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MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

R Revs DEPARTMENT

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Dated 6.9.1895 196 .

Not to be folded or roughly handled

No. 60. Read the following Extract from the Proceedings of the Government of India in the Department of Revenue, Agriculture, and Commerce, (Forests,) dated Simla, 3rd August 1875, Nos. 20/857—873 :—

Read again—

A Resolution No. 19/1,246—1,257, dated 17th October 1872, organising a special Survey Branch for the Forest Department.

Read—

A Report by the Inspector-General of Forests, dated 6th January 1875, on the operations of the Forest Survey.

RESOLUTION.

WHEN organising the Forest Survey the Government of India intended to form a scientific branch of the department, the officers of which would be competent to prepare accurate and useful maps of the Government forests, and to assist the local officers in framing regular plans of operations. It was supposed that, as the work of the department in the different Provinces expanded, the time and attention of the local forest officers would often be entirely absorbed by the current work of administering the public forest domains and of producing revenue from them, and that, in many cases, it would be necessary, in addition to the local forest establishments, to have the services of specially qualified officers available for the more scientific work of the department.

2. The need of this special agency will be felt less in some Provinces than in others. In Lower Bengal it is understood that the Conservator is in a position, with the aid of the local staff alone, to do what is required at present for the preparation of forest maps and preliminary working plans. And in the Central Provinces maps of certain reserves are being prepared by the Topographical Survey, while the Conservator is making progress in framing preliminary plans of operations through the agency of his local staff. Making allowance for these and similar cases, there is, however, ample work left in other Provinces which requires the services of the special department.

3. During the first years of its existence the work of the Forest Survey was necessarily confined to topographical survey and the preparation of forest maps. As explained in the Inspector-General's report, the need for regular working plans is, as a rule, not yet pressing, and preliminary plans of operations can, in many cases, be prepared by the local staff. Eventually, however, this branch of the work also will, as originally contemplated, form an important part of the work of the Forest Survey Department. It has been considered whether the topographical part of the work might not more economically be done by the Imperial Survey. As a matter of fact, the eastern reserves of the Central Provinces are being surveyed by a party of the Topographical Survey, and if the forests to be surveyed in other Provinces either consisted of extensive areas or if, in all cases, a party of the Imperial Survey were available on the spot to make detailed maps of the reserves, then this plan might, with advantage, be adopted. But the survey of extensive forest areas will be the exception, and most of the work will necessarily be in districts where the services of a party of the regular survey will not be available at the time that the maps are required. Moreover, it is obvious that, though in most cases a large scale will be required, yet it will not be necessary to represent the whole detail which the scale permits, but that a selection of those features must be made, the representation of which on the map is indispensable for forest purposes. General rules to guide the surveyors in the selection of topographical features cannot be laid down for all cases, because the requirements vary, and the survey of each forest district must be dealt with on its merits.

4. It is, however, essential clearly to define the relation of the Forest Survey to the great branches of the Imperial Survey. In February 1873 the Survey Branch was placed under the general control in survey matters of the Superintendent of the Great Trigonometrical Survey as long as it should continue to be employed in the district of Dehra Dún. The satisfactory progress of the operations of the Forest Survey and the promise which it now gives of being an important and most useful institution in connection with forest administration in this country is mainly due to the assistance and advice given by Colonel Walker, and His Excellency the Governor-General in Council considers it most desirable to continue this connection as long as possible. There will be no difficulty in this as long as its main work lies in North-West India, and, under these circumstances, Colonel Walker will be asked to continue to exercise a general control over the professional work of the Forest Survey. The Superintendent should seek his advice on all professional questions, and submit such periodical reports to him as Colonel Walker may from time to time deem expedient.

5. With these remarks, the Governor-General in Council is pleased generally to approve the plan of operations sketched in paragraphs 9 to 13 of the Inspector-General's report of the 6th January last. Orders have already issued for the survey of the Deoban and adjoining forests of Jaunsar, and a communication will be addressed to the Government of the North-West Provinces and to the Chief Commissioner of British Burma concerning the proposed surveys of a portion of the Garhwal and Kumaun Sâl forests and the Burma reserves.

6. Proposals for work to be undertaken in addition to that here indicated should, as suggested in paragraph 14 of Mr. Brandis's report, be made by local

Governments, with whom it will ordinarily rest to take the initiative in making proposals for all new surveys and for other work to be undertaken by the Forest Survey Department. The Superintendent will submit periodical reports to the local Governments or Administrations of all Provinces in which any work under his direction may be in progress, and he will give his best attention to all references which may be made to him by local Governments and Conservators of Forests. On the other hand, it is expected that the Conservators and local forest officers will afford every assistance to the Superintendent and officers of the Forest Survey, and will, at all times, supply them with any information which they may require for their work. The Superintendent of Forest Surveys will keep the Inspector-General of Forests informed of his correspondence with local Governments and Conservators. The annual report of the work accomplished by the Forest Survey will, until further orders, continue to be submitted through Colonel Walker, who will be requested, when transmitting it to the Government of India, to record his views regarding the progress made and to add such suggestions as he may wish to make concerning the methods to be pursued in future.

7. As regards the staff required for the work the proposals submitted in paragraphs 19—23 of the Inspector-General's report are approved. The permanent staff will, as at present, consist of one Superintendent and two Assistants, and in addition to these junior officers from other Provinces will, in the manner suggested by Mr. Brandis, be temporarily attached for instruction to the Forest Survey with the view of being available, on return to their own Provinces, for topographical survey and the preparation of working plans. An allowance of Rs. 500 will be paid to each officer on completion of his course of instruction, provided he obtains a certificate of proficiency from the Superintendent. Local Governments will be invited to submit the names of officers who, in their opinion, may, with advantage, be thus temporarily attached to the Forest Survey, but the Government of India reserves to itself the power of selection. The provision made for the pay and travelling allowances of these officers in the Provincial Budgets will, for the time of their instruction, be transferred to the Forest Survey Budget.

8. Thus it is hoped that this branch of the Forest Department will not only accomplish useful work, but that it will serve to instruct a succession of junior officers who will eventually be available for the survey work of the department in their own Provinces. In addition to this the Superintendent should consider, in consultation with Conservators of Forests, whether young men, Natives of India or others, may not, by employment in the forest Survey for a series of years, be prepared for service in the executive branch of the Forest Department.

