case of lac, annual.

ARTICLE 2.—*Special Works of Improvement undertaken.*

58. These are (A) Protection from fire, (B) Improvement Fellings, (C) Cultural operations, (D) Construction of Roads, and (E) Construction of Quarters for the Establishment.

A.—Protection from Fire.

59. As in other Divisions, so here, the forests are under three degrees of protection. Under A degree the forests are completely insulated by means of fire-traces and fire-guards are employed to patrol the traces and frequented lines of traffic and to see that the traces do not become ineffective by the covering of dead leaves shed by the trees which flank them; under B degree the forests are fire-traced just as under A degree, but no special establishment of fire-guards is entertained, while under C degree no further protection is sought beyond what is afforded by the five Rules comprised in Chief Commissioner's Notifications Nos. 3554 and 2823 of 12th June 1890 and 21st June 1894 respectively, and sub-clauses (a) and (b) of clause 4 of Section 78 of the Indian Forest Act (see Appendix V).

60. Fire-prevention operations (under A degree) were first undertaken in this Division in blocks 17, 18, 20 and 59 in 1871 and by 1893-94 protective measures against fire in one or other of the three forms became general throughout the Division. The following statement gives the result and cost of these operations by ranges as recorded in the Divisional Annual Reports:—

Range.	Acreage attempted under degree.			Acreage actually protected under degree.			Cost under degree.	
	A.	B.	C.	A.	B.	C.	A.	B.
1895-96.								
Murwara ...	49,670	5,047	...	49,270	4,947	...	674	...
Sihora ...	19,536	40,754	...	19,286	40,453	...	96	70
Jubbulpore ...	37,360	...	80,431	36,906	...	73,887	1,198	...
Bargi ...	22,640	...	...	22,079	...	...	50	...
Dhanwahi ...	50,328	34,365	...	50,203	34,365	...	786	47
Total ...	179,534	80,166	80,431	177,744	79,765	73,887	2,804	117
1896-97.								
Murwara ...	49,670	5,047	...	49,577	5,047	...	673	...
Sihora ...	9,286	51,004	...	9,257	50,963	...	54	6
Jubbulpore ...	37,360	...	77,300	37,204	...	55,022	1,161	...
Bargi ...	7,461	15,179	...	7,461	15,179	...	8	...
Dhanwahi ...	50,328	34,365	...	47,125	34,365	...	733	...
Total ...	154,105	105,595	77,300	150,624	105,554	55,022	2,629	6
1897-98.								
Murwara ...	36,219	...	51,295	34,903	...	49,748	764	...
Sihora ...	992	22,241	38,807	992	21,029	29,143	35	62
Jubbulpore ...	32,860	4,500	...	32,222	4,163	...	1,032	36
Bargi ...	1,411	...	30,704	477	...	25,912	22	...
Dhanwahi ...	24,522	7,121	92,017	20,432	4,110	21,207	616	5
Total ...	96,004	33,862	212,823	89,026	29,302	126,010	2,469	103

N.B.—Separate figures by Ranges are not available for 1895-96 and 1896-97 for areas under B degree of protection.

No expenditure was incurred on areas under C degree of protection.

It should be stated that the figures tabulated above are far from trustworthy. It has been proved by reference to original records that many extensive fires were never reported to the Conservator, some not even to the Divisional Officer. Moreover, many of the forests entered as having been under A and B degrees of protection had never been fire-traced at all.

61. In the subjoined statement will be found average figures compiled from the data of the past three years regarding the length, width and cost of the fire-traces and the number of fire-guards employed :—

Range.	FIRE-TRACES, THEIR			Number of Fire guards.
	Length in miles.	Width in feet.	Cost per run- ning mile.	
			Rs. a. p.	
Murwara	308	10—50	1 1 2	23
Sihora	61	20—40	0 13 2	2
Jubbulpore	310	20—40	0 14 6	42
Bargi	...	...	...	3
Dhanwahi	242	10—100	1 9 3	13
For Division ...	921	10—100	1 2 2	83

B.—Improvement Fellings.

62. These fellings have been carried out as shown in the statement below. It is, however, feared that the acreages are not in every case accurate :—

Range.	BLOCK.			ACREAGE WORKED OVER IN						
	No.	Name.		1892-93.	1893-94.	1894-95.	1895-96.	1896-97.	1897-98.	1898-99.
Murwara ...	113	Bhainswahi ...	...	...	...	487	...	8	8	...
	11	Majhgawan ...	...	...	...	...	...	186	...	...
	105	Lakhapateri ...	...	...	...	...	...	30	...	...
	10	Darori ...	...	...	...	...	...	...	162	...
	12	Bijori ...	...	...	...	...	...	...	127	138
	13	Gopalpur ...	...	...	...	...	...	...	84	176
	106	Jalasur ...	...	...	...	...	...	...	7	...
	111	Mamar ...	...	...	...	...	...	...	...	286
	108	Pathori ...	...	...	...	...	...	...	...	57
	Total ...	...	...	...	487	...	224	388	657	
Sihora ...	22	Jhapi ...	...	...	...	...	30	...	...	...
	27	Chheolapani ...	...	...	...	...	160	32	...	...
	28	Dhanwahi ...	...	...	...	...	102	143	...	...
	23	Jorpahar ...	...	...	...	...	...	31	...	...
	29	Hargarh ...	...	...	...	...	...	141	...	...
	102	Amoch ...	...	...	...	...	...	...	2	4
	Total ...	...	...	...	...	292	347	2	4	
Jubbulpore ...	44	Chitri ...	...	...	...	...	...	...	...	106
	45	Bijapuri ...	...	...	...	...	...	...	...	3
	50	Gangai ...	...	125	249	220	112	43	...	36
	51	Dasrathpur ...	...	...	...	...	...	...	...	3
	41	Taunri ...	...	20	5	253	460	62	230	183
	42	Borha ...	...	...	...	...	...	120	...	...
	43	Sakri ...	...	191	165	88	74	62	...	94
	46	Lower Gaur ...	...	226	183	157	170	95	6	91
	39	Kundwara ...	...	...	...	...	...	...	60	20
	Total ...	...	562	602	718	816	382	296	536	

Range.	BLOCK.			ACREAGE WORKED OVER IN							
	No.	Name.		1892-93.	1893-94.	1894-95.	1895-96.	1896-97.	1897-98.	1898-99.	
Bargi	...	83	Chhindwaha	...	...	...	...	200	...	...	...
		91	Bargi	...	...	...	...	50	...	...	15
		96	Kelon	...	...	...	...	11	...	...	24
		93	Semra	...	...	...	...	31	...	...	...
		94	Tigra	...	...	...	...	15	...	...	...
		92	Narainpur	...	...	50	...	...	70	37	17
		88	Silua	...	...	...	...	...	...	...	52
			Total	...	...	50	...	200	177	37	108
Dhanwahi	...	84	Kathotia	...	2	...	...	...	3½	...	20
		80	Jamunia	...	202	190	113	300	...	...	...
		79	Bijadoni	...	...	120	330	220	70	...	20
		81	Dobhi	...	...	...	...	...	192	124	...
		62	Kalpi	...	...	...	...	...	280	1,062	95
		48	Richhai	...	...	...	...	...	...	...	60
		69	Sahajpuri	...	...	...	...	...	...	...	26
		59	Barangda	...	...	...	...	...	...	...	68
			Total	...	204	310	443	520	545½	1,186	289
		GRAND TOTAL	...	766	962	1,648	1,828	1,675½	1,909	1,594	

63. A few words are necessary regarding the nature of the above fellings. Since the past two years they have been for all practical purposes coppice-with-standards fellings; the crop being everywhere composed of crooked or unsound or stunted and hide-bound stems, nearly every individual requires to be cut back in order to produce a new generation with some promise before it. Before 1897-98 the fellings were restricted to those places where the density of the crop was higher than $\frac{1}{2}$, and not only this, but the proportion of the crop removed was variable: whereas in some coupes only 40—60 stems per acre were left as standards, in others only a stem here and there was taken out, the selection in either case depending on no fixed principles, but almost exclusively on the judgment of the coolie employed to mark the coupe in question. The rule now is that no one of lower standing than a Sub-range Officer shall mark a coupe and that the Divisional Officer himself shall every year operate over limited areas in each Sub-range, thus providing models for the guidance of his subordinates.

C.—Cultural Operations.

64. As a rule, these operations consisted in scattering with the hand mixed seeds over patches 2 feet X 2 feet and 10—20 feet apart from edge to edge. The results are absolutely *nil*. The areas thus treated were as below:—

Year.

1891-92 ... A small area in Block 84.

1893-94 ... 5 acres in Block 11, 15 acres in Block 41, 31 acres in Block 46 and 3 acres in Block 80.

1894-95 ... 4 acres in Block 113.

In 1886-87 a small plantation of teak and sissoo was made in Block 46 on the bank of the Gaur river, result again *nil*.

A few coupes, after being felled, were sown broadcast without any preliminary preparation of the ground, in one case (Block 11, which originally contained no bamboo at all) bamboo seed being used. A few bamboo seedlings 2—3 feet high are still to be found after a minute search, while as regards the other species the results are obviously impossible to distinguish owing to the presence also of self-sown plants.

D.—Construction of Roads.

65. Short lengths of fair-weather roads intended to last only one or two seasons have been made as required for the extraction of produce where the ground was absolutely impassable for carts. The average annual expenditure on account of roads during the past nine years has been only Rs.495. A larger expenditure would have had a marked permanent beneficial effect on the revenue.

E.—Buildings.

66. This Division is extremely backward in the matter of accommodation for both the controlling and protective staffs. In 1871 an officer's rest-house and a set of Forester's quarters were erected at Khitoli. The rest-house was dismantled for no assignable reason in 1893 or 1894, and the range of subordinates' quarters is still the only accommodation we have to offer to a large staff of low-paid men living under the most unhealthy conditions. The rest-house has just been restored on an improved plan at a cost of Rs.232. In 1891 a small officer's rest-house was built at Dhanwahi in the Dhanwahi Range; it is, however, altogether unsuitable for the purpose and is scarcely ever used except by subordinates. Moreover, it is now in a dangerous condition.

A Range Officer's house was constructed in 1896-97 at Panagar. This place is, however, absolutely out of touch with the forest portion of the range. For this reason, and also because the site as well as the plan of the building was bad, the house had to be dismantled, the woodwork being removed to Umaria, where the Head-quarters of the Sihora Range will be built, and the rest of the materials sold.

ARTICLE 3.—Past Revenue and Expenditure.

67. The average annual Revenue and Expenditure of the past five years (two of them famine years) is exhibited below by ranges according to Budget sub-heads:—

Budget.	Sub-heads.	Mur-wara.	Sihora.	Jubbulpore.	Bargi.	Dhanwahi.	Divisional Office.	Total.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
RI <i>a</i>	Timber	9	...	35	...	45	...	89
„ <i>b</i>	Firewood and charcoal ...	1,599	163	1,220	22	804	3	3,811
„ <i>c</i>	Bamboos	1	...	16	...	15	3	35
„ <i>e</i>	Grass and other minor produce ...	129	...	10	...	124	...	263
RII <i>a</i>	Timber	79	55	330	107	920	...	1,491
„ <i>b</i>	Firewood and charcoal ...	3,492	258	2,579	417	2,277	...	9,023
„ <i>c</i>	Bamboos	472	235	1,521	2	1,787	...	4,017
„ <i>d</i>	Grazing and fodder-grass ...	2,406	3,686	3,332	2,079	6,055	...	17,558
„ <i>e</i>	Other minor produce ...	1,355	375	450	183	376	23	2,762
RIII	Drift and waif wood ...	12	3	...	120	181	...	316
RV <i>a</i>	Fines and forfeitures ...	14	1	14	16	3	...	48
RV <i>c</i>	Other sources	339	218	275	77	72	7	988
	Total	9,907	4,994	9,782	3,023	12,659	36	40,401
AI <i>a</i>	Timber	12	10	...	...	34	...	56
„ <i>b</i>	Firewood and charcoal ...	979	318	228	12	250	328	2,115
„ <i>c</i>	Bamboos	14	3	...	...	4	...	21
„ <i>d</i>	Grass and other minor produce ...	1	1	15	...	161	35	213
AII	Timber and other produce ...	869	836	1,784	372	2,657	1,152	7,670
AIII	Drift and waif wood ...	2	...	2	...	...	...	4
AVI <i>a</i>	Purchase of cattle	...	1	1	...	...	164	166
„ <i>b</i>	Feed and keep of cattle ...	...	...	4	...	...	4	8
„ <i>c</i>	Purchase of stores, tools and plant ...	...	...	5	...	3	19	27
AVII <i>a</i>	Roads and bridges	24	38	249	10	174	...	495
„ <i>b</i>	Buildings	84	39	181	3	188	1	496
„ <i>c</i>	Other works	3	...	22	...	5	...	30

Budget.	Sub-heads.	Mur-wara.	Sihora.	Jubbulpore.	Bargi.	Dhan-wahi.	Divisional Office.	Total.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
AVIII a	Demarcation ...	48	39	105	20	241	16	469
„ c	Surveys ...	...	1	...	...	...	40	41
„ d	Working plans ...	83	104	84	11	348	363	993
„ e	Sowing and planting ...	21	6	15	...	15	9	66
„ f	Protection from fire ...	611	66	1,123	21	563	...	2,384
„ g	Other works ...	5	...	2	...	...	...	7
AI X a	Law charges ...	...	1	2	...	2	3	8
„ b	Other charges ...	13	5	22	...	12	83	135
BI b	Superior Officers ...	...	...	...	...	...	7,863	7,863
„ c	Subordinate establishments ...	1,532	1,047	2,289	894	2,272	2,420	10,454
„ d	Office establishments ...	2	17	14	4	5	1,603	1,645
„ f	Exchange Compensation Allowance	...	...	...	...	...	859	859
BII b	Superior Officers ...	...	...	...	...	...	1,181	1,181
„ c	Subordinate establishments ...	133	80	202	125	131	227	898
„ d	Office establishments ...	6	...	...	...	...	144	150
BIII a	Stationery ...	1	2	4	1	3	50	61
„ b	Carriage of tents and records ...	1	1	1	...	...	668	671
„ c	Rents, rates and taxes ...	...	1	...	...	...	31	32
„ e	Official postage ...	2	3	1	...	...	219	225
„ f	Sundries ...	65	64	79	46	111	684	1,049
	Compensation for dearness of grain	9	8	13	7	14	3	54
	Total ...	4,520	2,691	6,447	1,526	7,193	18,169	40,546
	Net surplus or deficit ...	+5,387	+2,303	+3,335	+1,497	+5,466	-18,133	-145

CHAPTER IV.—UTILIZATION OF THE PRODUCE.

ARTICLE I.—*Marketable Products ; Quantities consumed in past Years.*

68. The various products of these forests which are in demand and marketable are given below arranged according to the purposes for which they are used.

(a)—*Woods for agricultural purposes.*

Tinsa and tendu.—Girth 12—24 inches, length 10—15 feet. For plough and bullock-hoe shafts, cart poles, and sides of body of carts.

Saj.—Same sizes and purposes as tinsa and tendu, but considered very much inferior.

Khair.—Girth 12—36 inches, length 12—18 feet. For yokes, spokes and naves of wheels and bullock-hoes.

Dhawa.—Girth 12—30 inches, length 8—18 feet. Axles and axle bed-plates and sides of body of carts, plough and hoe shafts, yokes and clod-crushers.

Teak.—Thick butt-ends for felloes, spokes and naves of wheels and ploughs, thinner pieces for cart poles and yokes.

Ber.—Thick butt-ends for felloes and naves of wheels.

Dhamin.—Girth 18—24 inches, length 10—18 feet. Cart poles and axe-handles.

Siwan.—Girth 24—36 inches, length 8—12 feet. Yokes and clod-crushers.

Siharu, ber, ghont, bamboo and karonda.—Branches for fencing.

Bamboo.—Supports for pan gardens and for training bean climbers.

(b)—*Woods most largely used in building.*

Teak, saj, tinsa, dhawa, seja, bija, haldu, kaim, tendu, aonla, bel, ghont, kusam, khair, shisham.—For rafters in small houses, from 9—15 inches in girth and 12—15 feet in length. For rafters in large houses from 15—18 inches in girth and 14—16 feet in length. For posts, from 18—24 inches in girth and 18—20 feet in length.

Siharu, dhawai and nirgur.—For wattling.

Salai, gunja, chheola, ber, ghont and bamboo.—For cattle pens.

(c)—*Woods used for manufactured articles.*

Combs and measures for grain and oil.—Jamrasi, shisham, papra, khumer, dudhi and kusam.

Mortars for husking grain.—Kusam.

Mortars for oil-mills and sugarcane crushers.—Kusam, tamarind, dhawa and khair.

Pestles for husking grain.—Khair.

Walking sticks.—Bamboo, akol, khirni.

Boats.—Teak, khumer, semal.

Dug-outs.—Gugar, haldu, semal, saj, kusam and salai.

Legs of beds.—Teak, shisham, saj, tendu, bansa and ber.

Bed frames.—Teak and dhaman.

Gun-stocks.—Ber, shisham and teak.

Furniture and boxes.—Teak, shisham, haldu, kaim and ber.

Spindles for cotton spinning.—Tinsa.

Toys.—Ber, chheola, saj and dudhi.

Besides the above bamboo is used for a great variety of purposes, such as baskets, mats, corn-bins, fans, winnowing-trays, sieves, trellis-work, chairs, sofas, tables, brackets and other articles of house furniture, chicks, ghee and oil receptacles, frames of beds, matting of beds to take the place of tape, fish snares, fishing rods, umbrella handles and frames, brooms, &c., &c.

(d)—*Fuel.*

Firewood.—The most esteemed for the purpose are tinsa, dhawa, khair, ghiria, koha, ber, seja, aonla, kanker, ghont and kasai.

Charcoal for cooking.—Khair, dhawa and most other hard woods.

Charcoal for lime burning

Charcoal for iron smelting } all woods, but salai preferred.

Charcoal for blacksmiths and goldsmiths.—Teak, mahua, khair and bamboos.

Charcoal for brassfounders.—Khair, dhawa, ber, bamboo and mahua.

(e) *Articles of minor produce used for various purposes.*

Ropes and lashing.—Babai grass, chheola roots, mahol bark.

Oil for burning and culinary purposes.—Gulli (fruit of mahua).

Medicinal oil.—Seed of kanji.

Spirits.—Mahua flower.

Food.—Mahua flower, fruit of tendu, achar, mango, khirni, ber, karonda, jaman, aonla, kanker, bhilawan, and mahol, kernel of bahera and achar fruit, kachnar buds and tender bamboo shoots, baichandi roots and honey.

Fodder grass.—Muchhel, kail, gunair, sukal, parwa and sen.

Thatching grass.—Sukal, parwa and sen.

Dunnage for roofs.—Teak, tendu, chheola and mahol leaves.

Medicines.—Honey, bahera, aonla, marorphalli, amaltas, nirgur leaves, bhilawan, palas, papra sufed musli (*Curculigo orchoides*), indarjao (bark of *Holarrhena antidysenterica*, commonly adulterated with the bark of *Wrightia tinctoria*, also called indarjao, but from a medicinal point of view practically useless), baiberang (seeds of *Embelia Ribes*), banada (*Zinziber Cassumunar*), bansinghara.

Building.—Limestones and clays.

Dyeing and Tanning.—Harra, behera and ghont fruit, dhawa and aonla leaves, saj, koha and rohni bark, chheola, dhawai and siharu flowers, lac-dye and bija and chheola kino.

Other arts and manufactures.—Lac, gums, wax, horns and hides.

69. Although the marketable products are so very various and are generally obtainable in abundance, yet the supply is, in nearly every case, far in excess of the demand. Hence the very insignificant figures recorded in the following statement giving the average quantities of such products consumed annually during the past five years, for which years alone separate data are available for the several ranges as at present constituted. Where the quantity is unknown, only the value has been given :—

Particulars.	MURWARA RANGE.		SIKHORA RANGE.		JUBBULPORE RANGE.		BARGI RANGE.		DHANWAHI RANGE.		TOTAL.	
	Quantity.	Value in rupees.	Quantity.	Value in rupees.	Quantity.	Value in rupees.	Quantity.	Value in rupees.	Quantity.	Value in rupees.	Quantity.	Value in rupees.
Teak timber,	779	Rs. 81	796	64	3,457	325	464	69	2,516	354	8,012	893
Other timber	762	47	963	49	8,540	694	305	41	1,805	109	12,375	940
Firewood	105,972	2,026	18,209	382	107,124	2,417	16,844	252	205,254	2,456	453,403	7,533
" (sold standing)	...	1,383	...	222	...	261	...	334	...	88	...	2,288
Charcoal	473	53	680	33	13,523	471	1	...	2,713	366	17,390	923
Bamboos	460,467	1,747	264,765	696	423,513	1,382	491	2	264,825	1,121	1,414,061	4,948
Thorns	4,910	36	129	2	1,516	29	145	6	8,405	92	15,105	165
Grass	2,748	27	658	12	1,144	23	209	2	5,406	65	10,165	129
"	...	117	...	8	...	227	...	11	...	25	...	388
"	...	54	49,446	4	1,448,389	99	5,010	1	206,991	124	2,278,929	282
Babai grass	86	3	106	4	452	31	...	...	20	1	664	39
Chhind	4	...	16	1	8	1	...	...	1	...	29	2
Roots for fibre	149	11	77	6	1,403	51	...	...	50	4	1,679	72
Leaves	1,322	10	49	1	1,011	23	317	2	2,676	32	5,375	63
Hides	16	5	11	2	29	7	...	...	68	12	124	26
"	...	95	...	100	...	65	...	47	...	156	...	463
Horus	81	6	11	2	35	4	3	1	6	2	136	15
Lac	192	192	...	...	...	...	...	...	...	...	192	192
"	...	207	...	35	...	26	...	54	...	308	...	630
Harra	...	311	...	19	...	49	...	...	...	197	...	576
Drift and waif wood	...	27	...	2	...	2	...	309	...	32	...	372
Mahua	...	154	...	...	...	13	...	34	...	13	...	214
Achar	...	1	...	...	...	2	...	...	...	...	...	3
Other fruits	3	1	...	...	10	2	...	...	2	1	15	4
Limestones, clays, &c.,	2	...	...	...	15,624	21	...	...	14	...	15,640	21
Bark	1	...	9	1	241	15	...	...	21	1	272	17
Other minor produce,	...	272	...	66	...	142	...	45	...	158	...	683

ARTICLE 2.—*Lines of Export.*

70. These will be conveniently considered under the three heads (i) Railways, (ii) Roads and (iii) Water-carriage.

71. *Railways.*—Jubbulpore town is the junction of the Great Indian Peninsula and East Indian Railways. The former, running nearly due west more or less parallel to the Nerbudda, leaves the district at about the 20th mile from Jubbulpore, while the latter, continuing the iron-road north-eastwards, traverses the rest of the length of the Division for nearly 70 miles. At Katni this railway is met by the Bengal-Nagpur line coming westwards from Bilaspur and by the Bina branch of the Indian Midland system coming eastwards from Saugor and Damoh.

72. *Roads.*—We have either (A) roads which, being bridged, sometimes also metalled are capable of carrying cart traffic all the year round, or (B) fair weather roads, which are absolutely closed to cart traffic during the south-west monsoon.

The roads of Class (A) are :—

1. The Jubbulpore-Mirzapur road, which closely follows the line of the East Indian Railway and taps blocks 102, 105, 106 and 115.
2. The Jubbulpore-Damoh road, running in a general north-westerly direction and passing through the large village of Katangi and tapping Block 100.
3. The Jubbulpore-Seoni road, running in a general south-westerly direction and tapping blocks 87, 88, 91 and 92 of the Bargi Range.
4. The Jubbulpore-Mandla road, which after leaving the Jubbulpore district traverses the Dhanwahi Range in a south-easterly direction, tapping blocks 48, 62, 63, 79 and 80.
5. The Jubbulpore-Kundam road, running west and tapping blocks 45, 46 and 50.
6. The Murwara-Barhi road, running due east and tapping blocks 11, 12, 13 and 15.
7. A portion of the Damoh-Mirzapur road which enters this district about 16 miles north-west of Murwara and runs through the northern extremity of the district for about 20 miles, passing close to Block 111.
8. Sihora-Salaiya road, connecting the East Indian and Indian Midland Railway stations bearing those names and tapping blocks 103 and 108.
9. The Murwara-Bilheri road, a short length of about 11 miles, tapping Block 112.

The fairly good roads of Class (B) comprise the following :—

1. From Sihora to Kunharwara, running almost due west from Sihora and tapping Block 101.
2. From Sihora to Kundam, tapping Block 37.
3. From Murwara to Rithi, tapping Block 111.
4. From Kaiwara to Barhi, tapping Block 6.
5. From Kaiwara to Juwara, tapping Block 8.
6. From Barhi to Bhada, tapping Block 5.
7. From Barhi to Chandia *viâ* Khitoli, tapping blocks 16, 17, 18 and 19.
8. From Rupaund to Block 23.
9. From Rupaund to Kudrao, tapping blocks 22 and 24.
10. From Bilheri to Block 110.
11. From Sleemanabad, through Block 26, to Jhiria.
12. From Sleemanabad to Block 27.
13. From Sleemanabad *viâ* Kurai to Block 104.
14. From Umaria to Khamtara, passing through Blocks 30 and 25.

15. From Panagar to Khimaria, passing through Block 43.
16. From Khimaria to Block 45.
17. From Lakhanwara through blocks 44, 41A, 41, close to Block 38 and on to Block 33.
18. From Chhatarpur, through Block 42, on to Murodh and finally on to Block 40.
19. From Mandia Khurd, through blocks 34 and 35 on to meet No. 9.
20. From Chhindgaon, through Block 55, to Menri.
21. From Kalpi, through Block 62 and on to Lakhanpur.
22. From Samnapur on to Lakhanpur, tapping Block 79.
23. From Lakhanpur, through Block 75, on to Maneri and finally on to Block 72.
24. From Purwa to Raichor in the Seoni district, passing through blocks 90 and 93.

73. From the accompanying index trace on the scale of 1 inch = 4 miles it will be seen that the above lines of transport form a very tolerable system of main lines of communication; but comparatively few are in immediate contact with the forest areas of this Division, and an internal system of feeder and subsidiary roads, to tap and open up the various coupes, is urgently needed.

74. *Transport by Water.*—The Mahanaddi, the Nerbudda, and the Gaur (one of the tributaries of the Nerbudda) all form possible lines of export. So far, however, the Nerbudda alone has been utilised. This river forms the southern boundary of the Dhanwahi Range and the eastern and northern boundaries of the Bargi Range, tapping, above the great timber mart at Gwari Ghat, blocks 62, 65, 67, 69, 70, 72, 73, 74, 75 and 77 of the Dhanwahi Range and blocks 83, 84, 85, 85A and 86 of the Bargi Range. Floating is effected chiefly from September to the end of December, but is still possible, in favourable years, up to the end of February, the rates in these latter months, however, becoming prohibitive.

The time of transit from Kudna Ghat, the highest point from which floating can take place, to Gwari Ghat, during the months of September and October is about 8 days. In December it is as much as 1½ months.

The following statement gives the cost of floating from various points down to Gwari Ghat at different times when floating is possible:—

From.	TIMBER PER 100 POLES OF GIRTH								Firewood per stack of 25 mannds.		Bamboos per 1,000.	
	1'	1½'	2'	3'	1'	1½'	2'	3'				
	September to December.				January to February.				Sep. to Dec.	Jany. to Feb.	Sep. to Dec.	Jany. to Feb.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Khamaria	2 0 0	3 0 0	4 0 0	5 0 0	3 0 0	4 0 0	5 0 0	6 0 0	0 8 0	0 12 0	1 8 0	2 0 0
Kisli	2 0 0	3 0 0	4 0 0	5 0 0	3 0 0	4 0 0	5 0 0	6 0 0	0 8 0	0 12 0	1 8 0	2 0 0
Mirki	2 0 0	3 0 0	4 0 0	5 0 0	3 0 0	4 0 0	5 0 0	6 0 0	0 8 0	0 12 0	1 8 0	2 0 0
Kathotia	2 0 0	3 0 0	4 0 0	5 0 0	3 0 0	4 0 0	5 0 0	6 0 0	0 8 0	0 12 0	1 8 0	2 0 0
Cbulia	2 8 0	3 8 0	4 8 0	5 8 0	3 8 0	4 8 0	5 8 0		0 12 0	1 0 0	2 0 0	3 0 0
Sahajpuri	2 8 0	3 8 0	4 8 0	5 8 0	3 8 0	4 8 0	5 8 0		0 12 0	1 0 0	2 0 0	3 0 0
Tatighat	3 0 0	4 0 0	5 0 0	6 0 0	4 0 0	5 0 0	6 0 0		0 14 0	1 2 0	3 0 0	4 0 0
Chutka	3 0 0	4 0 0	5 0 0	6 0 0	4 0 0	5 0 0	6 0 0		0 14 0	1 2 0	3 0 0	4 0 0
Patta	3 0 0	4 0 0	5 0 0	6 0 0	4 0 0	5 0 0	6 0 0		0 14 0	1 2 0	3 0 0	4 0 0
	October and November.				December.				Oct. to Nov.	Dec.	Oct. to Nov.	Dec.
Piparia	3 0 0	4 0 0	5 0 0	6 0 0	4 0 0	5 0 0	6 0 0		1 0 0	1 4 0	4 0 0	5 0 0
Kudna	5 0 0	6 0 0	7 0 0	8 0 0	No floating possible.				1 0 0	No float- ing.	4 0 0	No float- ing.

Insufficient depth of water for floating pieces of such size.

75. A serious, practically prohibitive, obstacle to the export of forest produce from the Bargi Range to Jubbulpore is the Public Works Department toll station established at Gwari Ghat, the only easy crossing of the Nerbudda river for heavy traffic.

This drawback has been represented to the Administration and the necessity of abolishing all dues except actual ferrying charges during the rainy season has been urged both by the Commissioner and the Conservator.

No.	Description.	Amount of Toll.
		Rs. a. p.
	<i>A.—Persons.</i>	
1	On every person whether carrying a load or accompanying an animal or vehicle or not	0 0 3
	<i>B.—Animals not drawing any vehicle for which toll can be demanded.</i>	
1	On every elephant	2 0 0
2	„ camel { a. laden { b. unladen	0 2 0 0 1 0
3	On buffaloes, bullocks and other like cattle per head { a. laden { b. unladen	0 1 0 0 0 9
4	On every horse	0 2 0
5	„ pony or mule { a. laden { b. unladen	0 1 0 0 0 9
6	„ donkey { a. laden { b. unladen	0 0 6 0 0 3
7	Sheep, goats and swine, for every three or fraction of three	0 0 6
	<i>C.—Vehicles.</i>	
1	On every two-wheeled carriage on springs (including bicycles and tricycles) ...	0 3 0
2	„ four-wheeled carriage on springs	0 4 0
3	„ cart laden with grass, wood, stone or <i>bona fide</i> building materials— (a) Two wheels, tyres 2½" or more (b) „ „ „ tyres under 2½"	0 2 0 0 5 0
4	On every other laden cart— (a) Two wheels, tyres 2½" or more (b) „ „ „ tyres under 2½" (c) More than two wheels, tyres 2½" or more	0 4 0 0 7 0 0 5 0
5	On every empty cart— (a) For each pair of wheels with tyres 2½" or more (b) „ „ „ „ „ under 2½"	0 1 0 0 2 0
6	On every ekka, chhakra and ringi	0 2 6

If to the above figures be added the octroi charged on entering Jubbulpore and the cost of collection and transport, there is absolutely no margin left for the smallest Government royalty on firewood and the inferior classes of timber which together constitute 99 per cent. of the produce of the Bargi Range.

ARTICLE 3.—*Markets.*

76. In addition to the small local centres of consumption the principal markets for the produce of these forests are the following towns:—

1. *Jubbulpore*.—The town and Cantonment of Jubbulpore with a total population of 90,000, about 2,000 being Europeans. Enormous quantities of harra are brought here for export, chiefly to the Port of Bombay, "Jubbulpore myrabolams" being a special line in the London market.

2. *Gwari Ghat* on the Nerbudda is for all purposes the port of receipt for Jubbulpore, with which it is connected by an excellent bridged and metalled road.

3. *Murwara*.—A thriving tahsili town of nearly 10,000 inhabitants on the East Indian Railway 57 miles north of Jubbulpore, famous for its extensive lime-industry, which consumes about 1,000,000 maunds of firewood. There is a small lac factory here and a by no means inconsiderable quantity of lac and harra comes here for sale.

4. *Sihora*.—The Head-quarters of the Sihora tahsil, also situated on the East Indian Railway, about half-way between Jubbulpore and Murwara and possessing the same population as Murwara. It is the centre of an extensive grain trade.

5. *Panagar*.—Also on the East Indian Railway, with a population of about 4,500 souls. An important weekly bazar is held here, to which numbers of cattle and large quantities of timber, firewood and bamboos are brought for sale.

6. *Barela*.—Population 3,166, consumes a considerable quantity of the produce of the Dhanwahi Range.

77. Other small towns of some importance are Bilheri (population 2,750), Bijeragogarh (population 2,450), Majholi (population 2,270), and Silondi (population 2,050). There are many wealthy and enterprising persons in the last-named town who trade in forest produce.

78. The iron industry of the Jubbulpore district, now in a state of collapse owing to the introduction of cheap European iron in convenient form, consumed formerly an enormous quantity of charcoal. If the present endeavours to revive it are successful, there will be a demand for all the fuel which the forests of the Jubbulpore district can produce. At the present time there are some 41 furnaces at spasmodic or regular work. Of these 7 are in the Sihora Range, 4 in the Murwara Range and 30 in the Jubbulpore Range.

A furnace in regular blast works about 180 days in the year and consumes during that time on an average nearly 4,000 maunds of wood, the corresponding outturn of crude pig-iron being 319 maunds from 802 maunds of ore. The present average annual yield of an acre being roughly 25 maunds of firewood, 160 acres are required to keep one furnace going.

The iron ores of the district are rich in metal, as proved by the following figures :—

			Ferric Oxide.		Iron.
Schistose hematite	...	...	98 per cent.	63	per cent.
Micaceous iron	...	...	92	65	"
Semi-ochreous hematite	...	...	98	69	"
Manganiferous hematite	...	...	66	46	" Also 12 per cent. of manganese.

ARTICLE 4.—*Mode of Extraction and its Cost.*

79. As far as possible, timber and firewood coupes are sold standing, the purchaser being bound by strict conditions in order to ensure the observance of silvicultural considerations. Otherwise felling and sometimes even export are carried out departmentally. Outside the Regular Felling Series coupes, petty purchasers holding licenses are allowed to come and cut what they like, leaving the standards untouched. By land produce is removed either in carts or by head or kanwar loads, or on pack animals (bullocks, ponies and donkeys). The daily hire of a cart is 9—12 annas, the load varying from 10—12 maunds on fair-weather tracks to 20 maunds and even more on bridged and metalled roads. Pack animals can be obtained at 8 annas a day and draught bullocks at about 4 annas a day each.

The cost of cutting firewood ranges from Re.1 to Re.1-4-0 per stack of $25 \times 3 \times 5'$. Charcoal is made at Rs.20 per 100 maunds.

The daily wages usually paid for labour are :—

Per man	...	...	...	...	...	...	2—2½ annas.
„ woman	...	...	...	...	...	...	1½ „
„ child	...	...	...	...	...	...	1 anna.

ARTICLE 5.—*Net Value of each Class of Produce.*

80. The net value of each class of produce must obviously vary from time to time with the extent of the demand for it and the labour of putting it on the market, which latter condition will itself depend on the nearness to markets and degree of accessibility of the forests. Until a few years ago a single set of rates was fixed for all forests independent of these considerations, the result being that there was no sale for produce from any forests except those which were situated within a few miles of central markets or which were tapped by good roads. Since an endeavour has been made to adopt a sliding scale of rates diminishing with increasing distance and difficulty of access, we have been handicapped by years of recurring famine and distress. It is therefore as yet impossible to state with any accuracy the net value of the various classes of produce.

As far as agriculturists are concerned the maximum rates of royalty we may charge them have been fixed for us by Chief Commissioner's Resolution No. 102, dated the 5th January 1893, an abstract of which will be found at the end of this Report as Appendix I.

CHAPTER V.—MISCELLANEOUS FACTS.

ARTICLE 1.—*The Forest Staff.*

81. The strength and distribution of the subordinate out-door and clerical establishments as at present sanctioned are shown in the following statement :—

Range.	Whether permanent or temporary.	Monthly Salary (Rupees.)																			Khalasi.	Dak- runner.	Orderlies.	Drafts- man.	Total month- ly cost.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Rangers.		Deputy Rangers.		Foresters.		Forest Guards.				Range Moharitra.		License- vendors.		English Clerks.		Vernacular Clerks.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Murwara.	Permanent ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...</

ARTICLE 2.—*Labour Supply.*

82. Except during the sowing and harvesting seasons, *viz.*, February, March, June, July and from the beginning of September to the middle of November, labour is easily procurable and sufficient for all forest purposes.

The Forest villages mentioned in para. 33 have been specially established under Chief Commissioner's Revenue Book Circular Section VII, Serial No. 2, in order to have always at hand a permanent and constant supply of work-people who are by caste and occupation habituated to the extraction and handling of forest produce.

PART II.

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED.

CHAPTER I.—BASIS OF PROPOSALS.

ARTICLE 1.—*Working Circles how composed ; Reasons for their Formation.*

83. Of the four main types which compose the stock, the teak and miscellaneous types require and will always require one and the same mode of treatment, while the sal type is in such a ruined condition that it is for the present unfitted for any other intrinsically different method of exploitation. Hence from a silvicultural point of view there need be only a single working circle. For convenience of administration, however, it is expedient and necessary to constitute four working circles conterminous with, and named after, the five Ranges, *viz.*, Murwara, Sihora, Jubbulpore, Bargi and Dhanwahi.

ARTICLE 2.—*Compartments ; Justification of the Sub-division adopted.*

84. For the examination of the forests preliminary to the framing of the present proposals, the smaller blocks have been treated as single compartments, while the larger blocks have been divided into two or more compartments. These proposals being of a very elementary character, an elaborate parcelling out of the forests would have been entirely superfluous. But for the future the formation of compartments of convenient size cannot be dispensed with, and the best compartments will be the coupes to be now adopted.