9. Regarding the establishment of a permanent office at Dehra proposed in the concluding paragraphs of the Inspector-General's report, the Governor-General in Council is not yet in a position to pass final orders. It is obviously necessary to provide for the safe custody of the maps and records. But these might be deposited either in the Office of the Surveyor-General or in that of the Superintendent of the Great Trigonometrical Survey. This subject, however, as well as the question of the recess quarters, will be considered when the work of the Forest Survey shall have further advanced.

10. It now remains to review the financial aspects of the question. In round numbers the expenditure of the Forest Survey, including salaries and allowances, has been as follows:—

	Rs.
In 1872-73	8,866
„ 1873-74	50,272
„ 1874-75	61,519
Total ..	1,20,657

It is understood that the survey of the Dún forests on the four-inch scale, with an area approximately of 530 square miles will, when completed, have cost Rs. 1,60,000, which is at the rate of Rs. 300 per square mile. This is a very high rate, which must be reduced, though no doubt some allowance must be made for the fact that it was the first work undertaken by the new department. Captain Bailey was single-handed during the greater part of the first season; one of his Assistants was entirely new to the work, and the greater part of his subordinate establishment was unskilled. This and the outlay for purchasing elephants, tents, and stores, has necessarily increased the cost of the first year's work, but the great advantage has been gained that officers and establishments have been trained to the work. The budget grant for the current year is Rs. 67,500. The annual cost of these operations will necessarily vary with the nature and extent of the work to be undertaken, and will differ in different Provinces. Large scale surveys of hilly country or of broken ground clothed with forest and without villages cannot, of course, be accomplished at the same rate as surveys of open cultivated districts where villagers assist in cutting lines and in other ways and where triangulation, traversing, and plane-table work is more easy and expeditious. It is not, however, contemplated during the next few years and as long as the main work continues to be in Northern India to raise the annual outlay on this account beyond the grant made for the current year, and the rate per mile will, it is hoped, be materially reduced as the establishment becomes more skilled in its work When the survey of the Burma reserves commences it will be considered whether it will not be preferable to provide the needful funds for that special work in the Provincial Forest Budget, and in that case the accounts of the party employed in Burma may, with advantage, be scrutinised by the Conservator and audited by the local Accountant-General; arrangements being made to submit all doubtful items to the Superintendent and to send him detailed monthly returns of the expenditure.

ORDER.—Ordered that a copy of the foregoing Resolution be forwarded to all local Governments and Administrations noted in the margin for information and guidance, and to the Governments of Madras and Bombay for information.

Bengal.	British Burma.
N.-W. Provinces.	Mysore and Coorg.
Punjab.	Ajmere.
Oudh.	Assam.
Central Provinces.	Hyderabad.

Ordered, also, that a copy be forwarded to the Financial Department for the issue of the necessary orders; to the Surveyor-General and the Superintendent, Great

Trigonometrical Survey, for information; and to the Superintendent of Forest Surveys and the Inspector-General of Forests for information and guidance.

(True Extract.)

(Signed) A. O. HUME,
Secretary to the Government of India.

No. 20/857.
To the Government of Madras.

ENCLOSURE No. 1.

MEMORANDUM ON THE OPERATIONS OF THE FOREST SURVEY.

I.—COMPLETION OF THE DUN SURVEY AND MAPS.

THE work was commenced in November 1872. All proposed triangulation has been completed, the forest boundaries have been surveyed, and most of them have been plotted on the 4-inch scale.

Work accomplished.

The topography of the detached forests of Ambári, Chándpúr, and Dholkote has been completed, as also has that of the Sewalik tract from the Jumna to about the Mohan Pass, a portion to the east of this road having been sketched, while another to the west is still in hand.

The traversing of main water-courses (Ráus) and minor drainage of the remainder of the Sewaliks and the topography of the flat ground to the south of the Sewaliks are also in course of completion.

Of Nágsidh and of the land in the valley of the Eastern Dún the boundaries only have been surveyed, but the topography is about to be commenced.

2. The survey will not be completed this season; but Colonel Walker has kindly promised to undertake a portion of the drawing of the maps, which will be completed in combination with the work of the party of the Great Trigonometrical Survey, now employed in surveying the private lands within the Dún, on the 4-inch scale.

Work remaining to be done.

We have considered whether, in order to complete the work this season, it would be advisable to modify it and to draw the maps on a smaller scale; but after fully weighing the advantages and drawbacks of such a change, we have concluded that it will be better to complete the work in the same manner as it has been commenced. The hill sketching in the remaining portion of the interior of the Sewaliks will, however, be reduced as much as possible, and the hill drawing on the final maps will be simplified.

3. It will be an advantage, in our opinion, to keep part of the establishment for another season employed in the Dún, while part takes up new work, provided a competent officer is available for its direction. This will obviate the necessity of moving the whole establishment in a body on to fresh ground. Under these arrangements, the field work in the Dún ought to be completed in Spring 1876. The time which this work has required must not be taken as the standard for other forest surveys. The work in the Dún has served as a training school for the establishment, and for this and other reasons it has necessarily been slow.

The whole Establishment not to be transferred to fresh ground at once.

II.—PLAN OF FUTURE OPERATIONS.

4. When the Forest Survey and Working-plan Department was formed in October 1872, the object was to obtain accurate maps of the Government forests, and to prepare plans for

Original Programme.

their systematic working. The work of the new department was, during the first years of its existence, mainly confined to the survey of the forest boundaries and sub-divisions, and to topography, and these, or at least the former, must, for obvious reasons, continue to be its main employment for some time to come, though eventually, if properly guided, its operations will extend over the entire range of subjects included in the original programme. Under these circumstances, it will suffice at present to consider the most urgent requirements for forest maps which are known to us, and the manner in which we propose that they should be met.

5. At the outset it may be useful to state that the conditions of the Government forests in the different provinces under the Government of India are so widely different that no general rules regarding scale and interior detail required can be laid down at present. With regard to those questions, therefore, it will be necessary to deal with each case on its own merits. A few general considerations should, however, be borne in mind.

Object of Forest Maps.

Speaking broadly, the use and object of forest maps may be said to be threefold: *first*, to represent the situation and, as far as may be practicable, the topography of the forests; *second*, to fix the limits of the forests, and to facilitate the settlement of questions of encroachment and boundary disputes; *third*, to ensure the systematic working of the forests by the representation on the maps of internal division lines and the determination of the area of compartments. The main point to be kept in view must be to attain these objects with the least possible expenditure of time and money. Therefore, no more topographical detail should be attempted than is necessary, the smallest scale which will answer the purpose should be selected, and, lastly, all existing work should be utilised as much as possible. In the printed maps no detail should, as a rule, be shown which is not of a more or less permanent nature. The character and age of the forest in the different compartments will, from time to time, be entered by hand, but there are certain lines, such as that which separates Sál from Khair and Sissu forest, which depend upon the configuration of the ground, and are, therefore, permanent. Such lines should be entered in the printed maps.

6. It is evident that the most detailed and accurate maps will be required in demarcated forests which are worked to their full extent, so as to utilise the entire annual production in the shape of stem-top—and branch-wood and other forest-produce. In such cases, it is essential to know the area of each compartment and to be able readily to ascertain the area of any portions of compartments which, for convenience of working, it may be desirable to separate from the rest. To this class belong, among others, the Deoban forests, which furnish fuel to the station of Chakráta, and the plantations in the plains of the Punjab. The working maps of such forests must be on a large scale, and must contain as much topographical detail as possible.

Scale and Detail to be shown must depend on the character of the Forest.

On the other hand, much less detailed maps will be required for reserves which, though demarcated, are not at present fully worked, but in which the main work will be protection and the keeping out of fires. Again, if forests of this description are burdened with forest rights or privileges which it may be possible hereafter to commute by the abandonment of part of the area, more detailed maps will be required at the present time than in tracts which are at the complete disposal of the State.

Lastly, for forests, the boundaries of which have not yet been demarcated, and in many other cases, sketch maps will generally be sufficient for the present.

7. The following sketch of the work to be done by the Forest Survey Department is not intended to exhaust the subject. Other wants will become known long before the work here indicated is completed, nor must it be imagined that on the completion of any particular survey the work of the department will cease in that forest. The survey of the Dún forests, for instance, has laid down the present Government forest boundaries; the greater part of these forests,

No present Forest Survey can be regarded as final.

however, is so burdened with grazing privileges that protection from fire is impossible, and this can only be altered by abandoning to the privilege-holders part of the forest area. Again, it has, we understand, been decided to give up for cultivation part of the forests in the Eastern Dún, so that it may be considered as certain that before long great alterations will take place in the boundaries now laid down on the maps.

8. Nor will it be possible in all cases beforehand to mark off on the ground the sub-division lines between blocks and compartments. The formation of these sub-divisions for the purpose of organising the systematic working of any forest is a most important operation, which requires long previous study of the forest, a knowledge of the demand for its produce in different directions, of the sources of labor, and of the treatment to which the different parts of the forest must be subjected. This operation will be of a more simple character on level or gently and uniformly sloping ground where the division lines may be straight than in a hilly country, but it cannot, as a rule, be completed before the topographical survey of a forest is commenced. In many instances the topographical survey must serve to facilitate this operation by laying down on the map the position of permanent points or lines likely to be useful in sub-dividing the forest. Some of these will be artificial, such as boundary marks, walls, bridges, roads, and paths; others,—and these will often be the more valuable of the two classes,—are natural land-marks, such as ridges, rocks, high-banks, jheels, streams, their junction, and the like. The selection of the topographical features to be entered on the map which this will involve renders it desirable that the topographical forest survey should be conducted by an establishment trained for this special work.

Most Forest Surveys can only be regarded as preliminary Works at present.

In some cases, the demarcation of the forest may not be completed at the time the survey is made, and thus there will be constant calls for the additional survey of boundary and sub-division lines, after the survey of any forest district has, for the time being, been completed.

With the view to the entering afterwards of additional detail on the maps, it is essential that those points and lines which are surveyed should be laid down with as much accuracy as possible, and that a complete record should be kept of the procedure. The first survey of a forest will often lay down the position of a few points and lines only, but whatever work is done must be done accurately, so that it need not be done over again by others, and may furnish safe starting points for the survey of additional detail at a future time.

9. After these general remarks, it will be best to review the work to be done in each province *seriatim*.

In the Punjab, the survey of the Khagan and Siran ranges and of the Bassahir Deodar forests has been contemplated. Of the former, a 2-inch scale map by the Revenue Survey Department, as well as a survey of the forest boundaries, already exists, and the reserves can be entered on that map without requiring additional work in the field.

Work to be done in the Punjab.

Regarding the Bassahir forests it has lately been suggested in a report submitted to the Government of India by the Inspector-General of Forests not to undertake a complete topographical survey of those forests for the present, but to prepare instead sketch maps of certain parts which are to be specially examined.

Pending the issue of further orders by the Government of India on these projects, no plans regarding these two districts need be framed.

In the plains it is probable that detailed maps of several plantations will be required, and that the maps of those rakhs, which are to be worked in regular rotation, will have to be compiled by the Forest Survey Department. On these subjects it will be well for the Conservator to place himself in direct communication with the Superintendent of Forest Surveys before any projects for work are submitted to Government.

10. In the North-West Provinces are two districts for which forest maps are urgently required, in addition to the Dehra Dún. The first is a portion of the tract of submontane Sál Bamboo and mixed forest between the Ganges and Sárda, in the Dúns and Sewalics of Garhwal and Kumaun. The map is at present required principally for those Sál forests, the improvement and regular management of which is to be taken in hand at once, and it is also intended to facilitate the demarcation of village areas and village forests in the Patlidún. The recent Great Trigonometrical Survey of that district will greatly facilitate this work. At the same time, it seems desirable that the valuation survey of the forests commonly called the Kumaun Iron Company's grant, which has been undertaken by the Forest Department of the North-West Provinces, and is now being carried on independently of the Forest Survey, should be placed under the direction of the Superintendent.

North-West Provinces.

The second work in the North-West Provinces is the forest on the Deoban range, which supplies Chakráta with fuel. The forest area, which will be required for this purpose, is estimated at 10,000 acres, but it is spread over an extent of country of about 50 square miles. In this forest every stick that can be produced will be utilised, and on that account a detailed map on a large scale will be required. As Colonel Walker is about to commence a survey of the whole of Jaunsár on the 2-inch scale, the Deoban forests may be undertaken by the Forest Survey in co-operation with his department.

As these Garhwal and Deoban forests are in close proximity to the Dún, it will probably be practicable to commence the work simultaneously with the completion of the Dún Survey. This will have a further advantage, that the establishment will, for a longer time, be mainly employed in Sál forests, and will become thoroughly familiar with the features which demand particular attention in that class of forest.