ARTICLE 3.—*Analysis of the Crop ; Method of Valuation employed.*

85. An analysis of the crop has been effected in the roughest manner consonant with the inferior character of the crop, the simple requirements of the consumers and the low prices prevailing. No valuation survey has been made, but the density of the stocking in different parts has been estimated with the eye and the distribution of the four main types of growth has been noted in a general manner ; the results, however, not being worth recording here.

CHAPTER II.—METHOD OF TREATMENT.

86. The remarks in this Chapter do not apply to the treatment of bamboos, which is prescribed in paras. 117—119 below.

ARTICLE 1.—*Objects sought to be attained.*

87. The main objects to be sought are :—

(i) The replacement of the present scrubby, generally crooked, often unhealthy growth which is capable of yielding scarcely anything better than firewood, by a new stock composed of a larger proportion of the better species and consisting of straight sound stems, some of which will in time develop into moderate-sized and even large timber.

(ii) The augmentation of the production in respect of every article by means of conservative and specially directed management.

(iii) The timely utilisation of deteriorating material and of material which no amount of preservation can improve.

(iv) While accomplishing these three objects specially connected with the maintenance and improvement of the forests and their economic utilisation, constant provision of a sufficient area for grazing and supply of wood within easy distance of every village requiring pasturage and timber and fuel.

(v) Special provision of a cheap and continuous supply of firewood for the iron-smelting industry with a view to revive and encourage it.

(vi) Improvement of communications and cheapening of transport so as to render all the remoter forests accessible to one or more great centres of demand.

ARTICLE 2.—*Method of Treatment adopted.*

88. The treatment in general will be a course of improvement fellings, in which, as in the climate and soils in question, artificial regeneration cannot be depended on at all and natural reproduction by seed would be far too slow a process to be trusted by itself to yield the desired results within a reasonable time, coppicing will play a large part in order that all unpromising stems capable of producing good stool-shoots or suckers may be made to contribute directly towards the formation of the new regenerate crop. This general method of treatment

must of course be locally modified according to the varying character of the stock and the requirements to be met. Thus, to take the two extreme ends of the scale, in sal forest, the improvement fellings will tend to approximate towards the nature of a selection felling and leave the crop as full as practicable; whereas in forests of miscellaneous species capable of yielding only fuel and situated near good markets, or in those forests which are more specially intended to supply fuel for the iron and lime industries, the fellings will be made with a freer hand and assimilate in character to fellings for coppice with standards. Then, again, if the demand is insignificant, the fellings will make hardly any impression on the stock and include only the stems whose removal is most urgent. And so on. In a word, the nature of the improvement felling will vary from forest to forest, from crop to crop, and even from group to group, being, all circumstances considered, the best that can be devised for the particular forest, crop or group to be treated. The treatment to adopt will ultimately be, in sal areas jardinage, everywhere else coppice with standards.

ARTICLE 3.—*The Exploitable Age.*

89. Age as a factor influencing the exploitability of the trees must once for all be abandoned in the working of these forests, where, seeing the great variability of the factors of soil and situation and the irregular mixture of species, a given diameter of stem may be produced in any time between n and thrice or even four times n years. So that whether during the course of the present improvement fellings or afterwards, it will almost invariably be its size and condition and its utility as a component part of the crop that will decide whether a given tree shall be cut at once or spared until the next felling. After the preceding remarks it is unnecessary to say that, so far at least as this working plan is concerned, there is no connection between the terms "exploitable age" and "rotation," which latter term will be used only in the sense of the period of return of the fellings.

CHAPTER III.—THE FELLINGS.

ARTICLE 1.—*The General Working Scheme; the Rotation and Possibility.*

90. It is evident that systematic annual fellings can be carried out only where the return will at least cover the cost of the operations. We must hence first of all separate the forests into (1) those which can be regularly worked on a commercial basis, and (2) those on which, either in consequence of the competition of private forests or of remoteness combined with the miserable quality of the present stock (the result of past maltreatment), there is little or no demand beyond what is necessary to meet the occasional wants of the sparse local population in respect of firewood and of small poles for hut-building (*nistar*).

91. The second class of areas will be considered first. If they are not at once brought under the provisions of a working plan and are merely left alone as they have been hitherto, they will certainly not improve, if they do not continue to deteriorate. They will hence be formed into 5-coupe felling series (*nistar series*), each coupe being successively opened to felling once in five years. As these areas consist of scattered blocks, each block will, as a rule, constitute an independent series, so that no village will have to go an unreasonable distance for its wood and grass and grazing. Every effort should be made to induce their inhabitants to visit the open coupes for the wood they require for their domestic purposes, and every opportunity yielded by any exceptional demand arising should be seized to get rid of the degenerate or hurtful elements of the stock. The effect of the arrangement here prescribed will be, even if the annual removals are insignificant, to subject the tracts in question to continuous and systematic supervision which they do not now get. Thus the condition and progress of the crops and all factors which in any way influence its growth will receive constant attention, so that further deterioration will be rendered impossible and no opportunity of improving it lost. The following are the areas to be worked in the manner just described:—

Working Circle.	Serial number.	BLOCKS.				Acreage.
		Name.				
Murwara	1	Guraiya	...	...	...	530
	2	Junwani	...	...	...	1,326
	3	Bara	...	...	...	1,070
	4	Karreha	...	...	...	1,267
	5	Hardua	...	...	...	2,772
	6	Banjari	...	...	...	652
	7	Surma	...	...	...	1,174
	16	Karondi	...	...	...	5,047
	112	Bilheri	...	...	...	1,285
Total					...	15,123

Working Circle.	Serial number.	BLOCKS.				Acreage.	
		Name.					
Sihora 	30	Deogarh	...	...	...	7,968	
	31	Umarpani	...	..	...	8,319	
	32	Deogawan	...	...	...	1,315	
	34	Kanharpura	...	...	...	5,669	
	35	Garhat	...	...	...	474	
	36	Punwasa	...	..	...	2,044	
					Total	...	25,789
Bargi 	89	Karanpathar	...	...	...	4,679	
	90	Lohri	...	...	...	4,515	
	93	Semra	...	...	...	4,573	
	94	Thengra	...	...	...	3,615	
	96	Kulaun	...	...	...	1,358	
	97	Piparia	...	...	...	1,159	
	98	Tontha	...	...	...	588	
				Total	...	20,487	
Dhanwahi 	53	Dhala	...	...	...	699	
	54	Pastara	...	...	...	16,399	
	55	Pararia	...	...	...	15,504	
	61	Ehondi	...	...	...	2,083	
	62	Kalpi (part)	...	...	...	18,560	
	63	Salaiya	...	...	...	492	
	64	Chargawan	...	...	..	363	
	68	Kunda (part)	...	...	...	924	
	76	Niwar-Khapa	...	...	...	76	
	78	Bilaikhapa	...	...	...	96	
	79	Bijadoni (part)	...	...	...	4,249	
	82	Pararia	...	...	...	1,060	
					Total	...	60,505
			GRAND TOTAL FOR DIVISION				...

If during the currency of this working plan the demand on any of these blocks should appreciably increase from any cause whatsoever, full advantage of this circumstance should be taken to make the treatment more intensive by augmenting the number and thus proportionately diminishing the size of the coupes. According to the extent of the increase the number of the coupes will be augmented by splitting up each of the original five coupes into two or more new coupes. The latter contingency would mean that the demand was large enough to justify the transfer of the block in question at once to the list of forests dealt with in the immediately following paragraphs.

92. The other class of areas, *viz.*, those capable of being at once worked systematically on a commercial basis, comprise all the remaining A class forests. These must be separated into (a) areas which have produced and can still produce large timber, so scarce in these Provinces, and (b) those which can never yield anything larger than the small timber constituting the bulk of the requirements of the local population and the poorer inhabitants of towns.

To the former sub-class belong only the Machmacha, Khitoli, Sutri and Karela blocks, *i.e.*, not more than 32 square miles (only 6 per cent.) out of the total area of 535 square miles composing the Division. The whole of these 32 square miles, which are situated within easy reach of two Railways, must therefore be worked exclusively in the interests of large timber.* Fortunately this is possible, for with the exception of Karela (just a little over half a square mile), the entire area has, under the orders of the Administration, been considered since

* It must not be understood from this that only large timber will be obtained from the forests so treated. Only the most promising trees will be kept to attain a large size, the rest will be cut at various ages just before they begin to deteriorate and will furnish all the classes of wood required by the village and poorer town population.

1871, as not being required for grazing, so that there is nothing in the conditions under which these forests are to be administered to restrict in any way the full application of a treatment based solely on sylvicultural considerations. Hence the improvement fellings should be passed quickly through the area, a rotation of 20 years being adopted and the four blocks being constituted into a single felling series.

93. As regards the areas falling under sub-class (b) the length of rotation will depend entirely on the intensity of the grazing pressure and will be 15, 20 or 30 years according as this is *light, moderate* or *heavy*. Such of them as are situated near iron-smelting furnaces or lime-kilns or within easy access of the town of Jubbulpore will be worked up to their full capability, only such stems being spared as belong to timber-yielding species and are certain to remain sound and in vigorous growth up to the end of the rotation. Elsewhere the severity of the fellings will obviously be commensurate with the demand for wood and only such stems will be removed as can be disposed of or, being thin and unpromising, can be cut back at slight cost to produce valuable coppice shoots possessing a certain future.

94. What has been said in the two preceding paragraphs is summarised in the following statement, which also gives the names and areas of the blocks and the constitution of the several felling series:—

Working Circle.	Serial number of Felling series.	COMPONENT BLOCKS.			Length of rotation in years.	General character of Improvement Fellings.	
		Serial number.	Name.	Acreage.			
<i>(a) To be worked specially for the production of large timber.</i>							
Murwara	I	{ 17	Machmacha	8,707	20	Light, consisting of extraction of dead and dying trees, of cleanings and thinnings in overcrowded places and of cutting back for improved regrowth where the cover is open (see paragraph 99 below).	
		{ 18	Khitoli	9,367			
		{ 19	Karela	386			
		{ 20	Sutri	2,498			
			Total	20,958			
<i>(b) To be worked specially for supply of fuel for iron-smelting.</i>							
Sibora	I	{ 37	Daroli	607	15	Practically identical with cutting for coppice with standards (see paragraph 100 below).	
		{ 38	Patna	2,409			
	VI	{ 28	Dhanwahi	575	20		
		{ 29	Hargarh	417			
	VII	33	Karopani	4,287	30		
	IX	{ 102	Amoch	470			
		{ 104	Juawal	796			
		Total	9,561				
	Jubbulpore	I	39	Kundwara	2,426		15
			II	40	Sonthi		
III		41	Taunri (part)	1,899			
Total		5,989					
GRAND TOTAL		15,550					
<i>(c) To be worked for general requirements, including fuel for lime-burning.</i>							
Murwara	II	{ 8	Jaiwara	1,672	30	Approximating in character to coppice-with-standards felling as nearly as the extent and nature of the demand for wood will allow (see paragraph 101 below).	
		{ 9	Gbugri	2,722			
	III	{ 10	Darori	1,545	20		
		{ 11	Majhgawan	1,438			
	IV	{ 12	Bijori	2,297	30		
		{ 13	Gopalpur	3,983			
	V	{ 14	Khairani	1,106	20		
		{ 15	Jhiria	1,758			
	VI	{ 21	Salaiya	341	30		
		{ 105	Lakhapateri	935			
	{ 106	Jalasur	568				

Working Circle.	Serial number of felling series.	COMPONENT BLOCKS.			Length of rotation in years.	General character of Improvement Fellings.
		Serial number.	Name.	Acreage.		
Sihora	VII	107	Pathrari	6,114	20	
	VIII	108	Pathori	2,352	30	
	IX {	109	Kena	9,941	20	
		111	Mamar	723		
	X	110	Umdar	13,451	15	
	XI	113	Bhainswahi	487		
			Total	51,433		
	II {	22	Jhapi	1,338	30	
		23	Jorpahar	191		
		24	Kudra	450		
	III	25	Bijhota (part)	1,102	20	
	IV	25	" "	14,005		
	V {	26	Katahi	4,339		
		27	Chheolapani	1,508		
	VIII {	99	Samasgarh	969	30	
		100	Jamunia	345		
		101	Mahgawan	684		
	X	103	Kuan	1,028		
			Total	25,959		
Jubbulpore	IV	41	Tauri (part)	2,740	30	
	V {	41	" "	1,044		
		41A	Pondi	3,362		
	VI	42	Bhaunraha	7,538	20	
	VII	43	Sakri	1,114		
	VIII {	44	Chitri	2,944	30	
		45	Bijapuri	458		
	IX	46	Lower Gaur	5,266		
	X {	50	Gangai	1,377	30	
		51	Dasrathpur (part)	476		
	XI	51	" "	3,566		
			Total	29,885		
	I	92	Narainpur	487	30	
	II	91	Bargi	924		
	III {	83	Chhindwaha	554		
		85	Khamkhera	289		
		85A	Salaiwara	4,451		
	IV {	86	Mankheri	347	20	
		87	Khapa	365		
		88	Silua	1,371		
			Total	8,788		
	I {	47	Kumbhi	1,103	30	
		48	Richhai	401		
		49	Bamhni-Purwa	732		
		80	Jamunia	1,603		
		81	Dohbi	4,885		

Working Circle.	Serial number of Felling series.	COMPONENT BLOCKS.			Length of rotation in years.	General character of Improvement Fellings.
		Serial number.	Name.	Acreage.		
	II	79	Bijadoni (part) ...	7,724	30	
	III	59	Barela ...	8,320		
	IV	62	Kalpi (part) ...	12,548		
		62	" "	3,247		
	V	65	Piparia ...	228		
		67	Chutka ...	484		
		72	Jamthar ...	1,537		
	VI	75	Chaonrai ...	3,898		
		77	Gumti ...	704		
		68	Kunda (part) ...	3,826		
	VII	69	Sahajpur ...	429		
	VIII	84	Kathotia ...	1,639		
			Total ...	53,308		
			GRAND TOTAL ...	169,373		
			GRAND TOTAL OF ALL THREE CLASSES ...	205,881		

It is hardly necessary to add that the coupes will be annual and that they are as equal in area as the adoption of well-marked natural boundaries has permitted.

95. All B class forests have been excluded from the prescriptions of this Article, as with scarcely a single exception they will soon be disforested for settlement on ryotwari principles. The provisions of Revenue Book Circular VII—15 will be fully carried out in the event of disforestation. In the contrary case, the areas will be transferred to class A and at once brought into the General Working Scheme sketched above.

ARTICLE 2.—*Period for which the Fellings have been prescribed.*

96. Absolutely speaking and in view of the radical economic changes which will certainly follow upon the application of this working plan, it would be best to limit its currency to ten years. But as a rotation of 30 years has been adopted for many of the forests, the fellings have, in compliance with the orders of the Inspector-General of Forests on the original Bargi Range Draft Plan, been prescribed for 30 years.

ARTICLE 3.—*Fellings whether annual or periodical; Method of their Allotment.*

97. In every series the fellings will succeed one another annually and their succession has been so arranged as to interfere as little as possible with the convenience of the villagers in respect of their grazing and other requirements. No one will ever have to go further than 3 miles from his village to get his wood or pasturage for his cattle.

ARTICLE 4.—*Nature of, and Mode of executing, the Fellings; Forecast of Condition of Crop at their Conclusion.*

98. The nature of the fellings to be made has been generally described in paras. 91—93 above; it therefore merely remains to particularize them for the groups into which the forests have been classed in Article 1 above.

99. *Firstly*, as regards the four sal blocks (Machmacha, Khitoli, Karela and Sutri) situated in the Murwara Range, which are to be managed specially for the production of large timber. They contain a very large proportion of crooked or otherwise unpromising poles and a few badly-grown, more or less unsound trees of moderate dimensions. These should be got rid of, provided of course that they are marketable and their removal does not over-expose the soil, the main end to be kept in view being to favour the free development of the most promising individuals (the large timber of the future), to give overtopped young growth the amount of light they require and to provoke new reproduction by seed of sal and of the more valuable timber-yielding species. At the same time ill-grown saplings and thin poles of these species which stand clear under the sky, should be cut back in order to raise up in their place good coppice shoots with a future. In frosty localities great prudence should be exercised.

100. *Secondly*, as regards the areas to be worked specially for fuel for iron-smelting. Here the principles of the coppice-with-standards system will be observed in their entirety. No hard-and-fast rule as to the number of standards to be preserved can, however, be laid down. In some places, the crop will consist mainly of shrubby species, which it would be manifestly absurd to reserve. If it is objected that cover must be left on the ground to secure immunity from frost-bite and drought, there is the unanswerable reply, based on long and repeated local experience, that 40 or even 60 little scare-crowlike standards to the acre can afford absolutely no protection against frost or the sun. Sceptics in regard to this fact have only to visit those parts of the district where our coupes, cut on the rule of 40 or 60 standards to the acre, lie side by side with private woodlands which have been clean cut

over; in these latter areas frost will not be found to have done any greater damage, while on the whole the regrowth will be observed to be fuller and more vigorous. Accordingly, the only rule to observe in marking for standards will be to reserve (i) all promising individuals of valuable timber-yielding species, (ii) all harra trees, (iii) all mahua, mango, achar, tendu and edible fig trees in a bearing condition, and (iv) all trees and shrubs intended for the cultivation of lac, quite irrespective of any consideration of their number and distribution. Only the stools of timber-yielding species will be cut flush with the ground and with a clean smooth section; in the case of other species it will suffice if stumps are not left more than a few inches high and the section is not too jagged, all that is wanted being that some at least of the resulting stool-shoots shall spring up close to or in contact with the ground so as to ultimately become independent individuals possessing their own root-system. The only exception to this rule will be, if the stem to be cut is too aged to throw up good coppice and the value of the extra wood to be thereby gained is entirely incommensurate with the labour and cost involved in felling low; in such cases pollarding will be allowable, if there is no neighbouring growth of greater value ready to take its place, otherwise it should be girdled, to die, if possible; if not to die, then to be prevented from throwing up shoots likely to harm the more valuable neighbour.

101. *Thirdly*, as regards the rest of the areas referred to in paragraph 93 above. Here the rule to follow, when all the produce of the coupe can be disposed of, will obviously be the same as that just explained in the immediately preceding paragraph. When, on the other hand, the demand is not equal to the full possible outturn, then less strictness will be exercised in selecting the standards, some of the least harmful or better class of the unpromising elements of the crop will be left standing along with those which from every point of view deserve to be reserved. Saplings and thin poles possessing for one reason or another no present promise will be carefully cut back, even if they yield no saleable produce, because it is such individuals that will furnish the very best elements for the constitution of the future coppice.

102. *Fourthly and lastly*, as regards the areas described in paragraph 91 above. Here all promising individuals and, without exception, all teak and tinsa trees and those enumerated in paragraph 103 below will be marked for reservation and the purchaser allowed to select from the remainder of the crop what suits his purpose, being obliged under the express terms of his license or permit to leave no stool that has not been cut within 3 inches of the ground and well smoothed off. *Nistar* permit-holders will remove only dead or fallen wood for their fuel. For fencing they may cut the following species without any restriction:—

Bekal.	Makor.	Bilsena.	Kanker.	Siharu.
Bhirara.	Akol.	Karonda.	Menhar.	Pendra.

103. Although mentioned in a particular manner only in para. 100 above, yet the unqualified reservation of the following trees should be understood in all the four cases of fellings:—

- (a) All harra trees.
- (b) All mahua, mango, achar, tendu and edible fig trees in a bearing condition.
- (c) All trees and shrubs intended for the cultivation of lac.

Also, as a general rule, fellings should be extremely light or not permitted at all in places where destructive frosts occur annually.

104. At the conclusion of the 30 years for which these fellings have been prescribed two cycles of fellings will have passed through felling series subject to a rotation of 15 years, two through the first 10 coupes and one through the other 10 of felling series subject to a rotation of 20 years and a complete succession through all the remaining series, while in the *nistar* series the cycle will have gone round 6 times, unless during the interval it has been found necessary to further sub-divide them. In all the series without exception more or less great changes for the better will have taken place, the greatest in felling series with a rotation of only 15 years, the coupes of which will contain a complete succession of ages from 1 to 15 years with standards of two distinct classes. In the sal areas all dead and deteriorating trees will have been removed and the crop will consist of vigorous young trees with a large sprinkling of older ones in full growth. In the felling series outside the sal area the proportion of the more valuable species will have everywhere increased and the young stock will consist mostly of straight, healthy, well-grown individuals. The experience of the past 25 years goes to show that any important increase in the stock of seedling trees is not to be expected, but the little increase that is certain to occur, combined with the production of at least one and half times as many coppice stems as the number of stems originally cut back will make the forest growth appreciably denser. It is not too much to say that whereas the present stock in the forest consists of quite 90 per cent. firewood, the percentage of timber will have increased in the 30 years from 10 to at least 40.

ARTICLE 5.—*Tabular Statements of the Fellings to be made.*

105. These statements are given below by Working Circles which are, as already stated in paragraph 83 above, co-extensive with the five ranges. The coupes have all been marked on the 4" = 1 mile maps, from which, as the boundaries follow as far as possible natural features and roads, they can be laid out without difficulty.

106. Details for the Regular Felling series are given in the following five statements. The successive order of the coupes has been fixed only after a careful study of lists showing the villages requiring grazing in our various forest blocks and the number of cattle sent by them to graze there.

Murwara Working Circle.

ROTATION IN YEAR.			20				30		30			20	30			15		20	30	20		20	15	Total acreage to be felled over each year.
NUMBER OF FELLING SERIES			I				II		III			IV	V			VI		VII	VIII	IX		X	XI	
Number of Block.			17	18	19	20	8	9	10	11	12	13	14	15	21	105	106	107	108	109	111	110	113	
Name of Block.			Machmachu.	Khittoli.	Karela.	Sutri.	Jalwara.	Chugri.	Darori.	Majgawan.	Bijori.	Gopalpur.	Khairani.	Jhila.	Salaya.	Lakhapateri.	Jalasur.	Pathrari.	Pathori.	Kenah.	Mamar.	Amdar.	Bhainswahi.	
Year.	Number of Coupe	Acreage.																						
1899-1900	1	...	...	...	1,170	...	156	...	...	165	186	...	...	160	91	...	303	77	573	...	639	32	3,561	
1900-1	2	...	...	...	1,319	...	143	...	...	195	214	112	...	...	103	...	328	80	522	...	709	32	3,757	
1901-2	3	...	1,045	...	...	...	125	...	...	178	207	95	...	...	111	...	319	85	570	...	620	34	3,389	
1902-3	4	...	1,337	...	...	...	134	...	...	153	204	...	78	...	108	...	281	73	576	...	719	34	3,697	
1903-4	5	...	1,274	...	...	...	139	190	...	...	203	...	113	...	...	103	219	78	541	...	677	30	3,567	
1904-5	6	...	1,214	...	...	...	158	200	...	...	189	...	92	...	...	105	331	71	575	...	655	30	3,620	
1905-6	7	...	1,315	...	...	...	178	204	...	...	200	...	104	...	...	106	354	78	577	...	734	30	3,880	
1906-7	8	...	895	...	200	...	...	160	194	...	...	189	...	116	...	102	...	337	96	616	...	624	37	3,566
1907-8	9	...	89	...	...	...	...	179	...	...	184	204	...	107	...	94	...	288	75	423	...	667	37	3,147
1908-9	10	...	1,171	...	...	...	132	...	...	...	173	197	...	105	...	90	...	284	80	...	381	644	25	3,285
1909-10	11	...	786	...	...	...	115	...	...	...	190	207	...	121	...	95	...	300	89	558	...	640	32	3,133
1910-11	12	...	771	...	...	...	131	...	...	...	189	188	128	...	...	96	345	76	540	...	637	37	3,118	
1911-12	13	...	1,002	...	...	...	167	...	...	...	183	205	104	...	...	46	50	283	92	506	...	615	30	3,373
1912-13	14	...	1,025	...	...	...	143	...	159	...	204	86	...	...	...	108	360	80	555	...	630	33	3,338	
1913-14	15	...	1,197	...	...	...	142	...	174	...	215	110	...	...	95	...	265	80	565	...	722	34	3,609	
1914-15	16	...	960	...	...	...	132	...	138	...	206	111	...	...	191	...	274	77	519	...	747	32	3,287	
1915-16	17	...	681	...	...	...	151	...	166	...	182	...	29	...	103	...	282	75	585	...	810	32	3,196	
1916-17	18	...	906	...	183	...	...	136	...	166	188	...	74	...	111	...	298	71	564	...	666	34	3,400	
1917-18	19	...	804	...	...	...	...	162	180	...	201	...	81	...	108	...	321	88	486	...	603	34	3,066	
1918-19	20	...	802	...	...	...	...	164	181	...	194	...	120	...	...	103	342	86	...	342	683	30	3,047	
1919-20	21	...	...	...	*1,179	...	159	204	...	...	*186	...	...	181	...	105	*303	88	*573	...	*639	30	3,847	
1920-21	22	...	...	...	1,319	...	168	192	...	...	214	...	96	...	...	106	328	75	522	...	709	30	3,757	
1921-22	23	...	1,045	...	...	...	157	...	...	143	...	207	98	...	...	102	...	319	68	570	...	620	37	3,366
1922-23	24	...	1,337	...	...	...	136	...	...	136	...	204	76	...	...	94	...	281	61	576	...	719	37	3,657
1923-24	25	...	1,274	...	...	...	133	...	...	163	...	203	84	...	...	90	...	219	67	541	...	677	25	3,476
1924-25	26	...	1,214	...	...	...	139	...	...	166	...	189	102	...	...	95	...	331	69	575	...	655	32	3,587
1925-26	27	...	1,315	...	...	...	135	...	...	193	...	200	...	93	...	...	96	354	69	577	...	734	37	3,803
1926-27	28	...	895	...	200	...	139	...	...	...	167	189	...	118	...	46	50	337	72	616	...	624	30	3,483
1927-28	29	...	889	...	...	...	137	...	...	...	198	204	...	108	...	...	108	288	78	423	...	657	33	3,133
1928-29	30	...	1,171	...	...	...	...	146	...	...	176	197	...	100	...	95	...	284	80	...	381	644	34	3,308
Total acreage to be felled in 30 years.		11,662	15,552	588	4,996	1,672	2,722	1,545	1,438	2,297	5,976	1,106	1,768	341	1,870	1,136	9,158	2,352	14,914	1,104	10,129	974	103,298	
Total acreage of Felling Series.		20,958				4,394		5,280			3,983	3,205			1,603		6,114	2,352	10,604		10,451	487	72,391	

* The rotation being 20 years, the cycle of fellings comes back to coupe 1 to go on again to coupes 2, 3 and so on.

† The rotation being 15 years, the cycle of fellings comes back to coupe No. 1 again.

Sihora Working Circle.

ROTATION IN YEARS.		15		30			20	20	20		20	20	20	30			30		30	Total acreage to be felled each year.	
NUMBER OF FELLING SERIES.		I		II			III	IV	V		VI		VII	VIII			IX		X		
Number of Block.		37	38	22	23	24	25	25	26	27	28	29	33	99	100	101	102	104	103		
Name of Block.		Daroli.	Patna.	Jhapi.	Jorpabar.	Kudra.	Bijhota (Upper part).	Bijhota (Lower part).	Katahi.	Chheolapani.	Dhanwahi.	Hargarh.	Karopani.	Samasgarh.	Jamnina.	Mahgawan.	Amoch.	Jujawal.	Kuan.		
Year.	Serial number of Coupe.	Acreage.																			
1897-98	1	...	204	60	...	...	42	782	291	...	...	47	216	...	70	...	40	...	36	1,788	
1898-99	2	...	178	60	...	...	61	769	294	...	...	55	196	...	82	...	44	...	35	1,774	
1899-1900	3	...	160	56	...	...	38	650	266	...	...	57	208	...	60	...	36	...	30	1,561	
1900-1	4	...	188	...	59	...	59	682	304	...	...	56	213	60	...	...	42	...	29	1,692	
1901-2	5	192	...	64	...	...	62	669	303	...	49	...	185	76	...	...	...	56	31	1,687	
1902-3	6	...	243	66	...	...	37	649	307	...	66	...	232	72	...	...	...	51	30	1,753	
1903-4	7	...	260	61	...	...	55	693	...	298	38	...	250	...	...	60	...	39	36	1,790	
1904-5	8	...	228	...	...	64	60	667	...	287	45	...	231	...	...	68	...	49	30	1,729	
1905-6	9	...	212	...	...	60	48	695	...	308	48	...	204	...	...	77	...	42	39	1,733	
1906-7	10	220	...	71	...	...	74	659	288	...	45	...	236	68	...	...	...	38	36	1,735	
1907-8	11	...	194	95	...	...	59	656	283	...	...	43	208	...	73	...	45	...	35	1,691	
1908-9	12	...	179	84	...	...	62	741	267	...	...	52	224	...	60	...	44	...	35	1,748	
1909-10	13	...	176	70	...	...	56	859	306	...	44	...	244	66	...	...	43	...	33	1,897	
1910-11	14	195	...	...	62	...	66	740	285	...	47	...	205	68	...	...	42	...	34	1,744	
1911-12	15	...	187	70	...	...	45	667	311	...	51	...	192	59	...	...	...	46	31	1,659	
1912-13	16	...	* 204	77	...	...	67	713	285	...	41	...	231	64	...	...	...	39	36	1,757	
1913-14	17	...	178	68	...	...	43	662	...	309	50	...	215	...	...	72	...	34	32	1,663	
1914-15	18	...	160	...	...	57	61	716	...	306	51	...	219	...	...	73	...	39	31	1,713	
1915-16	19	...	188	...	...	66	55	623	273	...	...	60	194	...	...	74	...	39	25	1,597	
1916-17	20	192	...	...	...	63	52	713	276	...	...	47	184	60	...	...	...	52	35	1,674	
1917-18	21	...	243	...	...	60	† 42	† 782	† 291	...	...	† 47	† 216	65	...	...	39	...	35	1,820	
1918-19	22	...	260	...	...	80	61	769	294	...	...	55	196	57	...	...	41	...	46	1,859	
1919-20	23	...	228	68	...	...	38	650	266	...	...	57	208	62	...	...	54	...	36	1,667	
1920-21	24	...	212	...	70	...	59	682	304	...	...	56	213	59	...	...	...	39	35	1,729	
1921-22	25	220	...	63	...	...	62	669	303	...	49	...	185	73	...	...	...	29	36	1,689	
1922-23	26	...	194	68	...	...	37	649	307	...	66	...	232	60	...	...	...	39	32	1,684	
1923-24	27	...	179	58	...	...	55	693	...	298	38	...	250	...	...	56	...	39	34	1,700	
1924-25	28	...	176	57	...	...	60	667	...	287	45	...	231	...	...	61	...	39	35	1,658	
1925-26	29	195	...	58	...	...	48	695	...	308	48	...	204	...	...	73	...	40	39	1,708	
1926-27	30	...	187	64	...	...	74	659	288	...	45	...	236	...	...	70	...	47	41	1,711	
Total area to be felled in 30 years.		1,214	4,818	1,338	191	450	1,638	20,920	6,392	2,401	866	632	6,468	969	345	684	470	796	1,028	51,610	
Total area of Felling series ...		3,016		1,979			1,102	14,005	5,847		992		4,287	1,998			1,266		1,028	35,520	

* The rotation being 15 years, the cycle of fellings comes back to coupe 1 and goes on to 2, 3 up to 15 again.

The rotation being 20 years, the cycle of fellings comes back to coupe 1 to go on as before to 2, 3.

Jubbulpore Working Circle.

ROTATION IN YEARS.		15	15	15	30	30		30	20	30		30	30		30	Total acreage to be felled each year.	
NUMBER OF FELLING SERIES.		I	II	III	IV	V		VI	VII	VIII		IX	X		XI		
Number of Block.		39	40	41	41	41	41A	42	43	44	45	46	50	51	51		
Name of Block.		Kundwara.	Sonthi.	Taunri (part).	Taunri (part).	Taunri (part).	Pondi.	Bhaonraha.	Sakri.	Chitri.	Bijapuri.	Lower Gaur.	Gangai.	Dasrathpur (part).	Dasrathpur (part).		
Year.	Serial number of Coupe.	Acreage.															
1899-1900	...	1	177	121	126	93	155	...	246	86	106	...	184	56	...	136	1,486
1900-1	...	2	215	116	125	93	142	...	269	52	108	...	224	55	...	117	1,516
1901-2	...	3	122	118	128	95	112	33	247	102	104	...	174	61	...	124	1,420
1902-3	...	4	151	120	123	99	128	...	266	93	124	...	219	71	...	123	1,517
1903-4	...	5	123	109	124	96	122	...	250	55	98	...	137	...	63	118	1,295
1904-5	...	6	177	119	127	110	80	45	227	34	94	...	193	...	68	126	1,400
1905-6	...	7	193	113	138	86	143	...	272	43	115	...	137	...	79	117	1,426
1906-7	...	8	159	110	130	90	162	...	298	52	101	...	136	...	63	112	1,413
1907-8	...	9	191	110	126	89	...	125	239	41	...	116	173	...	48	106	1,364
1908-9	...	10	181	91	127	85	...	130	261	34	115	...	204	...	49	140	1,417
1909-10	...	11	187	95	123	98	...	112	273	57	122	...	172	...	55	109	1,103
1910-11	...	12	153	98	126	97	...	128	238	34	97	...	191	...	51	110	1,323
1911-12	...	13	123	109	126	100	...	158	272	89	114	...	136	105	...	139	1,471
1912-13	...	14	153	119	124	105	...	141	240	67	109	...	179	57	...	136	1,430
1913-14	...	15	121	116	126	75	...	157	259	64	118	...	178	58	...	120	1,392
1914-15	...	16	*177	*121	*126	80	...	161	281	44	130	...	127	67	...	119	1,433
1915-16	...	17	215	116	125	89	...	154	238	34	122	...	111	46	...	107	1,358
1916-17	...	18	122	118	128	84	...	136	252	54	111	...	140	64	...	116	1,322
1917-18	...	19	151	120	123	89	...	152	239	45	...	100	191	56	...	98	1,369
1918-19	...	20	123	109	124	99	...	164	243	34	108	...	216	80	...	125	1,424
1919-20	...	21	177	119	127	86	...	180	238	†86	116	...	211	51	...	94	1,482
1920-21	...	22	193	113	138	81	...	193	265	52	95	...	208	63	...	131	1,521
1921-22	...	23	159	110	130	95	...	189	253	102	126	...	158	78	...	161	1,569
1922-23	...	24	191	110	126	97	...	138	249	93	129	...	168	53	...	95	1,453
1923-24	...	25	181	91	127	94	...	165	258	55	113	...	183	49	...	111	1,426
1924-25	...	26	187	95	123	94	...	118	243	34	151	...	145	54	...	147	1,395
1925-26	...	27	153	98	126	88	...	136	214	43	122	...	234	59	...	98	1,368
1926-27	...	28	123	109	126	70	...	172	247	52	...	121	175	58	...	109	1,362
1927-28	...	29	153	119	124	90	...	139	240	41	...	121	199	74	...	107	1,407
1928-29	...	30	121	116	126	93	...	136	221	34	106	...	163	62	...	115	1,293
Total area to be felled in 30 years.	...	4,852	3,328	3,798	2,740	1,044	3,362	7,538	1,706	2,944	458	5,266	1,377	476	3,566	42,455	
Total area of Felling series.		2,426	1,664	1,899	2,740	4,406		7,538	1,114	3,402		5,266		1,853	3,566	35,874	

* The rotation being 15 years, the cycle of fellings comes back to coupe 1 and goes on to 2, 3 up to 15 again.

† The rotation being 20 years, the cycle of fellings comes back to coupe 1 to go on as before to 2, 3.

Bargi Working Circle.

ROTATION IN YEARS.				30	30	30				20		Total acreage to be felled every year.
NUMBER OF FELLING SERIES.				1	11	111				IV		
Number of Block.				92	91	83	85	85A	86	87	88	
Name of Block.				Narainpur.	Bargi.	Chhind- waha.	Kham- khera.	Salaiwara.	Man- kheri.	Khapa.	Silua.	
Year.		Serial number of Coupe.	Acreage.									
1899-1900	...	1	17	30	...	...	190	...	...	94	331	
1900-1	...	2	16	30	...	...	180	...	...	91	317	
1901-2	...	3	18	30	...	...	...	174	...	74	296	
1902-3	...	4	17	30	...	...	203	...	...	88	338	
1903-4	...	5	17	30	...	...	174	...	...	88	309	
1904-5	...	6	16	30	...	...	171	...	...	67	284	
1905-6	...	7	15	30	154	...	...	...	...	65	264	
1906-7	...	8	16	30	...	...	210	...	...	106	362	
1907-8	...	9	15	35	...	...	192	...	...	64	306	
1908-9	...	10	16	33	...	...	220	...	...	103	372	
1909-10	...	11	16	34	...	143	...	...	...	80	273	
1910-11	...	12	16	28	...	...	200	...	...	88	332	
1911-12	...	13	15	28	...	...	190	...	...	83	316	
1912-13	...	14	15	28	...	...	210	...	...	100	353	
1913-14	...	15	16	38	108	...	...	...	116	...	278	
1914-15	...	16	17	29	...	...	254	...	71	...	371	
1915-16	...	17	17	29	...	...	230	...	90	...	366	
1916-17	...	18	16	27	...	...	...	173	88	...	304	
1917-18	...	19	15	28	...	...	229	...	...	76	348	
1918-19	...	20	15	27	...	...	216	...	...	104	362	
1919-20	...	21	15	28	...	...	200	...	...	*94	337	
1920-21	...	22	16	32	106	...	...	...	...	91	245	
1921-22	...	23	16	27	...	...	205	...	...	74	322	
1922-23	...	24	17	31	...	...	182	...	...	88	318	
1923-24	...	25	18	32	...	...	180	...	...	88	318	
1924-25	...	26	17	34	...	146	...	...	...	67	264	
1925-26	...	27	17	42	...	...	200	...	...	65	324	
1926-27	...	28	16	34	...	...	195	...	...	106	351	
1927-28	...	29	17	30	...	...	220	...	...	64	331	
1928-29	...	30	17	30	186	...	...	...	...	103	386	
Total area to be felled in 30 years ...			487	924	554	289	4,451	347	365	2,211	9,628	
Total area of felling series ...			487	924		5,641		1,736			8,788	

* Here, the rotation being 20 years, the cycle of fellings comes back to coupe 1 and begins over again.