11. In Oudh, Bengal, and Assam we are not aware of any immediate work to be done by the Forest Survey. In Oudh the maps of the Revenue Survey Department are sufficient for the present, though they will soon require more filling in of detail, and in Bengal maps of the reserves are being prepared by the local officers under the direction of the Conservator of Forests.

Oudh, Bengal, and Assam.

12. In Ajmere and Mhairwára maps will be required of the recently formed reserves. As protection and exclusion of fire will be the main work in those reserves for a considerable time to come, it will suffice at present to use the 1-inch scale map prepared by the Topographical Survey. Forest boundaries and other detail that may be required in the reserves can probably be surveyed and entered on those maps by the Topographical Survey Department, and it is recommended that the Surveyor-General may at once be moved to have this done, as the operations are now in progress.

Ajmere and Mhairwara.

In the Central Provinces and Berar we understand that arrangements for the survey of the reserves have been made with the Revenue and Topographical Survey Department, and that no action is at present required there by the Forest Survey; but in order to prevent any misapprehensions on the subject, it is recommended that the attention of the Surveyor-General should be drawn to it at an early date. In this case, as well as in the case of the Ajmere and Mhairwara reserves, the Superintendent should be consulted regarding the preparation of these forest maps.

Central Provinces and Berar.

In Coorg it has been ordered that the reserves should be surveyed by the Madras Revenue Survey, and Captain Bailey is in communication with the Conservator on the subject.

Coorg and Mysore.

From Mysore no requisition for aid in the preparation of forest maps has, as far as we know, been made.

13. With regard to Burma, the orders of the Government of India are that, as soon as the work now in hand in North-Western India is completed, the Forest Survey Department shall be transferred to Burma, to undertake the preparation of the needful maps of the reserves. According to the last annual report, the area finally demarcated by the close of 1873-74 amounted to 279·34 square miles, principally situated in the Prome and Tharawaddi divisions, small areas only having been demarcated in the other divisions. But even in Prome and Tharawaddi the selection of the Government reserves is as yet far from completed, nor has the question been settled whether maps will be required of all reserves or only of a limited area to be called special reserves. Under these circumstances, it is hoped that it may be possible to complete what has to be done in the Deoban forests and Kumaun, before the demand from Burma becomes urgent. When commenced, however, the survey of the reserves in Burma will be a large original work, which will employ a large staff for a series of years.

Burma.

The result is that, if these suggestions are accepted, the completion of the Dún Survey and the work in the Kumaun and Garhwál Sál forests and the Deoban Circle will be the main task for the next two or three years; that the Burma reserves will be the next large work to be undertaken, but that, at the same time, the Superintendent of the Forest Survey will be called upon to give advice and assistance to Conservators of Forests in other provinces.

14. It now remains to suggest in what manner new proposals for work to be undertaken by the Forest Survey should be made and considered previous to their being submitted for the orders of the Government of India.

Proposals for new surveys how to be made.

It appears to us that, as a rule, it should be the duty of the Conservator or other head of the Forest Department in each province to take the initiative in this matter. He should frame the proposals in communication with, and with the advice of, the Superintendent of Forest Surveys, and then submit them to the local Government. All proposals will thus reach the Government of India through the regular channel, and, at the same time, the advantage will be gained of having each project, in the first instance, considered in detail by the local officers and the Head of the Forest Survey. In order to facilitate this, personal interviews between the Superintendent of Forest Surveys and Conservators should, as much as possible, be encouraged; and the Superintendent should be authorised to visit any forest district, the survey of which is considered necessary by the Conservator if desired to do so by the local Government concerned, provided the needful arrangements can be made without detriment to the work actually in hand.

15. Local Governments might be invited to consult the Superintendent on all questions connected with forest surveys, and the Superintendent would give his best attention to such references. It appears to us essential that the Superintendent should be placed in a definite official relation to the Government of the province where he is working. He should submit, through the Conservator, periodical reports concerning the progress of his work. In order to obtain the needful information regarding the boundaries of Government forest lands, and (for working plans) regarding forest rights, the Superintendent and his officers must be in constant communication with the provincial forest and civil officers, and for that purpose, also, it is necessary to regulate his official relation to the Conservator and the local Government of the province where he is working.

Relations of the Superintendent to local Governments.

16. As the preparation of the forest maps is intimately connected with the preparation of working plans, and as the Forest Survey Department will eventually be employed to assist in the preparation of working plans, it is necessary here to explain what we recommend as the procedure to be followed in these matters. At the outset, we desire to state that regular working plans which provide for a long series of years are, with few exceptions, out of the question at present in India. Regular working plans are required for the Deoban forests, the plantations in the Punjab plains, and possibly for the Ahiri forests and some other compact forest tracts of a

Working Plans.

similar character, but, as a rule, we must at present limit our work to providing for each forest a plan of operations for the next few years.

Our knowledge of the rate of growth and the requirements of the trees which compose our forests is, in most cases, as yet too incomplete to go further, and more than all the demand for timber-wood and forest-produce, which is the natural basis of every working plan, is changing from year to year, and it is impossible to foresee now what this demand will be a few years hence.

In Pegu, for instance, Teak was the only saleable wood twenty years ago; now there is a considerable and annually growing trade in several woods of other kinds. In North-West India the demand for *Pinus longifolia* and *Pinus excelsa* wood is of comparatively recent origin, and the North Canara forests, the splendid timber of which was formerly almost regarded as unsaleable, now export timber to the annual value of four lakhs a year to the cotton districts of Dharwar and Belgaum. This change, and, in most cases, large increase in the demand for forest-produce, have been experienced almost everywhere, where Government forests have been separated from private and village-forests. The consequence of this state of things is that a forecast for a longer period than a few years is out of the question.

17. Plans of operations for short periods, however, are necessary everywhere, and they must provide for the organisation and improvement of the forests as well as for their working. Such projects we propose to call preliminary working plans. In this, as in the case of forest maps, Conservators must take the initiative, but in whatever way any project to frame a preliminary working plan may be brought forward, one thing is essential, that the working out and framing of such plans must be done by the local forest officers either alone or with the advice and aid of the officers of the Forest Survey Department. Such work must, as a rule, not be entrusted to one man, but should be done jointly by a number of forest officers forming a commission for that purpose. As instances may be mentioned the two preliminary working plans for the Sutlej and Deoban working circles, which were prepared within the last few months on the spot by the local officers of the Punjab and North-West Provinces with the assistance of the Inspector-General of Forests, and an officer specially deputed for this purpose (Mr. B. Ribbentrop). Whether, in future, the Inspector-General of Forests, or the Superintendent of Forest Surveys, or both, or other specially qualified officers will generally be associated in such work with the local officers, it is essential that the data should be collected and all preparatory work be done by the local officers, and that the proposal to undertake such a work should emanate from the head of the Forest Department in each province. To which authority these working plans should be submitted for sanction is a subject which requires further consideration.