Dhanwahi Working Circle.

ROTATION IN YEARS.		30					30	30	30	30			30			30		30	Total acreage to be felled over each year.
NUMBER OF FELLING SERIES.		I					II	III	IV	V			VI			VII		VIII	
Number of Block.		47	48	49	80	81	79	59	62	62	65	67	72	75	77	68	69	84	
Name of Block.		Kumbhi.	Richhai.	Bamni Purwa.	Jamunia.	Dobhi.	Bijadoni (part).	Barela.	Kalpi (part).	Kalpi (part).	Piparia.	Chutka.	Jamthar.	Chaonrai.	Gumti.	Kunda.	Sehajpur.	Kathotia.	
Year.	Num-ber of Conpe.	Acreage.																	
1899-1900 ...	1	...	...	...	268	...	265	314	477	...	...	120	...	240	...	126	...	54	1,864
1900-1 ...	2	...	...	...	279	...	259	287	362	...	111	...	...	193	...	138	...	54	1,683
1901-2 ...	3	...	...	...	...	275	259	265	388	138	...	...	...	...	192	100	...	54	1,671
1902-3 ...	4	...	...	...	...	272	249	324	384	94	...	...	164	...	...	173	...	54	1,714
1903-4 ...	5	...	...	...	...	270	235	320	388	215	...	...	216	...	...	180	...	54	1,878
1904-5 ...	6	...	...	...	...	311	224	246	395	131	...	...	180	...	...	155	...	54	1,699
1905-6 ...	7	...	...	...	...	311	232	304	381	118	...	...	...	261	...	113	...	54	1,774
1906-7 ...	8	...	...	...	...	254	270	270	400	169	...	...	...	224	...	158	...	54	1,799
1907-8 ...	9	...	...	355	...	...	223	360	436	106	...	...	...	241	...	98	...	65	1,884
1908-9 ...	10	...	...	377	...	...	257	242	418	...	...	132	...	188	...	...	140	51	1,805
1909-10 ...	11	...	...	...	328	...	249	265	360	124	...	...	...	182	...	133	...	48	1,689
1910-11 ...	12	...	...	...	296	...	262	237	353	...	117	...	...	189	...	190	...	50	1,694
1911-12 ...	13	...	...	...	...	275	280	216	442	115	...	...	...	...	239	138	...	57	1,762
1912-13 ...	14	...	...	...	...	270	300	272	480	130	...	...	183	...	...	120	...	69	1,824
1913-14 ...	15	...	...	...	...	298	239	306	456	170	...	...	250	...	...	130	...	65	1,914
1914-15 ...	16	...	...	...	...	257	257	214	448	94	...	...	165	...	...	187	...	70	1,692
1915-16 ...	17	...	...	...	...	306	282	245	427	159	...	...	...	168	...	162	...	55	1,804
1916-17 ...	18	...	...	...	...	357	205	352	471	139	...	...	...	216	...	202	...	54	1,996
1917-18 ..	19	...	...	...	...	287	267	364	416	117	...	...	...	258	...	128	...	54	1,891
1918-19 ...	20	325	...	...	...	...	299	299	430	...	...	102	...	158	...	...	172	54	1,839
1919-20 ...	21	276	...	...	...	...	260	366	484	113	...	...	...	206	...	168	...	50	1,923
1920-21 ...	22	...	...	...	273	...	229	246	405	158	...	...	...	275	...	123	...	49	1,758
1921-22 ...	23	260	...	...	...	...	207	239	435	93	...	...	...	...	273	120	...	49	1,676
1922-23 ...	24	242	...	...	...	...	262	294	465	139	...	...	199	...	...	150	...	50	1,801
1923-24 ...	25	...	...	...	...	282	264	289	399	155	...	...	180	...	...	95	...	51	1,715
1924-25 ...	26	...	...	...	...	265	299	298	408	122	...	...	...	158	...	107	...	57	1,714
1925-26 ...	27	...	...	...	...	308	259	179	385	148	...	...	...	166	...	208	...	56	1,709
1926-27 ...	28	...	...	...	...	287	296	219	415	163	...	...	...	164	...	115	...	45	1,704
1927-28 ...	29	...	281	...	...	...	287	272	446	134	...	...	...	199	...	109	...	54	1,782
1928-29 ...	30	...	120	...	159	...	248	216	394	...	...	130	...	212	...	...	117	54	1,650
Total area to be felled in 30 years.	...	1,103	401	732	1,603	4,885	7,724	8,320	12,548	3,247	228	484	1,537	3,898	704	3,826	429	1,639	53,308
Total area of Felling series.	...	8,724					7,724	8,320	12,548	3,959			6,139			4,255		1,639	53,308

107. The arrangement and succession of the *nistar* coupes (see paragraph 91) are indicated below :—

Working Circle.	SERIAL No. OF COUPES.			1	2	3	4	5	Acreage of <i>nistar</i> series.
	YEARS IN WHICH TO BE WORKED.			1899-1900, 1904-5 1909-10, 1914 15 1919-20, 1924 25.	1900-1, 1905-6 1910-11, 1915-16 1920-21, 1925-26.	1901-2, 1906-7 1911-12, 1916-17 1921-22, 1926-27.	1902-3, 1907-8 1912-13, 1917 18 1922-23, 1927-28.	1903-4, 1903-9 1913-14, 1918-19 1923-24, 1928-29.	
	Series.	Block.		Acreage of coupe.					
Serial No.		Name.							
Murwara.	A	1	Guraiya ...	106	114	122	93	95	530
	B	2	Junwani ...	238	264	222	300	302	1,326
	C	3	Bara ...	240	198	200	182	250	1,070
	D	4	Karreha ...	220	213	274	254	306	1,267
	E	5	Hardua ...	569	584	468	540	611	2,772
	F	6	Banjari ...	145	134	120	130	123	652
	G	7	Surma ...	232	224	238	278	202	1,174
	H	16	Karondi ...	1,102	1,080	1,090	877	898	5,047
	I	112	Bilheri ...	272	286	196	245	286	1,285
			Total ...	3,124	3,097	2,930	2,899	3,073	15,123
Sihora.	A	30	Deogarh ...	1,680	1,691	1,592	1,501	1,504	7,968
	B	31	Umarpani ...	1,576	1,659	1,550	1,602	1,932	8,319
	C	32	Deogawan ...	269	279	289	229	249	1,315
	D	34	Kanharpura ...	1,129	1,136	1,208	1,240	956	5,669
	E	35	Garhat ...	106	84	90	120	80	474
	F	36	Punwasa ...	448	389	389	379	439	2,044
		Total ...	5,202	5,238	5,118	5,071	5,160	25,789	
Bargi.	A	98	Tontha ...	109	80	103	161	135	588
	B	97	Piparia (part) ...	100	106	97	127	174	604
	C	97	" " ...	97	115	109	100	134	555
	D	96	Kulaun (part) ...	162	138	142	124	125	691
	E	96	" " ...	154	142	137	97	137	667
	F	93	Semra (part) ...	448	399	472	421	477	2,217
	G	93	" " ...	515	496	446	432	467	2,356
	H	90	Lohri (part) ...	408	382	424	376	311	1,901
	I	90	" " ...	513	583	582	594	342	2,614
	J	94	Thengra (part) ...	349	357	366	329	380	1,781
	K	94	" " ...	372	393	292	359	418	1,834
	L	89	Karanpathar (part) ...	555	394	444	314	283	1,990
	M	89	" " ...	584	469	463	543	630	2,689
		Total ...	4,366	4,054	4,077	3,977	4,013	20,487	
Dhanwahi.	A	55	Pararia (part) ...	541	524	531	564	695	2,855
	B	55	" " ...	575	477	542	458	666	2,718
	C	55	" " ...	979	869	1,026	936	985	4,795
	D	53	Dhala ...						
	E	55	Pararia (part) ...	1,039	1,595	1,054	1,074	1,073	5,835
	F	54	Bastara " ...	1,182	1,221	1,009	1,083	1,330	5,830
	G	54	" " ...	2,157	1,856	1,876	2,053	2,633	10,569
	H	61	Bhondi " ...	383	448	372	414	466	2,083
	I	62	Salaiya ...	124	109	76	89	94	492
	J	64	Chargawan ...	69	74	75	71	74	363
	K	76	Niwar Khapa ...	16	16	14	16	14	76
	L	68	Kunda (part) ...	157	165	103	158	341	924
	M	82	Pararia ...	217	247	188	190	218	1,060
	N	62	Kalpi (part) ...	751	781	698	780	722	3,732
	O	62	" " ...	1,254	892	714	906	1,202	4,968
	P	62	" " ...	507	684	680	653	564	3,088
	Q	62	" " ...	1,734	1,412	973	1,267	1,386	6,772
	R	79	Bijudoni (part) ...	355	329	336	471	283	1,774
	S	79	" " ...	383	530	438	492	632	2,475
		78	Bilaikhapa ...	21	17	20	18	20	96
		Total ...	12,444	12,240	10,725	11,698	13,398	60,505	
Total acreage to be gone over each year.				25,136	24,629	22,850	23,645	25,644	121,904

CHAPTER IV.—SUPPLEMENTARY REGULATIONS.

ARTICLE 1.—*Cleanings, Thinnings or other Improvement Fellings.*

108. Cleanings and thinnings as independent operations are entirely excluded by the extreme cheapness of small wood, which would not permit of more than a fraction of their cost being recouped. They must therefore form an integral part of the fellings prescribed in paragraphs 99 and 102 above, and as regards the areas to be treated as coppice-with-standards, their absence will be of little consequence, as our most valuable species are well able to take care of themselves in the respective localities and soils which they affect. During the course of a rotation some stems are bound to die or get broken. If there is a demand for them for *nistar* or for the supply of a neighbouring town, they should of course be removed. If such removal is to be effected by the purchasers themselves, then for the safety of the forest no coupe should be visited for the purpose for five years after it has been felled and not oftener than once in three years thereafter. Such removals will be arranged for by the Conservator in the Annual Plans of Operations.

ARTICLE 2.—*Regulation of Grazing.*

109. Every area worked as prescribed in paragraphs 99, 100 and 101 and enumerated under paragraph 106 will be closed to grazing for ten consecutive years immediately after it has been felled over: on no other condition will the advantages expected from the prescribed treatment be secured. It is on this account, in order always to have a sufficient area open for the grazing requirements of neighbouring villagers, that for felling series where grazing is of importance a rotation of as much as 30 years has been adopted and that the succession of coupes has been so arranged as always to leave a sufficient open area near each village in need of grazing. Also see paragraph 93 and second sentence of paragraph 106 above.

In the *nistar* series (paragraph 107) there will be no restrictions laid on the grazing of cattle beyond the prevention of overgrazing in areas containing promising forest. Such prevention can be automatically secured without any real hardship on the people by gradually raising the grazing fees leviable in those areas until the number of head is reduced to the maximum allowable, the rest being driven to areas where no such restriction is called for.

Thus the aggregate acreage closed to grazing out of the total of 327,785 acres included in A Class Reserves will at no time exceed 86,800 acres or 26 per cent. For the first nine years it will be less. Hitherto, with only a small area worked over, it has averaged 14 per cent.

Goats and camels will, for obvious reasons, be absolutely excluded from the forests.

ARTICLE 3.—*Works of Artificial Reproduction.*

110. Nothing will be done under this head *departmentally* beyond the scattering of teak, bamboo, khair and tinsa seed immediately after, or better still, simultaneously with, the exploitation of the coupe without any preliminary preparation of the ground, those places being selected for the operation which are most favourable for the development of the several species. On the other hand, if the co-operation of the surrounding population can be enlisted for it, the plan of combined agriculture and forestry now about to be described will be adopted on as large a scale as possible.

111. In most of the coupes of the Regular Felling Series there will be found compact stretches of soil suitable for temporary cultivation, such soils, in short, as can bear crops for only 2—4 years in succession and require a long period of fallow to recover again their temporary fertility. As soon as a coupe has been worked or, better still, in the very year in which it is worked, persons accustomed to this nomadic style of cultivation should be given temporary allotments to cultivate on the following terms:—

- (i) No individual allotment to exceed 10 acres.
- (ii) Existing stools of forest trees, except such as may, with the previous special permission of the Department be grubbed out, to be carefully preserved although he may, as long as he holds it, cut down all and any shoots which interfere with his cultivation. This condition will not preclude him from cutting through small or moderate-sized roots which come in the way of his plough.
- (iii) Seeds of such of the more valuable forest species as the Divisional Forest Officer may prescribe, to be collected by the cultivator and sown simultaneously with his own crop.
- (iv) As consideration for the due fulfilment of conditions (ii) and (iii), the cultivator to be entitled to free *nistar* and free grazing for four head of cattle and to cultivate his holding until he relinquishes it of his own accord.

The areas selected for such combined agri-sylvicultural treatment will obviously be those open, almost treeless wastes which after years of so-called conservation are in the very same condition now as that in which we received them. The field cultivation will have the effect of loosening and cleaning the soil for the favourable germination of the forest seeds and the after-development of the young plants, so that most of these will have become fully

established before the grass again takes possession of the soil and will then be able to spread their roots in the lower layers of the soil not occupied by the roots of the grasses. No doubt many forest seedlings resulting from the combined sowing will be killed by subsequent ploughing operations, but a certain considerable number, comprising a large number of those which will come up just before the abandonment of the field, are bound to survive and form a more or less promising forest, which under any other conditions, it would be hopeless to expect. The survival will be all the more certain, if species which produce root-suckers, like tinsa and tendu, others which are not easily killed by rough ploughing operations, such as khair, habul and ber, are used. In the case of teak, its seeds sown in the last year of cultivation will go on germinating for two years afterwards. The words "rough ploughing operations" have been used advisedly, as it is not men who go in for high cultivation whose co-operation we require, for they would point blank refuse our terms, but those who as inferior cultivators or field-labourers eke out a precarious existence and would hence be only too glad to accept conditions which gave them rent-free fields and free *nistar* and partially free grazing without compelling them to depart from their usual methods of tillage, such men, in short, as would readily colonise our forest villages. Indeed, in many cases it will be found advantageous to establish a forest village in the middle of each felling series; from their village site, which would be fixed, they would carry on their squatter cultivation and furnish us with labour for our forest operations.

To any professional objection that may be raised against the agri-sylvicultural treatment for regeneration here sketched out, it has only to be replied that all our best forests in these Provinces are the result of squatter cultivation in the past, when the principal factor requisite for success, *viz.*, the simultaneous sowing of forest seeds with the field crop, was absent, and that since such cultivation was discontinued in forests like Blocks 17, 18 and 20 and others, regeneration has been practically at a standstill. Also it must not be forgotten that whereas in the days preceding forest conservancy, squatter cultivation was free to move when and where it listed and thus undo the good results of previous years by cutting down young forest before it could come to maturity, now it will be so controlled that it will be restricted to those places where natural regeneration has failed and the co-operation of the squatter cultivator has become necessary.

ARTICLE 4.—*Improvements common to the whole Area.*

112. These fall under (A) Protection from Fire, (B) Roads, (C) Buildings and Wells and (D) Systematic Organisation of Forest Villages.

A.—Protection from Fire.

113. Experience has shown that a considerable measure of protection is secured merely by the operation of the five Rules promulgated by the Chief Commissioner under Section 25 of the Indian Forest Act, 1878 (see Appendix V). Special protection, *i.e.*, fire-tracing, with a special establishment of fire-guards, will hence be confined to areas felled within the preceding 10 years and therefore closed to grazing and will also be continued over the whole of the blocks which have hitherto been subject to it. Elsewhere, wherever the growth of grass is high and abundant or there is danger of fire entering from outside, fire-traces will be cleared, patrolling being left to be done by the regular Forest Establishment. In order to diminish the chances of fire occurring and to minimise its destructiveness in case it occurred, every endeavour should be made to dispose of the grass, especially from recently-cut coupes; if there is no sale for the grass, people should be invited to come and take it away free. Another important precaution to adopt will be to deliberately fire in the cold weather open areas containing no reproduction; it is in such places that our worst conflagrations generally originate and it is they which render the extinction of conflagrations difficult, if not impossible, when once they have started. An indirect beneficial result of great value resulting from such systematic firing will be the springing up of an early crop of new wholesome grass on what are after all, until they have been reforested (if they will ever bear real forest), essentially grazing areas. By thus actively meeting the wants of the agricultural classes, we shall, it is to be hoped, to some extent gain more of their confidence and good-will than we at present possess. We have the Commissioner's assurance that villagers will meet us half-way by giving us gratuitous labour for firing the areas in question.

B.—Roads.

114. As shown in paragraphs 72 and 73 above, a fairly effective system of main roads already exists, but, owing to the scattered and isolated position of most of the blocks, a supplementary system placing all the blocks in complete communication with the main one is urgently required. This supplementary system is indicated by Working Circles in the statements below. Its construction will be taken in hand *pari passu* with actual requirements, but most, if not all of them, should be completed in the first ten years of the currency of this working plan. Once constructed, it should always be kept in repair, the cost probably averaging Rs.5 per mile. Temporary feeder roads abutting on this system will have to be made year by year as the various coupes come to be worked, and it is expected that the aggregate length of such feeders will be about 34 miles, costing on an average Rs.20 a mile.

Supplementary System of Roads to be constructed within the first ten years.