Preliminary working Plans.

18. In some provinces the local officers are competent to prepare, without the assistance of the Forest Survey Department, such forest maps as may at the time be required, and to frame the needful plans of operations. In such cases, the co-operation of the Forest Survey Department will not be required, though all operations should be carried on in consultation with the Superintendent of Forest Surveys. But it will be evident from what has been said that the operations of the Forest Survey Department must gradually spread over a large area, and that work will often have to be done in several provinces at the same time. It is, therefore, necessary to explain how sufficient officers can be provided to carry on the topographical survey and to assist in the preparation of working plans simultaneously in several provinces. How we propose to effect this will be explained in the next chapter.

Co-operation of Forest Survey Department may not be required in all Provinces.

III.—Permanent and Temporary Staff and Training of Forest Officers for the Work.

19. In addition to the Superintendent, two permanent officers are sanctioned, both at present Assistant Conservators. With this staff it would probably not be practicable to under-

Permanent Staff.

take more than one survey at a time. If it is intended to make satisfactory progress with the work sketched in the preceding chapter, then it is necessary to increase the number of officers.

It is unlikely that a sufficient number can, for a long time at least, be added to the permanent imperial establishment, or that the strength of the subordinate establishment can be sufficiently augmented.

It is also certain that sufficient officers cannot be found who are, at the present moment, qualified to undertake the charge of a detached party. Several of the younger forest officers on the Government of India list are believed to have a good general theoretical knowledge of surveying; but however well taught they may prove to be, it is essential that before employment they should be attached for some time to the headquarters of the Survey Branch, to learn the system there adopted, in order that uniformity of procedure throughout all the forest surveys may be ensured.

20. Under these circumstances, we suggest that a few of the more promising younger forest officers should be temporarily withdrawn from those provinces from which they can best be spared, and be attached to the Survey Branch for purposes of instruction, their pay and allowances being provided from the local budgets.

Temporary Staff.

The officers thus attached should remain for at least twelve months, and, in some cases, this period might be advantageously extended so as to secure from them before they leave some useful work in addition to their own instruction. When the first of the officers so attached to the Survey Branch shall have returned to his own province, another should be sent to take his place, and thus in course of time a considerable number of the younger men would be instructed. It is proposed to execute the surveys of the forests in each province mainly through the agency of local officers who have, in the manner explained, been for some time attached to the Forest Survey, with the assistance of the officers of the permanent establishment, when their services are available, and under the professional direction of the Superintendent of Forest Surveys.

From the sketch of the work to be done given in the previous chapter, it will be evident that, with the exception of the Burma reserves, the operations of the Forest Survey will not, for the present at least, include many original works of large extent.

A selection of the officers thus instructed will, therefore, it is hoped, be found competent to undertake the work which has to be done.

21. In many respects this system will be found to possess advantages over the employment solely of officers belonging to an imperial establishment.

Advantages of employing local Officers.

The conduct of forest surveys will always differ materially from that of others which embrace large continuous tracts of country, whereas blocks of forest are usually more or less scattered, and have to be taken up piecemeal. A forest survey, moreover, requires the selection of such topographical detail to be shown on the map as may be most useful for forest purposes. Lastly, the survey of the forests must go hand in hand with their sub-division into blocks and compartments and with the preparation of working plans. In many respects, therefore, the professional and local knowledge of provincial officers utilised in the manner here suggested will be of great value.

22. A further advantage will be that the subordinate establishments required for each work can more readily be organised in each province, and that much expense will thus be saved.

The subordinate Establishments must chiefly be organised in each Province.

It will, however, be necessary to maintain a permanent subordinate establishment to be available for service in any province, and with their aid it will be possible to train the local subordinate establishments.

The officers and subordinates of the permanent staff will, if these suggestions are accepted, be the means of forming a number of provincial establishments that will, we trust, be found equal to the large and manifold task to be accomplished. The maintenance of an efficient permanent staff is indispensable for the success of this scheme; the main duty of the permanent staff will be

to enforce a high standard of accuracy and uniform procedure in all topographical work, to maintain a professional connection with the great branches of the Imperial Survey Department, and to secure the observance of correct principles in the preparation of working plans.

23. Regarding the selection of the local officers to be attached from time to time to the Forest Survey, we would recommend that Conservators should place themselves in communication with the Superintendent of Forest Surveys, but all formal proposals in that respect should be submitted in the usual course by local Governments to the Government of India.

Selection of local Officers.

Some practical difficulty may arise in carrying out the scheme, from the fact that the young officers will be put to a good deal of unavoidable expense by their temporary removal from their provinces, and in consideration of this it is proposed to grant an allowance of Rs. 500 to each officer on completion of his course of instruction, the payment being dependent on his receiving a certificate of qualification from the Superintendent of Forest Surveys. More than three or four men could not be under instruction at the same time; the total annual outlay on this account, therefore, would not exceed Rs. 1,000.

VI.—Location of the Head-quarters of the Forest Survey.

24. It is essential that all original maps and records be kept permanently in one place, guarded from risk of fire and insects, and that they be kept in systematic order so as to be readily accessible; also that copies of all existing forest maps, however rough they may be, of those districts in which the forest survey has commenced work, or regarding which the Superintendent's advice is asked, be deposited there, together with all working plans and documents relating to them.

Permanent headquarter Office necessary.

To a great extent, we propose to localise the agency for the topographical forest survey and the preparation of working plans, but it is necessary that all original maps and records be kept in one place, and that for the permanent staff there should be a permanent and conveniently situated central office.

For this purpose a permanent Forest Survey Office is necessary, and the choice of localities seems to lie between Dehra Dún and Calcutta. Dehra possesses greater advantages for the following reasons:—

(1.) It is centrally situated for the forests of the Punjab, North-Western Provinces, Oudh, Central Provinces, Ajmere, and Berar; Calcutta being nearer to Bengal, Assam, and Burma, but more difficult of access from all the others. During the next few years, while the main field work will be in North-West India, Dehra is the best place for recess quarters; after that, while the Burma reserves are being surveyed, Rangoon will probably be selected as the recess quarters for the staff employed in that province, but even during that time all maps and records of the Forest Survey must be kept somewhere, and some work will necessarily go on in other provinces, and for these reasons a central office must be maintained.

(2.) The climate is good, and the houses and living are cheap.

(3.) The forests in the vicinity of Dehra offer great advantages for the establishment of a forest school. Here is found a large extent of compact forest, in which the settlement of grazing privileges (one of the most instructive operations of forestry) will be progressing for some time to come. The Sál forests of Garhwal which differ materially from those of the Dún, and the plantations of the Punjab are close by, as also are the hill forests of Jaunsár, including the Deoban working circle.

The Deoban working circle and the plantations of the Punjab will probably be the first forest districts in India worked under a regular working plan. No place in India more favorably situated could be selected; and as soon as the maps of the Dún forests are completed, and the Deoban forests are in full working order, for the supply of fuel to Chakráta, the establishment of a forest school at Dehra may be commenced. The location of the Forest Survey Office in the same station would then be a matter of great advantage.

25. As a preparatory measure in this direction, a forest library should be attached to the Survey Office, to contain a complete collection of all published reports and other documents on Indian forests, as well as selected works of English and Continental Forest literature. A collection of specimens of timber and forest-produce from the forests of North-West India, made without much expense, should also be commenced, and if this is done, the Forest Survey Office will be a most useful institution for forest officers of Central India, the Punjab, and North-Western Provinces. All this requires the establishment of a permanent office, and the provision of the means has now to be considered.

Forest Library.

26. At present matters stand as follows:—

During seven months of the field season a small house is rented at Rs. 20 a-month, and during five months of the recess a larger house is taken at a rental of Rs. 60, total Rs. 440 per annum. But the inconvenience of moving from one to the other is great.

Rent of Office.

Eventually, it may be an advantage to build an office in the vicinity of that of the Great Trigonometrical Survey, whence most of the data will be obtained and much time and trouble would be saved by being near the office in which the maps are photozincographed. This, however, must be left for future consideration, after the survey of the principal Burma reserves shall have been completed. At present, we only suggest to rent the requisite accommodation throughout the year, say for the next three years. The outside rent of a suitable house would be Rs. 1,200 a-year, and this sum can be provided without increasing the sum at present allotted for the annual expenses of the Forest Survey. It is, however, probable that the outlay on this account can be considerably diminished by sub-letting part of the house during the recess months. Sanction would be requisite at present for a maximum outlay on this account of Rs. 100 per mensem from 1875-76 to 1877-78.

The establishment of a permanent office for the Forest Survey would place the whole professional work of the Forest Department in the provinces under the Government of India upon a more satisfactory footing. For many provinces it would be a place of reference on professional questions. Such an office does not exist at present, and its advantages cannot be over-rated.

Dehra, D. BRANDIS.
6th January 1875.

No. 61. Order thereon, 6th September 1875, No. 1,331.

Forests, No. 6.

Ordered to be communicated to the Board of Revenue and the Inspector of Forests, and also to Colonel Hessey, Deputy Superintendent of Revenue Survey, with reference to paragraph 2 of G. O., dated 4th September 1875, No. 1,329.

2. It is observed that this Resolution is communicated to this Government "for information" only.

(True Extract.)

Acting Secretary to Government.

To the Board of Revenue.
,, the Officiating Inspector of Forests.
,, Colonel W. H. Hessey, Deputy Superintendent of Revenue Survey.
,, the Superintendent of Revenue Survey.

Exd. F. R. Bantleman.

Govt. of India, 1875.
REVENUE.
To THE BOARD OF REVENUE, &c., &c.
Dated September, 1875.
Read.
SEPTEMBER, 1875.
Nos. 60-61.
Vide ent: 20/1.
TCR 1478/77
1475/77

20
Nos. 857—873.

Extract from the Proceedings of the Government of India in the Department of Revenue, Agriculture, and Commerce,—Dated Simla, the 3rd August 1875.

FORESTS.

READ again—

A Resolution No. 19—1246-1257, dated 17th October 1872, organising a special Survey Branch for the Forest Department.

Read—

A Report by the Inspector General of Forests dated 6th January 1875 on the operations of the Forest Survey.

RESOLUTION.

WHEN organising the Forest Survey the Government of India intended to form a scientific branch of the Department the officers of which would be competent to prepare accurate and useful maps of the Government forests and to assist the local officers in framing regular plans of operations. It was supposed that as the work of the Department in the different Provinces expanded the time and attention of the local Forest Officers would often be entirely absorbed by the current work of administering the public forest domains and of producing revenue from them, and that in many cases it would be necessary in addition to the local forest establishments to have the services of specially qualified officers available for the more scientific work of the Department.

2. The need of this special agency will be felt less in some Provinces than in others. In Lower Bengal it is understood that the Conservator is in a position with the aid of the local staff alone to do what is required at present for the preparation of forest maps and preliminary working plans. And in the Central Provinces maps of certain reserves are being prepared by the Topographical Survey, while the Conservator is making progress in framing preliminary plans of operations through the agency of his local staff. Making allowance for these and similar cases, there is however ample work left in other Provinces which requires the services of the special department.

3. During the first years of its existence the work of the Forest Survey was necessarily confined to topographical survey and the preparation of forest maps. As explained in the Inspector General's report, the need for regular working plans is as a rule not yet pressing and preliminary plans of operations can in many cases be prepared by the local staff. Eventually however this branch of the work also will, as originally contemplated, form an important part of the work of the Forest Survey Department. It has been considered whether the topographical part of the work might not more economically be done by the Imperial Survey. As a matter of fact the Eastern reserves of the Central Provinces are being surveyed by a party of the Topographical Survey, and if the forests to be surveyed in other Provinces either consisted of extensive areas or if in all cases a party of the Imperial Survey were available on the spot to make detailed maps of the reserves, then this plan might with advantage be adopted. But the survey of extensive forest areas will be the exception and most of the work will necessarily be in districts where the services

of a party of the regular survey wil not be available at the time that the maps are required. Moreover it is obvious that though in most cases a large scale will be required, yet it will not be necessary to represent the whole detail which the scale permits, but that a selection of those features must be made the representation of which on the nap is indispensable for forest purposes. General rules to guide the surveyors n the selection of topographical features cannot be laid down for all cases because the requirements vary and the survey of each forest district must be dealt with on its merits.