Range.	Serial No. of road.	Probable alignment.	Length in miles.	Cost in rupees.	Felling series served.	Remarks.
Murwara.	1	Jajagarh <i>via</i> Biroli, Gabdi-Nipania and Jagua to Khitoli	12	300	I	Partly new, partly over existing path.
	2	Machmacha to Biroli, joining No. 1	2	80	I	New road.
	3	Karela to Khitoli	3½	105	I	To follow existing path.
	4	Khitoli to the Rewah border following the Panchperi path	4	100	I	Ditto.
	5	Khitoli <i>via</i> Mirki to Bagdara	3½	140	I	Ditto.
	6	From Block 20, Sutri to Chandia <i>via</i> Barragaon, Barra-Mehgawan and Karchulia	9	200	I	To follow existing road, approaches to nalas, &c., require improvement.
	7	Khitoli to Chandia	11	880	I	Ditto.
	8	Rajuwara <i>via</i> Narera Nareri and Gondra, joining Bijeragorah (between the two blocks)	8	320	II	Partly new and partly to follow existing path.
	9	Ghugri to join Katni-Barhi road near 14th mile-stone	3	120	II	New road.
	10	South of Hathera <i>via</i> Kerani to Katni-Barhi road at Piparia	2½	100	V	To follow footpath.
	11	Gatakhera <i>via</i> Umgawan to Bahoriban	4	180	VII	Partly new road and partly to follow existing path.
	12	From Boundary pillar No. 26 to Salaiya Station	3½	140	VIII	Ditto.
	13	Chiroli <i>via</i> Kupia to Rithi	5	300	IX	Ditto.
	14	Rithi Station <i>via</i> Kainah to base of plateau near Bakleta	5½	275	IX	Ditto.
	15	Nipania <i>via</i> Umdar, Ghurhar to Bilheri	11	550	IX	Ditto.
		Total	87½	3,790		
Sihora.	1	Parsel <i>via</i> Kamtara-Peharwa, Khamaria, Loharwara and Parasia to Chandia	16	640	II, IV, V	To follow existing track.
	2	Shahidad <i>via</i> Jagnagra to Bundhi station	23	200	V	Ditto.
	3	Ponri <i>via</i> Shahpur to Niwar station	10	200	IV	Ditto.
		Besides the above only feeder roads will be needed. Total	49	1,100		
Jubbulpore.	1	From Khamaria on the Jubbulpore-Kundam road to Bagraji <i>via</i> Sundarpur and Taunea	12	3,000	II, III, IV, V, VII	Partly new road and partly existing track.
	2	Kundwara to Tilsani	6	1,200	I	
	3	From Kundwara to Bagraji	5	400	I	
	4	From Manera <i>via</i> Hathidol to Taunri	5	1,000	II, III, V	
	5	From Bagraji <i>via</i> Coupe No. I of Felling Series No. IV to Kundwara-Tilsani road	5	1,000	IV	
	6	Manera <i>via</i> Mahgawan to Jubbulpore-Bagraji road	10	2,000	V	
	7	Bhaonraha to Chhatarpur	9	1,800	VI	
	8	Marodh <i>via</i> Bongar, Barera, Surmabah to Chhatarpur,	10	1,000	VI, VII	
	9	Bijapuri <i>via</i> Sakri to Mahgawan	3	300	VIII	
	10	Gadheri <i>via</i> Domna to Kundam road	4	800		
	11	Tikritola to Domna	4	800		
	12	Sankui <i>via</i> Doli, Dadargawan, Dasrathpur to Kundam road,	9	1,800		
		Total	82	15,100		
Bargi.	1	New road from Block 87 to Seoni-Jubbulpore road <i>via</i> Khapa and Kaladehi	3	60		
	2	New road from Khapa to Block 85A	2½	50		
		Total	5½	110		
Dhanwahi.	1	From 11th milestone on Mandla-Jubbulpore road to Gopalpur <i>via</i> Purwa	8	400	I, III	
	2	From Bijadoni to Panri <i>via</i> Barangda	12	300	II, III	
	3	From Tikaria to Manegaon	8	160	IV, V	
	4	From 27th milestone on Mandla-Jubbulpore road to Chanti <i>via</i> Ghontkhera	6	120	IV	
	5	From Chanti to the banks of the Nerbudda River	4	80	V	
	6	From Patha to Chheolia <i>via</i> Tatighat and Sahajpuri	6	120	VI, VII	
	7	From Chheolia to the Mandla-Jubbulpore road <i>via</i> Ponri, Maili and Samnapur	20	1,000	VI, II	
	8	From Dobhi to Narrai	10	250	I	
	9	From Lakhanpur to Ponri and thence on to Path <i>via</i> Sutri-Chargaon	12	120	VII	
		GRAND TOTAL FOR DIVISION	86	2,550		

C.—Buildings and Wells.

115. The weakest point of Forest Administration here, after want of roads is the almost total absence of quarters deserving the name for the out-door establishment. Most of the guards live in wretched huts giving but little protection against the inclemencies of

the weather, thus comparing very unfavourably with the housing of Police Constables, while the Divisional and Range and Sub-range Officers are unable to travel about during the rains except at certain risk to their health. The improvement of the water-supply by the sinking of wells where there is no running stream close by, is also a great desideratum. Hence the largeness and expensiveness of the following scheme of buildings and wells to be made, if possible, during the first 10 years of the 30 during which this plan is to be current; it will, however, repay Government by the more efficient administration consequent on the good health of all and the more frequent and closer supervision of work and collection of revenue by Inspecting Officers.

Range.	Officers' Rest-houses, costing each Rs.1,000.	Range Quarters, costing each Rs.1,000.	Sub-range Quarters, costing each Rs.500.	Forest Guards' Chaukis, costing each Rs.200.	Wells, costing each Rs.200.
Murwara.	Rithi. Lakhapateri. Majhgawan. Basondha.	Murwara.	Bilheri. Majhgawan. Karitalai. Khitoli.	Siunhri. Kenah. Mamar. Bilheri. Pali. Gatakhera. Khamaria. Majhgawan. Gopalpur. Ghugri. Bijeragogarh. Hardua. Junwani. Sutri. Piparia. Karondi. Biraoli. Karela. Majhauhi. Pondi. Hargarb. Bhatagawan. Jhiri. Lamkana. Jhiria. Umarpani. Halka. Patna. Ladwar. Kakartala. Gangai. Dasrathpur. Jaitpuri. Umaria. Paraspani. Sakri. Surmaba. Mehgawan. Tilgawan. Chitri. Taunri. Kundwara. Dabra Kalan. Salaiwara. Gaganda. Nakatia. Khapa. Chhindwaha. Gwarighat. Bandiwara. Barayakhara. Sukha. Kulaon. Semra.	Bhilwara. Karopani.
Sihora.	Bakal. Kuan. Khamtara. Jhirna Piparia. Karopani.	Umaria.	Kuan. Pondi. Jhirna Piparia. Silondi.		
Jubbulpore.	Amjhar. Manera. Bagraji. Chhatarpur.	Sundarpur.	Kakartala. Sakri. Bagraji.		Manera. Kakartala.
Bargi.	Hulki.	Bargi.	Bandiwara. Sukri.		Semra. Bandiwara.
Dhanwahi.	Kalpi. Sutri. Chheolia. Kikra. Gwara. Maneri. Barangda. Marai.	Barela.	Dobhi. Barangda. Chargaon. Chheolia.	Dobhi. Bijadoni. Gaor River. Parwa. Barela. Chaoki. Kukrikhera. Karonda. Maili. Barha. Gopalpur. Chikli. Kuromaili. Pondi. Mohda. Dhanwahi. Tatighat. Chaonrai. Lakhanpur. Chargaon. Kathotia.	Dobhi. Dhanwahi. Bijadoni. Kalpi.

Abstract.

							Rs.
22 Officers' Rest-houses,	@ Rs. 1,000	...	...	...	...	...	22,000
5 Range Quarters,	@ „ 1,000	...	...	...	...	...	5,000
17 Sub-range Quarters	@ „ 500	...	...	...	...	...	8,500
75 Forest Guards' Chaukis @ „	200	...	...	...	...	...	15,000
10 Wells	@ „ 200	...	...	...	...	...	2,000
Total							52,500

D.—Systematic Organisation of Forest Villages.

116. The rules which govern the establishment, constitution and management of Forest Villages are laid down in Revenue Book Circular VII (2). In order to complete their organisation their boundaries should be clearly defined by permanent serially numbered marks. A map of each village on the scale of 16 inches=1 mile should be made, showing, besides its boundaries, the village site and the limits of each field or holding, which should be distinguished by a serial number. A field register should be prepared and kept corrected up to date, giving the serial number of the fields, their respective acreages, the names and caste of the tenants, the nature of the crops grown, the rate of assessment and the amount of rent. The maximum number of plough and of milch cattle allowed to be kept and grazed free by the several families will be fixed and every attempt at professional cattle-breeding or herding will be suppressed, and to this end an accurate return of cattle kept by each family will be prepared on the 1st July of each year and submitted to the Divisional Officer on the earliest subsequent date, and a copy thereof kept in the Range and Sub-range offices for the purpose of subsequent verification from time to time.

More forest villages than the existing ones are required for the proper working of the forests, particularly in the Dhanwahi and Sihora Ranges and also with special reference to the agri-sylvicultural scheme of *reboisement* prescribed in paragraph 111 above.

CHAPTER V.—MISCELLANEOUS.

ARTICLE 1.—*Exploitation of Bamboos.*

117. Until the new generation of bamboos (see paragraph 46 above) becomes productive in another 6—8 years there will be little produce to cut, especially as the surviving clumps are all in a poor condition owing to past unsystematic exploitation and overcutting; this latter having only increased since the diminution of the supply consequent on the recent general flowering. But as the currency of this working plan extends much beyond the time when bamboo will be in full production again, it has been considered inadvisable to adopt a temporary scheme of coupes devised specially for the areas which still contain productive clumps in workable numbers. The following scheme accordingly takes no account of the present temporary conditions and will hence reach its full application only when all the young reproduction has begun to produce shoots of marketable size. A rest of one year after subjection to cutting for one year is considered sufficient with the close supervision we shall be able to command; hence the fixing of a rotation of two years.

WORKING CIRCLE.	MURWARA.			JUBBULPORE.					SINORA.	DHANWAHI.					
Felling series.	I	II	III	I	II	III	IV	V	I	I	II	III	IV	V	VI
Serial numbers of component Blocks.	17	18	109 110 111	39 41	41a 44	42	45 50 51	46	25,26,27	47 48 49 50	54	59 63	62 (part)	79	81 82
Serial No. of Coupe.	Acreage.														
1	4,846	4,621	10,464	4,001	3,362	4,064	2,431	2,868	10,497	2,335	8,979	4,538	15,621	5,712	3,341
2	3,861	4,746	13,651	4,103	2,944	3,474	3,446	2,393	10,457	1,504	7,420	4,274	15,487	6,261	2,604
Total area ...	8,707	9,367	24,115	8,109	6,306	7,538	5,877	5,266	20,954	3,839	16,399	8,812	31,108	11,973	5,945

Coupe 1 will be worked in 1900-1901, 1902-3, 1904-5, . . . ; Coupe 2 in 1901-2, 1903-4, 1905-6 . . . ; and so on.

118. The grand rule to observe, if the clumps are to be brought up to, and kept up at, their full production is to maintain in each clump at least twice as many shoots of marketable size as are produced in one season. A simple way to apply this rule will be to direct that in no case shall shoots of the current year be cut; the balance required to make up the minimum number of shoots to be preserved will then consist of shoots that are too crooked to be saleable or are situated too far inside the clump to be accessible to the cutter. High stumps left in a clump always render its exploitation difficult; hence the necessity of insisting on cutting within one foot of the ground. See also concluding sentence of paragraph 120 below.

119. Owing to the extreme paucity of bamboo clumps in them, many blocks and parts of blocks have been left out of the scheme of coupes given in paragraph 117 above. In such areas the bamboos will not of course remain unutilised, but will be exploited, on the principles enunciated in the immediately preceding paragraph, for the benefit of adjoining villagers, who will absorb the entire annual production.

ARTICLE 2.—*Manufacture of Charcoal.*

120. Thanks to the Brewery at Jubbulpore and the presence of a large European population there, the demand for charcoal at that town certainly exceeds 4,000 maunds a year. This will render feasible the immediate utilisation, within a radius of 20 miles of it, of more than 20,000 maunds of wood that would otherwise have no value whatsoever and would either be left uncut to the detriment of the forest, or if cut, cumber the ground in the coupes, offering a serious obstacle to the coppice reproduction or increasing the destructiveness of possible conflagrations.

For iron-smelting the furnace owners make their own arrangements for the manufacture of their charcoal. In this connection it must not be forgotten that for refining the locally made pig, bamboo charcoal is used, thus enabling us to clean out without expense congested clumps and to utilise the refuse left behind by bamboo cutters.

ARTICLE 3.—*Utilization of Minor Produce.*

121. Every endeavour should be made to dispose of as much grass as possible with the double object of making revenue and diminishing the frequency and destructiveness of forest fires. The rates of royalty must therefore be pitched low and in inverse proportion to the distance of the forests from the place of demand. It is in the coupes that will be closed to grazing immediately after exploitation that the grass will be most abundant and most dangerous; its removal should hence be encouraged, even if it is necessary to give it away free. A useful measure with reference to prosperous villages possessing an insufficiency of grass lands will be to levy a small annual fee from those inhabitants who are willing to commute by means of a single trifling payment for the right to take out as much grass as they want and whenever they care to take it out.

In connection with the utilisation of grass it must not be forgotten that the best crop comes up where a forest fire has passed through or where the previous year's crop has been cut or grazed over or where recent felling and export operations have broken up and crushed down into the soil the old crop. Accordingly where there is a steady demand for grass, care should be taken to entirely remove the crop every year, and if there is no other way of getting rid of it, it should be carefully considered whether the suggestions contained in the concluding portion of paragraph 113 above cannot be safely carried out.

122. The utilisation of the harra fruit requires much more attention than has hitherto been given to it. The tree is abundant in the Dhanwahi Range and in the blocks bordering on the Mandla district and the Rewah State, but the outturn, as shown by our books, is entirely incommensurate with this abundance. As soon as practicable an enumeration survey of the harra trees will be made in each block under the following classes (see Appendix VI) :—

- Class A.—Trees up to 6" in diameter
 „ B. „ from 6" to 12" in diameter
 „ C. „ „ 12" „ 18" „ „
 „ D. „ above 18" in diameter

and by actual continued experiment with a sufficient number of selected trees an estimate will be made of the average yield of a tree of each class in (i) a good year, (ii) an average year, and (iii) a bad year. Hitherto most of the harra of Government forests gets stolen, often with the connivance of, and even directly by, the dishonest members of the out-door staff. It is to provide against such theft that the above enumeration of the trees has been prescribed; every subordinate will each year know how much harra is expected from the various blocks in his charge, and any marked divergence between the expected and actual outturn of a block will be immediately enquired into and the facts ascertained with certainty. Each year the abundance of the flowering, the progress of fructification and ripening and the character of the season will be closely watched and recorded and also noted in the Forest Journal.

As only trees with fully developed crowns bathed on every side in light can be fully fruitful, a light clearing will be made, wherever necessary, round harra trees whose crowns are pressed in by their neighbours.

123. Next, the production of lac deserves special attention. The most must be made of kusam, chheola, ber and ghont trees, where they stand in sufficient numbers for effective supervision and economical exploitation. The pruning of the trees in order to obtain a generous growth of young shoots should not be neglected before the seed lac is applied, and in the case of productive trees, a sufficient quantity of the lac should be left unbroken at different points high up in the crown for the purpose of propagation. Lac thus tied up or left unbroken for propagation should be carefully removed after the insects have swarmed out and begun to form their encrustations, for the dye which the larvae eat before emerging has now no market value and the lac thus recovered will always form about 20 per cent. of the total yield.

124. The mahua flower is another article, the utilisation of which is capable of very great extension. It would appear that but for the high freights charged by the Great Indian Peninsula Railway, large quantities would go to Bombay for export and to Poona for the Great Central Distillery there.

125. Katha is a produce that has hitherto been entirely lost sight of, and yet there are large areas in which khair is abundant enough for its manufacture. The aggregate area adapted for the industry is, however, not extensive enough to give continuous employment to a gang of boilers, and it will be necessary to form a single Katha Working Circle embracing the Jubbulpore and Damoh, and perhaps also the Saugor and Narsinghpur Divisions. Also see Appendix VII.

126. As certain iron mines are under the control of the Department, although situated outside Government Forest, the revival and extension of the iron industry is one of the ends for which we have to strive. The co-operation which the Locomotive Department of the East India Railway is giving us in the matter is an encouraging feature in the situation. That Railway carries on large foundry operations at Jamalpur, for which pig iron from Europe has to be imported at great expense. The Railway authorities are therefore trying to devise for us a simple charcoal furnace, such as our local smelters could work and which could produce a purer pig iron than that yielded by the local furnaces. The relations of mutual help thus begun with the Railway Administration should be maintained and if possible extended, and every assistance required to make the Jamalpur experiments a success should be freely rendered.

127. With respect to other articles of minor produce no special directions need be given in this working plan.

ARTICLE 4.—*Development of Water Transport.*

128. But little use has hitherto been made of the waterway offered by the Nerbudda. By private enterprise a large quantity of timber, fuel and bamboos comes down to Gwari Ghat from points even considerably above the town of Mandla. The Department has now begun in earnest to turn this waterway to account and such efforts should not be relaxed. Launching and catching stations should be established at convenient points and obstructions in the river, so far as this can be done without costly operations, removed or mitigated. In this matter there should be complete co-operation with the Mandla Division, which has a considerable supply of produce to send down to Gwari Ghat. Such co-operation will ensure both economy and efficiency and will render more effective the control of the river conferred on the Department by Chief Commissioner's Notification No. 3845, dated the 17th August 1893, promulgated under Section 45 of the Indian Forest Act (1878).

ARTICLE 5.—*Control of the Working Plan.*

129. The prescriptions of the Forest Department Code in regard to the maintenance of Control Books will be strictly observed. Although the Annual Returns in Forms 2 and 3 will give figures by Working Circles, yet for the purpose of the Divisional Officer and his Assistants and the revision of the Working Plan details will be kept in the Divisional Office by Felling Series. These details will be obtained directly from the "Accomplished" portion of the Plan of Operation Forms. The Forest Journal will be kept in the form and manner prescribed by the Conservator; by the entries made in it, it should be possible in a few years to arrive at a complete and accurate knowledge of the habits and requirements of our principal trees, whereby we shall be able to devise the best possible system of treatment to follow in order to attain a given object.

130. At the same time that the Control Books and Forest Journal are maintained, a book will be opened for a complete description of Compartments, which, as said in paragraph 84 above, will be the coupes themselves. A complete opening of the book will be given to each Compartment. At the top of the left hand page will be made a sketch, on the scale of 4-inches = 1 mile, of the Compartment, the serial numbers of the surrounding compartments, &c., being indicated, and within the limits of the Compartment the distribution of the various types of forest will be shown by means of washes and lines of representative colours.

The following colours will be employed :—

(a) For teak	...	...	...	...	...	Green.
(b) „ Sal	...	...	...	...	...	Carmine.
(c) „ Bamboos	...	...	...	...	...	Gamboge.
(d) „ Bija	...	...	...	...	...	Dark-blue.
(e) „ Mixed forest of inferior timber trees	...	...	...	...	...	Sepia.
(f) „ „ „ species	...	...	...	...	...	Burnt sienna.
(g) „ Blank	...	...	...	...	...	No colour.

The predominating type will be indicated by a ground wash of its representative colour and a mixture with it of other species by parallel lines, the lines being vertical when the mixture is marked, horizontal when it is only slight. A type will be considered to predominate when the species representing it composes more than half the crop. When more than one type is in mixture with the predominating type, the several types in mixture will be represented by alternating lines of the respective representative colours. The above instructions will be best understood by means of a few examples :—

Nature of crop.	How represented.
(i) Complete blank	No colour at all.
(ii) Grassy blank dotted with inferior species	Horizontal lines of burnt sienna on uncoloured ground.
(iii) Very open forest with sal	Vertical carmine lines on uncoloured ground.
(iv) Bamboo forest with a sprinkling of teak ...	Horizontal green lines on gamboge ground.
(v) Bamboo forest with a considerable number of teak, inferior timber trees and inferior species.	Alternating green, sepia and burnt sienna vertical lines on gamboge ground.

And so on.

Types (e) and (f) each include several species. As the stock colouring will not show what individual species are present, these will be specified in the verbal description under the heading of "Stock."

The headings of the verbal description will be (1) configuration, aspect and elevation, (2) soil and underlying rock, (3) stock, (4) reproduction present, (5) communications, (6) distance in miles from market or markets or from where the produce is used up. As far as possible the verbal description, beginning immediately below the stock map, should be completed on the left hand page, the right hand page being reserved for date or dates of felling and for special remarks made from time to time on the progress of the crop, accidents of frost, fire, &c., occurring and other such noteworthy circumstances, each remark being signed and dated. Thus the right hand page will contain a complete history of the Compartment during the currency of this Working Plan.

The acreage of the Compartment will be written at the top of the left hand page immediately after the specification of the Compartment.