4. It is however essential clearly to define the relation of the Forest Survey to the great branches of the Imperial Survey. In February 1873 the Survey Branch was placed under the general control in survey matters of the Superintendent of the Great Trigonometrical Survey as long as it should continue to be employed in the district of Dehra Dún. The satisfactory progress of the operations of the Forest Survey and the promise which it now gives of being an important and most useful institution in connection with forest administration in this country is mainly due to the assistance and advice given by Colonel Walker, and His Excellency the Governor General in Council considers it most desirable to continue this connection as long as possible. There will be no difficulty in this as long as its main work lies in North-West India, and under these circumstances Colonel Walker will be asked to continue to exercise a general control over the professional work of the Forest Survey. The Superintendent should seek his advice on all professional questions and submit such periodical reports to him as Colonel Walker may from time to time deem expedient.

5. With these remarks the Governor General in Council is pleased generally to approve the plan of operations sketched in paragraphs 9 to 13 of the Inspector General's report of the 3th January last. Orders have already issued for the survey of the Deobar and adjoining forests of Jaunsar, and a communication will be addressed to the Government of the North-West Provinces and to the Chief Commissioner of British Burma concerning the proposed surveys of a portion of the Garhwal and Kumaun sâl forests and the Burma reserves.

6. Proposals for work to be undertaken in addition to that here indicated should, as suggested in paragraph 14 of Mr. Brandis' report, be made by Local Governments, with whom it will ordinarily rest to take the initiative in making proposals for all new surveys and for other work to be undertaken by the Forest Survey Department. The Superintendent will submit periodical reports to the Local Governments or Administrations of all Provinces in which any work under his direction may be in progress and he will give his best attention to all references which may be made to him by Local Governments and Conservators of Forests. On the other hand it is expected that the Conservators and local Forest Officers will afford every assistance to the Superintendent and Officers of the Forest Survey and will at all times supply them with any information which they may require for their work. The Superintendent of Forest Surveys will keep the Inspector General of Forests informed of his correspondence with Local Governments and Conservators. The annual report of the work accomplished by the Forest Survey will until further orders continue to be submitted through Colonel Walker, who will be requested when transmitting it to the Government of India to record his views regarding the progress made and to add such suggestions as he may wish to make concerning the methods to be pursued in future.

7. As regards the staff required for the work the proposals submitted in paragraphs 19—23 of the Inspector General's report are approved. The permanent staff will as at present consist of one Superintendent and two Assistants, and in addition to these junior officers from other Provinces will in the manner suggested by Mr. Brandis be temporarily attached for instruction to the Forest Survey with the view of being available on return to their own Provinces for topographical survey and the preparation of working plans.

An allowance of Rs. 500 will be paid to each officer on completion of his course of instruction, provided he obtains a certificate of proficiency from the Superintendent. Local Governments will be invited to submit the names of officers who in their opinion may with advantage be thus temporarily attached to the Forest Survey, but the Government of India reserves to itself the power of selection. The provision made for the pay and travelling allowances of these officers in the Provincial Budgets will for the time of their instruction be transferred to the Forest Survey Budget.

8. Thus it is hoped that this branch of the Forest Department will not only accomplish useful work, but that it will serve to instruct a succession of junior officers who will eventually be available for the survey work of the Department in their own Provinces. In addition to this the Superintendent should consider in consultation with Conservators of Forests whether young men, Natives of India or others, may not by employment in the Forest Survey for a series of years be prepared for service in the executive branch of the Forest Department.

9. Regarding the establishment of a permanent office at Dehra proposed in the concluding paragraphs of the Inspector General's report the Governor General in Council is not yet in a position to pass final orders. It is obviously necessary to provide for the safe custody of the maps and records. But these might be deposited either in the office of the Surveyor General or in that of the Superintendent of the Great Trigonometrical Survey. This subject however, as well as the question of the recess quarters, will be considered when the work of the Forest Survey shall have further advanced.

10. It now remains to review the financial aspects of the question. In round numbers the expenditure of the Forest Survey, including salaries and allowances, has been as follows :—

				Rs.
In 1872-73	...	...	...	8,866
,, 1873-74	...	...	...	50,272
,, 1874-75	...	...	...	61,519
		TOTAL	...	1,20,657

It is understood that the survey of the Dún forests on the four-inch scale, with an area approximately of 530 square miles, will when completed have cost Rs. 1,60,000, which is at the rate of Rs. 300 per square mile. This is a very high rate, which must be reduced, though no doubt some allowance must be made for the fact that it was the first work undertaken by the new Department. Captain Bailey was single-handed during the greater part of the first season; one of his Assistants was entirely new to the work, and the greater part of his subordinate establishment was unskilled. This and the outlay for purchasing elephants, tents and stores has necessarily increased the cost of the first year's work, but the great advantage has been gained that officers and establishments have been trained to the work. The budget grant for the current year is Rs. 67,500. The annual cost of these operations will necessarily vary with the nature and extent of the work to be undertaken and will differ in different Provinces. Large scale surveys of hilly country or of broken ground clothed with forest and without villages cannot of course be accomplished at the same rate as surveys of open cultivated districts where villagers assist in cutting lines and in other ways and where triangulation, traversing and plane-table work is more easy and expeditious. It is not however contemplated during the next few years and as long as the main work continues to be in Northern India to raise the annual outlay on this account beyond the grant made for the current year, and the rate per mile will it is hoped be materially reduced as the establishment becomes more skilled in its work. When the survey of the Burma reserves commences it will be

considered whether it will not be preferable to provide the needful funds for that special work in the Provincial Forest Budget, and in that case the accounts of the party employed in Burma may with advantage be scrutinised by the Conservator and audited by the local Accountant General,—arrangements being made to submit all doubtful items to the Superintendent and to send him detailed monthly returns of the expenditure.

ORDER.—Ordered that a copy of the foregoing Resolution be forwarded to all Local Governments and Administrations noted in the margin* for information and guidance, and to the Governments of Madras and Bombay for information.

* Bengal. | British Burma.
N. W. Provinces. | Mysore and Coorg.
Punjab. | Ajmere.
Oudh. | Assam.
Central Provinces. | Hyderabad.

Ordered also, that a copy be forwarded to the Financial Department for the issue of the necessary orders; to the Surveyor General and the Superintendent, Great Trigonometrical Survey, for information; and to the Superintendent of Forest Surveys and the Inspector General of Forests for information and guidance.