ARTICLE 6.—*Revision of the Working Plan.*

131. In the present state of forest management and treatment conditions governing them will alter so rapidly that a revision of this plan is certain to become necessary long before the close of the 30 years for which it has, under the orders of the Inspector-General of Forests, been drawn up. But unless conditions alter to such an extent as to call for a radical change of procedure, it will suffice to insert in their proper places the few alterations or additions that may from time to time become necessary. The most important change will be the raising of a *nistar* into a new felling series and *vice versa*. These changes will be easily embodied in the Working Plan, the first by scoring out the *nistar* series from the list given in paragraphs 91 and 107 and inserting the coupes of the new felling series in the appropriate one of the five statements given under paragraph 106, the second by scoring out the felling series from the latter paragraph and inserting the name of the new *nistar* series under the other paragraph. On the ground the only change to make will be the sub-division of each of the *nistar* coupes into 3, 4 or 6 new coupes, as the case may be, or the lumping together of groups of 3, 4 or 6 coupes into single *nistar* coupes.

ARTICLE 7.—*Changes proposed in the Forest Staff.*

132. The actual staff is in all respects adequate for the present. If, later on, any increase of strength is found necessary, it will be in the power of the Conservator to provide it by a due distribution of the temporary posts annually sanctioned by the Chief Commissioner. But in view of the limited revenue expected, strong reasons will have to be adduced to justify additional establishments.

ARTICLE 8.—*Financial Results of Proposed Working.*

133. The financial results expected are summarised in the statement below. The revenue derivable from timber and fuel has been estimated on the basis of the rates at which

couples have been sold standing and that from bamboo on the supposition that all the young bamboo clumps have become productive. In the matter of grazing it has been assumed that the present low rates will be immediately raised in accordance with the recently declared policy of the Administration. The expenditure on new roads, buildings and other works has been distributed over the entire period of 30 years for which this Plan provides, although, if funds are available, all these works should be completed within the next ten years. The completion of rest-houses for officers will result in a direct annual saving, on account of camels and tents of nearly Rs.400, representing an investment of more than Rs.13,000 at 3 per cent. per annum, while the closer and constant supervision consequent on travelling being rendered possible throughout the year (especially in the rains, when grazing dues are realized) will add several thousands to the revenue, which have not been taken account of in the summary below.

Budget Heads.	Particulars.	RANGE.					Divisional Office.	Total.
		Murwar.	Sihora.	Jubbulpore.	Bargi.	Dhanwahi.		
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
R I & II a	Timber ...	10,000	5,000	6,000	3,000	10,000	...	34,000
" " b	Firewood and charcoal ...						...	
" " c	Bamboos ...	1,000	100	2,000	...	2,000	...	5,100
" " d	Grazing and grass ...	3,000	4,000	4,000	2,500	10,000	...	23,500
" " e	Other minor produce ...	1,500	500	400	400	1,400	...	4,200
R III	Drift and waif wood ...	10	10	10	350	120	...	500
" V	Miscellaneous ...	500	700	900	200	600	...	2,900
	Total Revenue ...	16,010	10,310	13,310	6,450	24,120	...	70,200
	<i>Expenditure.</i>							
A I & II	All Sub-heads ...	5,000	800	2,500	500	2,000	...	10,800
" VI	Live-stock, stores, tools and plant.	100	50	80	20	150	100	500
" VII a	Roads and bridges ...	300	100	700	50	250	...	1,400
" " b	Buildings ...	500	500	450	250	600	...	2,300
" " c	Other works ...	30	50	50	20	100	...	250
" VIII a	Demarcation ...	60	60	60	60	60	...	300
" " d	Working Plans ...	10	10	10	10	20	40	100
" " e	Sowings and planting ...	20	20	20	20	20	...	100
" " f	Fire-protection ...	600	200	1,000	400	600	...	2,800
" " g	Other works ...	10	10	10	10	10	...	50
" IX	Miscellaneous ...	30	30	80	30	30	...	200
	Total A charges ...	6,660	1,830	4,960	1,370	3,840	140	18,800
B I b	Superior officers ...	...	...	...	...	...	9,000	9,000
" " c	Subordinate forest and dépôt establishments.	3,400	1,800	3,000	1,200	5,600	1,500	16,500
" " d	Office establishments ...	100	100	200	100	100	2,000	2,600
" II b	Superior officers ...	...	...	...	...	...	1,200	1,200
" " c	Subordinate forest and dépôt establishments.	210	200	200	170	220	400	1,400
" " d	Office establishments ...	...	...	...	...	...	200	200
" III	Contingencies ...	140	140	140	140	140	1,000	1,700
	Total B charges ...	3,850	2,240	3,540	1,610	6,060	15,300	32,600
	Total Expenditure A & B ...	10,510	4,070	8,500	2,980	9,900	15,440	51,400
	Net Revenue ...	5,500	6,240	4,810	3,470	14,220	-15,440	18,800

APPENDIX I.

*Schedule of Forest Rates for Agricultural Requirements prescribed by Chief Commissioner's
Resolution No. 102, dated 5th January 1893.*

NOTE.—This schedule applies only to Central Provinces cultivators, ryots, day-labourers, village artisans and village servants for domestic use.

Class of Forest produce.	Rate per ton of 50 c. ft.	Approximate rate per c. ft.	Rate per ton of 27 maunds.	Rate per headload of 30 seers.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
(A)—Timber Class I.— <i>Teak and Bijasal.</i>				
Poles 10' × 9" girth at thick end ... }				
„ 12' × 12" „ „ ... }	15 0 0	0 5 0	...	...
„ 16' × 18" „ „ ... }				
„ 20' × 24" „ „ ... }	17 0 0	0 5 6	...	...
Class II.— <i>Saj, Sal and Shisham.</i>				
Poles 10' × 9" girth at thick end ... }				
„ 12' × 12" „ „ ... }	9 8 0	0 3 0	...	...
„ 16' × 18" „ „ ... }				
„ 20' × 24" „ „ ... }	11 0 0	0 3 6	...	...
Class III.— <i>All other kinds not specially excepted by order of the Conservator.</i>				
Poles 10' × 9" girth at thick end ... }				
„ 12' × 12" „ „ ... }	5 0 0	0 1 6	...	...
„ 16' × 18" „ „ ... }				
„ 20' × 24" „ „ ... }	6 0 0	0 2 0	...	...

NOTE.—Poles of intermediate girths will pay the next highest rate.

(B)— <i>Minor Forest Produce.</i>				
Firewood felled from green trees ...	...	...	0 6 0	0 0 2
„ dead-wood picked in forests ...	...	...	0 3 0	0 0 1
Thorns ...	...	...	0 3 0	0 0 1
Fodder grass ...	...	...	0 3 0	0 0 1
Leaves ...	...	...	0 3 0	0 0 1
Bamboos, green... ..	...	...	0 12 0	per cent.
„ dry	...	...	0 4 0	„

(C)—*Grazing.*

NOTE.—Calves under a year are free.

Forest Division.	RATE PER HEAD OF—			
	Buffaloes.	Cows, oxen or ponies.	Goats.	Sheep.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Jubbulpore	0 4 6	0 2 6	0 1 3	0 0 3

APPENDIX II.

LIST OF SPECIES.

Vernacular Name.				Systematic Name.
1.	Achár	...	...	<i>Buchanania latifolia.</i>
2.	Air, Ail	...	...	{ <i>Acacia Cæsia.</i>
3.	Akol	...	...	" <i>pennata.</i>
4.	Am	...	...	<i>Alangium Lamarckii.</i>
5.	Aonla	...	...	<i>Mangifera indica.</i>
6.	Ashto, Mahala	...	...	<i>Phyllanthus Emblica.</i>
7.	Bahera	...	...	<i>Bauhinia racemosa.</i>
8.	Báiberang	...	...	<i>Terminalia belerica.</i>
9.	Baichánda	...	...	<i>Embelia Ribes.</i>
10.	Bekal	...	...	<i>Dioscorea</i> sp.
11.	Bainsa	...	...	<i>Celastrus senegalensis.</i>
12.	Bamura	...	...	<i>Salix tetrasperma.</i>
13.	Bánda	...	...	<i>Acacia arabica.</i>
14.	Báns	...	...	{ <i>Viscum attenuatum.</i>
15.	Bánsa	...	...	<i>Loranthus longiflorus.</i>
16.	Bar	...	...	<i>Dendrocalamus strictus.</i>
17.	Baranga	...	...	<i>Albizzia odoratissima.</i>
18.	Barsing, mirsing	...	...	<i>Ficus bengalensis.</i>
19.	Bel	...	...	<i>Kydia calycina.</i>
20.	Ber	...	...	<i>Spathodea falcata.</i>
21.	Bhánt	...	...	<i>Ægle Marmelos.</i>
22.	Bhiláwán	...	...	{ <i>Zizyphus Jujuba.</i>
23.	Bhirara	...	...	" <i>nummularia.</i>
24.	Bhirol	...	...	<i>Olerodendron infortunatum.</i>
25.	Bhira	...	...	<i>Semecarpus Anacardium.</i>
26.	{ Bhonria Chheola	...	...	<i>Randia uliginosa.</i>
27.	{ Bhadoria	...	...	<i>Indigofera</i> sp.
28.	Bija	...	...	<i>Chloroxylon Swietenia.</i>
29.	Biláikand	...	...	{ <i>Butea superba.</i>
30.	Bilsena	...	...	<i>Pterocarpus Marsupium.</i>
31.	?	...	...	<i>Pueraria tuberosa.</i>
32.	Chambeli	...	...	<i>Limonia acidissima.</i>
33.	Chilla	...	...	<i>Casearia tomentosa.</i>
34.	Chhind, Khajuri	...	...	<i>Jasminum arborescens.</i>
35.	Chheola	...	...	<i>Holoptela integrifolia.</i>
36.	Dhámin	...	...	<i>Phœnix acaulis.</i>
37.	Dhawa	...	...	<i>Butea frondosa.</i>
38.	Dhawai	...	...	<i>Grewia</i> sp.
39.	Dhegan, Dháman	...	...	<i>Anogeissus latifolia.</i>
40.	Dhobain, Pánsi	...	...	<i>Woodfordia floribunda.</i>
41.	Dudhi	...	...	<i>Cordia Macleodii.</i>
42.	Dikámali	...	...	<i>Dalbergia paniculata.</i>
43.	Entni, Atena	...	...	{ <i>Wrightia tinctoria.</i>
44.	?	...	...	" <i>tomentosa.</i>
45.	Gabdi	...	...	<i>Gardenia gummifera.</i>
46.	Ganger	...	...	<i>Helicteres Isora.</i>
47.	Ghanto, Mokha	...	...	<i>Flemingia lineata.</i>
48.	Ghont	...	...	<i>Cochlospermum Gossypium.</i>
49.	Gunchhi	...	...	<i>Grewia</i> sp.
50.	Gunja	...	...	<i>Schrebera swietenoides.</i>
51.	Gurár	...	...	<i>Zizyphus xylopyra.</i>
52.	Haldu	...	...	<i>Abrus precatorius.</i>
53.	Harra	...	...	<i>Odina Wodier.</i>
54.	Harua	...	...	<i>Albizzia procera.</i>
55.	Imli	...	...	<i>Adina cordifolia.</i>
56.	Indarjao	...	...	<i>Terminalia Chebula.</i>
57.	Jait	...	...	<i>Erythrina suberosa.</i>
58.	Jamnera	...	...	<i>Tamarindus indica.</i>
59.	Jamrásí	...	...	<i>Holarrhena antidysenterica.</i>
60.	Jámun	...	...	<i>Sesbania ægyptiaca.</i>
	?	...	...	<i>Eugenia salicifolia.</i>
		...	...	<i>Elæodendron Roxburghii.</i>
		...	...	<i>Eugenia jambolana.</i>
		...	...	<i>Jasminum hirsutum.</i>

Vernacular Name.				Systematic Name.
61.	Kachnár	...	...	<i>Bauhinia variegata.</i>
62.	Kadam	...	...	<i>Anthocephalus Cadamba.</i>
63.	Kaim	...	...	<i>Stephegyne parvifolia.</i>
64.	Kait	...	...	<i>Feronia Elephantum.</i>
65.	Kakunan	...	...	<i>Celastrus paniculatus.</i>
66.	Kámpthi	...	...	<i>Hiptage Madablota.</i>
67.	Kánji	...	...	<i>Pongamia glabra.</i>
68.	Kánker	...	...	<i>Flacourtia Ramontchi.</i>
69.	Karanj	...	...	<i>Cæsalpinia sepiaria.</i>
70.	Kardehi	...	...	<i>Anogeissus pendula.</i>
71.	Kári	...	...	<i>Miliusa velutina.</i>
72.	Karonda	...	...	<i>Carissa diffusa.</i>
73.	Kasai	...	...	<i>Briedelia retusa.</i>
74.	Kat-umar	...	...	<i>Ficus hispida.</i>
75.	Kau	...	...	<i>Ixora parviflora.</i>
76.	Kenkra	...	...	<i>Garuga pinnata.</i>
77.	Khair	...	...	<i>Acacia Catechu.</i>
78.	Khajuri	...	...	<i>Phoenix sylvestris.</i>
79.	Khatua	...	...	<i>Antidesma diandrum.</i>
80.	Khirni	...	...	<i>Mimusops indica.</i>
81.	Kirwára	...	...	<i>Cassia Fistula.</i>
82.	Koha	...	...	<i>Terminalia arjuna.</i>
83.	Kulu	...	...	<i>Sterculia urens.</i>
84.	Kumbhi	...	...	<i>Careya arborea.</i>
85.	Khumer	...	...	<i>Gmelina arborea.</i>
86.	Kusam	...	...	<i>Schleichera trijuga.</i>
87.	Máhárukh	...	...	<i>Ailanthus excelsa.</i>
88.	Máhol	...	...	<i>Bauhinia Vahlia.</i>
89.	Mahua	...	...	<i>Bassia latifolia.</i>
90.	Menhar	...	...	<i>Randia dumetorum.</i>
91.	Makor	...	...	<i>Zizyphus Ænopia.</i>
92.	Menda	...	...	<i>Tetranthera laurifolia.</i>
93.	Mendhi	...	...	<i>Lowsonia alba.</i>
94.	?	...	...	<i>Millstia auriculata.</i>
95.	Mudár	...	...	<i>Calotropis procera.</i>
96.	Musli, Sufed...	...	...	<i>Curculigo orchioides.</i>
97.	Nim	...	...	<i>Melia indica.</i>
98.	Ningori	...	...	<i>Vitex Negundo.</i>
99.	Pákar	...	...	<i>Ficus infectoria.</i>
100.	Panwár	...	...	<i>Cassia Tora.</i>
101.	Pápra	...	...	<i>Gardenia latifolia.</i>
102.	Pápri	...	...	<i>Ventilago calyculata.</i>
103.	Pendra	...	...	<i>Gardenia turgida.</i>
104.	Pipal	...	...	<i>Ficus religiosa.</i>
105.	Rakat-barár	...	...	<i>Capparis spinosa.</i>
106.	Rámdáton	...	...	<i>Smilax sp.</i>
107.	Rassala	...	...	<i>Cordia Myxa.</i>
108.	Reonjha	...	...	<i>Acacia leucophlea.</i>
109.	Rohin	...	...	<i>Soyimida febrifuga.</i>
110.	Rori	...	...	<i>Mallotus philippinensis.</i>
111.	Ságon	...	...	<i>Tectona grandis.</i>
112.	Sáj	...	...	<i>Terminalia tomentosa.</i>
113.	Sálai	...	...	<i>Boswellia thurifera.</i>
114.	Sarai	...	...	<i>Shorea robusta.</i>
115.	Seji, Seja	...	...	<i>Lagerstræmia parviflora.</i>
116.	Semal	...	...	<i>Bombax malabaricum.</i>
117.	Senjna	...	...	<i>Moringa pterygosperma.</i>
118.	Shisham	...	...	<i>Dalbergia latifolia.</i>
119.	Siháru	...	...	<i>Nyctanthes Arbor-tristis.</i>
120.	Siris	...	...	<i>Albizzia Lebbeck.</i>
121.	Sitáphal	...	...	<i>Anona squamosa.</i>
122.	?	...	...	<i>Sponia politoria.</i>
123.	Tendu	...	...	<i>Diospyros Melanoxylon.</i>
124.	Tilban	...	...	<i>Premna integrifolia.</i>
125.	Tinsa	...	...	<i>Ougeinia dalbergioides.</i>
126.	Thuar	...	...	<i>Euphorbia Tirucalli.</i>
127.	Umar, Gular	...	...	<i>Ficus glomerata.</i>

R. S. HOLE,

Assistant Conservator of Forests.

APPENDIX III.

Extract from letter No. 221 W. P., dated Calcutta, the 8th December 1896, from B. RIBBENTROP, Esq., C.I.E., Inspector-General of Forests to the Government of India, to the Conservator of Forests, Northern Circle, Central Provinces.

* * * * *

3. I do not altogether disagree in the classification adopted in paragraph 6 of the memorandum as a means of obtaining a bird's-eye view of the forest areas which we have to deal with. But I entirely disapprove of the information thus obtained being taken as the sole basis of future management. It is essential that each Working Circle should, as far as it is feasible, be formed of compact, easily managed forest areas, and not consist of a chess-board of areas subject to entirely different rules of management.

* * * * *

7. As regards your proposal to rewrite all the plans I would suggest that the plans for one or two selected ranges be re-constructed in the light of these remarks and of this office letter No. 121 *W. P., dated 28th June 1895, and submitted to me for criticism as preliminary reports, together with the original plans drawn up for the same area.

* To Secretary to the Chief Commissioner, Central Provinces. (Copy enclosed).

APPENDIX IV.

Statement showing the grazing pressure by Blocks, Sub-ranges and Ranges.

Range.	Sub-range.	BLOCK.		Acreage.	Number of cattle.	Number of acres per head.	
		Serial number.	Name.				
Murwara ... (4.1 acres per head.)	Bijeragogarh ... (3.5 acres per head.)	1	Guraiya ...	530	238	2.2	
		2	Junwani ...	1,326	212	6.2	
		4	Karreha ...	1,267	148	8.5	
		5	Hardna ...	2,772	803	3.4	
		6	Banjari ...	652	312	2.0	
		8	Jaiwara ...	4,394	1,288	3.4	
		9	Ghugri ...				
		10	Darori ...	9,263	2,747	3.3	
		11	Majhgawan...				
		12	Bijori ...				
		13	Gopalpur ...				
		Khitoli ... (3.1 acres per head.)	3	Bara ...	1,070	351	3.0
			14	Khairani ...	2,864	950	3.0
	15		Jhiria ...				
	16		Karondi ...	5,047	1,471	3.4	
	19		Karela ...	386	158	2.4	
	Tilgawan ... (5.0 acres per head.)	21	Salaiya ...	341	114	2.9	
		105	Lakhapateri ...	14,954	1,717	8.7	
		110	Amdar ...				
		106	Jalasur ...				
		107	Pathrari ...	6,114	410	14.9	
		108	Pathori ...	2,352	1,358	1.7	
		109	Kenah ...	9,941	962	10.3	
		111	Mamar ...	723	155	4.6	
		112	Bilheri ...	1,235	1,994	0.6	
		113	Bhainswahi ...	487	478	1.0	
Total ...			65,768	15,866	4.1		
Sihora ... (8.5 acres per head.)		Sleemanabad ... (14.3 acres per head.)	22	Jhapi ...	1,979	445	4.4
			23	Jorpahar ...			
	24		Kudra ...				
	25		Bijhota ...	15,107	1,135	13.3	
	26		Katahi ...	5,847	21	278.4	
	27		Chheolapani ...				
	Kuan ... (3.6 acres per head.)	28	Dhanwahi ...	992	47	21.1	
		29	Hargarh ...				
		99	Samasgarh ...	1,998	527	3.7	
		100	Jamunia ...				
		101	Mahgawan ...				

Range.	Sub-range.	Block.		Average.	Number of cattle.	Number of acres per head.
		Serial number.	Name.			
		102	Amoch ...	2,294	858	2.6
		103	Kuan ...			
		104	Jujawal ...			
	Jhirna Piparia ... (7.9 acres per head.)	30	Deogarh ...	17,602	2,258	7.7
		31	Umarpani ...			
		32	Deogawan ...			
		33	Karopani ...	10,430	701	14.8
		34	Kanharpura ...			
		35	Garhat ...			
		36	Punwasa ...	5,060	1,209	4.1
		37	Daroli ...			
		38	Patua ...			
		Total		61,309	7,201	8.5
Jubbulpore ... (4.6 acres per head.)	Bagraji ... (5.1 acres per head.)	39	Kundwara ...	2,426	30	80.8
		40	Sonti or Budhari ...	1,664	188	8.8
		41	Taunri (part) ...	13,640	3,286	4.1
		41A	Pondi ...			
		42	Bhaunraha ...			
	Ker ... (3.3 acres per head.)	41	Taunri (part) ...	4,559	1,080	4.2
		43	Kakri ...			
		44	Chitri ...			
		45	Bijapuri ...	3,402	1,322	2.5
	Kakartala ... (5.3 acres per head.)	46	Lower Gaur ...	5,266	768	6.8
		50	Gangai ...	5,419	1,214	4.4
		51	Dasrathpur ...			
		Total		36,376	7,888	4.6
Bargi ... (4.7 acres per head.)	Sukri ... (4.5 acres per head.)	83	Chhindwaha ...	5,641	1,503	3.7
		85	Khamkhera ...			
		85A	Salaiwara ...			
		86	Mankheri ...	1,736	551	3.1
		87	Khapa ...			
		88	Silua ...			
		89	Karanpathar ...	4,679	597	7.1
		90	Lohri ...	4,515	628	7.1
		91	Bargi ...	924	521	1.7
		92	Narainpur ...	487	155	3.1
	Bandiwara ... (5.1 acres per head.)	93	Semra ...	4,573	823	5.5
		94	Thengra ...	3,615	767	4.1

Range.	Sub-range.	Block.		Average.	Number of cattle.	Number of acres per head.
		Serial number.	Name.			
Dhanwahi ... (4.5 acres per head.)	Bandiwara ... (5.1 acres per head.)	96	Kulaun ...	3,105	604	5.0
		97	Piparia ...			
		98	Tontha ...			
			Total ...	29,275	6,149	4.7
	Dobhi ... (5.5 acres per head.)	48	Richhai ...	401	128	3.1
		78	Bilaikhapa ...	96	318	0.3
		79	Bijadoni ...	12,358	1,543	8.0
		80	Jamunia ...	1,603	426	3.7
		81	Dobhi ...	4,885	1,228	3.9
		82	Pararia ...	1,060	29	36.5
	Barangda ... (5.8 acres per head.)	54	Bastara ...	16,399	2,116	7.7
		55	Pararia ...	15,504	2,441	6.3
		59	Barela ...	8,320	144	57.7
		61	Bhondi ...	2,083	221	9.4
		62	Kalpi ...	34,355	8,170	4.2
		63	Salaiya ...	492	72	6.8
	Chargaon ... (1.6 acre per head.)	67	Chutka ...	484	1,062	0.4
		68	Kunda ...	4,750	3,018	1.5
		69	Sahajpur ...	429	123	3.4
		72	Jamthar ...	1,537	712	2.1
		73	Chulia ...	151	400	0.3
		75	Chaonrai ...	3,898	1,897	2.1
		84	Kathotia ...	1,639	436	3.7
			Total ...	110,444	24,484	4.5
			Entire Division ...	303,172	61,588	4.9

APPENDIX V.

Notifications Nos. 3554 of 12th June 1890 and No. 2823 of 21st June 1894.

The following rules have been made by the Chief Commissioner :—

I. Any person desirous of clearing by fire any standing forest or grass land within three miles of any reserved forest shall observe the following rules :—

- (1) He shall give notice of his intention to burn at least one week beforehand to the nearest Forest Guard, Forester or Ranger.
- (2) He shall clear a fire belt at least 30 feet broad on that side of the area which he proposes to burn which is nearest to the reserved forest in such manner that no fire can spread across such belt.
- (3) He shall take care not to burn when a high wind is blowing.

II. Any person desirous of burning on land within one mile of a reserved forest, any wood, grass, weeds or other inflammable materials shall collect such material into heaps and burn it heap by heap in such a manner that the resulting fire shall not extend to the surrounding area or endanger the reserved forest.

III. Any person collecting inflammable forest produce, such as grass and bamboos, on land adjoining a reserved forest, and any holder of a permit to collect such produce from a reserved forest shall stack it in an open space at such reasonable distance from the forest as the Forest Divisional Officer may by general or special orders prescribe, and shall isolate the stacks in such manner that if they take fire the fire shall not be able to spread to the surrounding area or endanger the reserved forest.

IV. Camping places along the boundary of and within the limits of a reserved forest will be cleared and set apart by the Divisional Forest Officer for the use of travellers, a list thereof being published annually, and except on such camping grounds no fires shall be lighted within or along the boundary of a reserved forest. All persons using these camping grounds shall light any fires they make for cooking or other purposes in such a way as not to endanger the reserved forest or any buildings, sheds or other property on the camping ground: and before leaving they shall collect in the centre of the camping ground all inflammable material which is to be left behind, and shall carefully extinguish all fires.

V. The carrying of burning wood, firebrands, or torches along the boundary of any reserved forest is prohibited between the 1st November and 30th June or such earlier or later date as may be notified by the Forest Divisional Officer under Section 25 (c) with the previous approval of the Conservator. Smoking is similarly prohibited between the 1st November and 30th June within a reserved forest, save at an authorised camping ground.

APPENDIX VI.

CIRCULAR NO. $\frac{III}{750}$ OF 1900-1.

FROM

E. E. FERNANDEZ, Esq.,

OFFICIATING CONSERVATOR OF FORESTS, NORTHERN CIRCLE,

Central Provinces,

TO

THE DIVISIONAL FOREST OFFICERS,

Mandla, Jubbulpore, Narsinghpur and Betul.

Dated Jubbulpore, the 20th April 1900.

SIR,

As you are no doubt aware, a very large proportion of the harra crop of our forests is stolen every year through the carelessness as well as the dishonesty of our subordinates, who protect themselves behind our absolute ignorance of our resources in that product. An enumeration of the harra trees according to size-classes in each block and an accurate estimate of the yield of the type tree of each class in (a) a good year, (b) a moderate year and (c) a bad year will at once afford us a certain basis for checking the actual outturn each year and circumventing fraud and neglect of duty. I accordingly forward herewith a set of instructions together with an extract from the Working Plan Report, for the forests of the Jubbulpore Division, and beg that you will at once commence an enumeration survey on the lines indicated therein.

2. As the enumeration survey of each block is completed, the results obtained will be at once communicated to this office.

3. The estimates of the outturn of type trees will be made partly by the Divisional Forest Officer personally, partly by the Working Plans Assistant, and partly by other upper subordinates, whose character books afford a guarantee of their trustworthiness. Every year, on the 1st February, a complete report on the experiments made to establish the outturn of type tree will be submitted to this office.

I have the honour to be,

SIR,

Your most obedient servant,

E. E. FERNANDEZ,

Offg. Conservator of Forests, Northern Circle,

Central Provinces.

Instructions for carrying out an Enumeration Survey of Harra Trees.

I. The following diameter-classes will be adopted :—

- Class A.—Trees up to 6" in diameter.
 „ B. „ from 6" to 12" in diameter.
 „ C. „ „ 12" to 18" „ „
 „ D. „ above 18" in diameter.

II. The callipers used for gauging the diameter of the trees will have the rule on which the movable arm slides divided into 6-inch compartments, each compartment being painted a different colour. The gaugemen will thus have only to note and call out the colour of the compartment intersected by the inner edge of the sliding arm, and any illiterate man or boy who can recognise the principal colours can be a gaugeman.

III. The callipers will be applied at the height of the gaugeman's shoulders, and as nearly as possible at right angles to the axis of the tree. If there is an excrescence or the tree is forked at that height, the measurement will be taken immediately above the excrescence or below the fork, as the case may be.

IV. Every gaugeman will be furnished also with a light axe with a short haft, with which he will blaze each tree immediately after he has called out the colour intersected on the painted rule. This is to prevent one and the same tree being enumerated more than once.

V. Each page of the recorder's note-book will be divided by three parallel lines into four vertical columns, headed successively A, B, C and D, commencing from the left. The record will be kept by means of groups of ten trees, each group consisting of two vertical rows of four dots each joined by two diagonal lines, thus [X] [X] [X] [X], and so on. Thus, when the enumeration in any block has been completed, there will be no difficulty in totalling up and noting down at its foot the number of trees recorded in each compartment of the page.

VI. In the case of small forest blocks, the enumeration survey will be made by entire blocks. If the block is large, the survey will be effected separately for large compartments of the block formed by intersecting roads and important streams and ridges. A whole page will be assigned to each separate survey and the name and number of the block and, in the case of large blocks, also the boundaries of the compartment will be noted at the top of the page.

VII. The enumeration survey will be effected over successive strips just broad enough to be completely covered by the line of gaugemen and efficiently overlooked by the recorder. In the annexed diagram the black parallel lines show the strips and the red line the march of the enumeration survey party. The strips need not be marked at all on the ground; the regular march of the enumerating party will be secured by the gaugemen keeping in line and at the proper distances apart from each other and by one man (not provided with a gauge, whom we will call the boundary man) walking along the boundary of the forest or compartment or along the edge of the last strip surveyed, as the case may be, and thus serving as guide to the rest of the party. Thanks to the blazes made by the gaugemen (the blazes, to be readily seen, should of course always be made on the trunks on the side facing the area still remaining to be surveyed), the boundary man will have no difficulty at all in following the outer edge of the strip last surveyed.

VIII. The number of gaugemen should be large enough to keep the recorder fully employed and will obviously depend on the abundance of harra trees in the crop. At the same time they should not be so numerous as to spread out of sight and beyond the call of the recorder, whose most convenient position will be immediately behind the middle point of the line of gaugemen.

IX. It is essential that the enumeration should be as accurate as possible, and hence only your Working Plans Assistant and, in his occasional unavoidable absences, a trustworthy upper subordinate should perform the duties of recorder. Whoever records must sign his name at the foot of each record kept by him; in no other way will it be possible to fix responsibility, and unless we can fix responsibility, the work will be bound to be unsatisfactory.

E. E. FERNANDEZ,

*Offg. Conservator of Forests, Northern Circle,
 Central Provinces.*

APPENDIX VII.

Letter No. 13491, dated Jubbulpore, the 8th March 1900, from E. E. FERNANDEZ, Esq., Officiating Conservator of Forests, Northern Circle, Central Provinces, to the Divisional Forest Officer, Jubbulpore.

* * * * *

2. In reply I beg to say that conditions here do not in any respect differ from those prevailing in the Bombay forests. With the class of khair forests we have to deal with, very large areas would have to be cut over in a single season and as the katha-boilers will operate only where khair trees suitable for their purpose are numerous enough, I fear that half-a-dozen seasons' work would exhaust all the limited resources of the Jubbulpore Division. Restrictions are therefore absolutely necessary, but not such as those which were adopted in Damoh, which I would never have assented to had they been submitted for my approval.

3. In order to obtain a katha-boiling Working Circle we should probably have to combine Jubbulpore, Damoh and Saugor together. Hence before your proposals can be considered you should consult your colleagues of Saugor and Damoh and elaborate a joint plan of operations.

Letter No. G-10, dated Damoh, the 7th April 1900, from L. GISBORNE-SMITH, Esq., Divisional Forest Officer, Damoh Division, to the Divisional Forest Officer, Jubbulpore.

In reply to your endorsement No. G-1722, dated 19th March 1900, with enclosures, I have the honour to inform you that the "khair" tracts in this Division cannot be systematically improved through the agency of katha-boilers for two reasons, first, because of the irregularity and scarcity of the water-supply, and second because the katha-boilers are natives of the Panna State and only visit this district when it pleases them.

2. The want of consideration of these facts led to the failure of Mr. Faiz Baksh's Working Plan.

The katha-boilers will not commence operations unless they can get a plentiful supply of water within reasonable distance of khair trees. If the improvement of khair is to depend alone upon the katha industry, the best results will be obtained by binding the katha-boilers to work over large areas in the vicinity of water and seeing that they fulfil this condition.

A tract once cut over should not be re-opened for 15 years.

3. The visits of the "Khairwas" to this district have been so irregular that every advantage has hitherto been taken of their advent to get as large areas improved as possible.

The reduction of areas in my opinion would either result in over-felling or in no improvement fellings being made by katha-boilers at all.

Letter No. 786, dated Jubbulpore, the 21st April 1900, from E. E. FERNANDEZ, Esq., Officiating Conservator of Forests, Northern Circle, Central Provinces, to the Divisional Forest Officer, Jubbulpore.

With reference to your letter No. C-46, dated the 13th April 1900, forwarding copy of the Damoh Divisional Forest Officer's reply to your reference to him on the subject of constituting a katha-boiling Working Circle by combining the two Divisions, I have the honour to say that the Damoh Divisional Forest Officer's letter brings forward no circumstance against the feasibility of regularising katha-boiling operations in accordance with a working plan. Indeed it gives no definite information whatsoever bearing on the question. What is wanted is for each Divisional Officer to prepare a map of his Division showing all the areas suitable for such operations and the sites at which the khairwas may establish their camps. We can then see whether a continuous round of operations is possible. It does not matter where the original home of the khairwas may be; they will travel 100 miles to seek favourable grounds for their work. At present their visits are irregular because we have done nothing to bring them over annually. Your ideas are identical with mine; but whereas I would introduce system, you would leave everything to chance. From my previous experience I know that the latter procedure leads to the certain deterioration of the forests.

Letter No. C-76, dated Jubbulpore, the 26th April 1900, from R. S. HOLE, Esq., Divisional Forest Officer, Jubbulpore Division, to the Conservator of Forests, Northern Circle, Central Provinces.

* * * * *

2. In your letter under reply you say "at present their (speaking of the khairwas) visits are irregular because we have done nothing to bring them over annually." It was precisely the knowledge of the fact that the stagnation of the industry in the past was

owing to unnecessary obstructions which had been put in the way of the khairwas by the forest officials and to no systematic action whatever having been taken to encourage their operations which induced me to advocate the policy of the open door, at all events for the present, and to recommend that the khairwas should be allowed to settle where they pleased and carry on their work with the one and only restriction of having to coppice all trees cut by them.

* * * * *

4. As laid down in your letter under reply the one necessity is that "each Divisional Officer should prepare a map of his Division showing all the areas suitable for such operations and the sites at which the khairwas may establish their camps," but, speaking with reference to my own case, I could only prepare such a map at the present moment from very doubtful data received from Range Officers which would be certainly incomplete and probably also inaccurate. Previously little if any katha-boiling appears to have been carried out in this Division and this year I have got khairwas to work in three Sub-ranges only, from which it will be seen that at present it is impossible for me to draw up a correct list of sites for khairwa-camps.

5. I therefore, with due deference, beg to propose that work should be allowed for, say, two or three years at least in this Division on the terms originally proposed by me, i.e., that khairwas shall be allowed to work where they like on the condition that they carefully coppice all trees cut by them. At the end of each season a full report on the year's work would be submitted to you showing the sites of the camps where work was carried on during the year, with the number of *bhattis* and *handis* at work in each camp and a careful estimate, from an inspection of the neighbouring forests, of the area actually worked over during the year and the period for which the existing stock of khair trees may be expected to give employment to the number of khairwas at each camp. The absence of unnecessary restrictions will give every possible encouragement to the khairwas to settle in all suitable places and if the annual reports on the work are carefully made, an accurate estimate can be framed regarding the resources of the Division in respect of katha. If this plan is adopted in other Divisions also it would, I feel confident, be possible in a very few years to draw up a thoroughly practical plan of operations by which the industry will be not only greatly extended, but also given a permanent footing which it has never had before.

6. In conclusion I should like to remark that I visited yesterday (22-4-1900) a khairwa-camp I have had established this year at Birholi near Block 17 in the Murwara Range. Four *bhattis* or furnaces are at work with 60 *handis* and from a casual inspection of the forest, I should say that the same number can be worked here for two or three years more at least. I saw no tree which had been cut less than 12" in girth at the base and all stools had been most carefully dressed * * * *

Letter No. 1176, dated Jubbulpore, the 2nd May 1900, from E. E. FERNANDEZ, Esq., Officiating Conservator of Forests, Northern Circle, Central Provinces.

Referring to your letter No. C-76, dated 26th April 1900, I have the honour to say that as you have now made it clear that your proposals regarding katha-boiling are purely experimental in their objective and are intended to furnish accurate data for the framing of a katha-boiling Working Plan, I have no objection to their present adoption and continuance for two or three years.

APPENDIX VIII.

Letter No. 4266, dated Jubbulpore, the 28th April 1900, from M. W. FOX-STRANGWAYS, Esq., I.C.S., Officiating Commissioner, Jubbulpore Division, to the Conservator of Forests, Northern Circle, Central Provinces.

I have the honour to return the proof of the Working Plan for the forests of the Jubbulpore Forest Division forwarded with your letter No. 51, dated the 24th instant. I regret that it was received too late to have the advantage of my predecessor's criticism. So far as I am able to form an opinion on it, the provisions seem to me in all respects excellent. But I think it would be best that it should first be sent to the Deputy Commissioner for examination and I should be glad to see it again after he has criticised it. I note that you refer to paragraph IV of Revenue Book Circular VII-4 as the rule in accordance with which you send it to me, but I cannot find that this Circular lays down any procedure.

Letter No. 2164 dated, Jubbulpore, the 21st April 1900, from B. ROBERTSON, Esq., I.C.S., C.I.E., Deputy Commissioner, Jubbulpore, to the Conservator of Forests, Northern Circle, Central Provinces.

With reference to your No. 29, dated 13th April 1900, I have the honour to return the draft of the Working Plan. I have no criticism to offer.

Endorsement from Conservator of Forests, Northern Circle, Central Provinces, to Commissioner, Jubbulpore Division, No. 1143, dated Jubbulpore, the 30th April 1900.

Copy of the above letter (No. 2164, dated the 21st April 1900) is forwarded to the Commissioner, Jubbulpore Division, in compliance with his letter No. 4266, dated the 28th April 1900. As the Deputy Commissioner's letter contains no criticism, the Draft Working Plan is not returned.

(17)
 

ALBANY, 10th Decr. 1850.

Central Provinces
India, Forest
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