(True Extract)

A. Rivett

Secretary to the Government of India.

No 20/854

To The Government of Madras

1875

DEPARTMENT OF REVENUE,
AGRICULTURE AND COMMERCE.

FORESTS.

RESOLUTION.

Nos. 857—873.

Dated Simla, the 3rd August 1875.

SUBJECT.

ON the future operations of the Forest Survey Department.

MEMORANDUM

ON THE

OPERATIONS OF THE FOREST SURVEY.

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I.—COMPLETION OF THE DUN SURVEY AND MAPS.

Work accomplished.

THE work was commenced in November 1872. All proposed triangulation has been completed, the forest boundaries have been surveyed, and most of them have been plotted on the 4-inch scale.

The topography of the detached forests of Ambári, Chándpúr, and Dholkote has been completed, as also has that of the Sewalik tract from the Jumna to about the Mohan Pass, a portion to the east of this road having been sketched, while another to the west is still in hand.

The traversing of main water-courses (Rāus) and minor drainage of the remainder of the Sewaliks and the topography of the flat ground to the south of the Sewaliks are also in course of completion.

Of Nágsidh and of the land in the valley of the Eastern Dún the boundaries only have been surveyed, but the topography is about to be commenced.

Work remaining to be done.

2. The survey will not be completed this season; but Colonel Walker has kindly promised to undertake a portion of the drawing of the maps, which will be completed in combination with the work of the party of the Great Trigonometrical Survey, now employed in surveying the private lands within the Dún, on the 4-inch scale.

We have considered whether, in order to complete the work this season, it would be advisable to modify it and to draw the maps on a smaller scale; but after fully weighing the advantages and drawbacks of such a change, we have concluded that it will be better to complete the work in the same manner as it has been commenced. The hill sketching in the remaining portion of the interior of the Sewaliks will, however, be reduced as much as possible, and the hill drawing on the final maps will be simplified.

The whole establishment not to be transferred to fresh ground at once.

3. It will be an advantage, in our opinion, to keep part of the establishment for another season employed in the Dún, while part takes up new work, provided a competent officer is available for its direction. This will obviate the necessity of moving the whole establishment in a body on to fresh ground. Under these arrangements, the field work in the Dún ought to be completed in spring 1876. The time which this work has required must not be taken as the standard for other forest surveys. The work in the Dún has served as a training school for the establishment, and for this and other reasons it has necessarily been slow.

II.—PLAN OF FUTURE OPERATIONS.

Original programme.

4. When the Forest Survey and Working-plan Department was formed in October 1872, the object was to obtain accurate maps of the Government forests, and to prepare plans for their systematic working. The work of the new Department was, during the first years of its existence, mainly confined to the survey of the forest boundaries and sub-divisions, and to topography, and these, or at least the former, must for obvious reasons continue to be its main employment for some time to come, though eventually, if properly guided, its operations will extend over the entire range of subjects included in the original programme. Under these circumstances it will suffice at present to consider the most urgent requirements for forest maps which are known to us, and the manner in which we propose that they should be met.

Object of forest maps.

5. At the outset it may be useful to state that the conditions of the Government forests in the different provinces under the Government of India are so widely different that no general rules regarding scale and interior detail required can be laid down at present. With regard to those questions therefore, it will be necessary to deal with each case on its own merits. A few general considerations should, however, be borne in mind.

Speaking broadly, the use and object of forest maps may be said to be three-fold: *first*, to represent the situation and, as far as may be practicable, the topography of the forests; *second*, to fix the limits of the forests, and to facilitate the settlement of questions of encroachment and boundary disputes; *third*, to ensure the systematic working of the forests, by the representation on the maps of internal division lines and the determination of the area of compartments. The main point to be kept in view must be to attain these objects with the least possible expenditure of time and money. Therefore: no more topographical detail should be attempted than is necessary, the smallest scale which will answer the purpose should be selected, and lastly all existing work should be utilized as much as possible. In the printed maps no detail should as a rule be shown which is not of a more or less permanent nature. The character and age of the Forest in the different compartments will from time to time be entered by hand, but there are certain lines, such as that which separates Sál from Khair and Sissu Forest, which depend upon the configuration of the ground, and are therefore permanent. Such lines should be entered in the printed maps.

Scale and detail to be shown must depend on the character of the forest.

6. It is evident that the most detailed and accurate maps will be required in demarcated forests which are worked to their full extent, so as to utilize the entire annual production in the shape of stem-top—and branch-wood and other forest produce. In such cases it is essential to know the area of each compartment and to be able readily to ascertain the area of any portions of compartments which for convenience of working it may be desirable to

separate from the rest. To this class belong, among others, the Deoban Forests, which furnish fuel to the station of Chakráta, and the plantations in the plains of the Punjab. The working maps of such forests must be on a large scale, and must contain as much topographical detail as possible.

On the other hand, much less detailed maps will be required for reserves which though demarcated are not at present fully worked, but in which the main work will be protection and the keeping out of fires. Again, if forests of this description are burdened with forest rights or privileges which it may be possible hereafter to commute by the abandonment of part of the area, more detailed maps will be required at the present time than in tracts which are at the complete disposal of the State.

Lastly, for forests the boundaries of which have not yet been demarcated, and in many other cases, sketch maps will generally be sufficient for the present.

No present forest survey can be regarded as final.

7. The following sketch of the work to be done by the Forest Survey Department is not intended to exhaust the subject. Other wants will become known long before the work here indicated is completed, nor must it be imagined that on the completion of any particular survey the work of the department will cease in that forest. The survey of the Dún forests for instance has laid down the present Government forest boundaries; the greater part of these forests, however, is so burdened with grazing privileges that protection from fire is impossible, and this can only be altered by abandoning to the privilege-holders part of the forest area. Again, it has we understand been decided to give up for cultivation part of the forests in the Eastern Dún, so that it may be considered as certain that before long great alterations will take place in the boundaries now laid down on the maps.

Most forest surveys can only be regarded as preliminary works at present.

8. Nor will it be possible in all cases beforehand to mark off on the ground the sub-division lines between blocks and compartments. The formation of these sub-divisions for the purpose of organizing the systematic working of any forest is a most important operation which requires long previous study of the forest, a knowledge of the demand for its produce in different directions, of the sources of labour, and of the treatment to which the different parts of the forest must be subjected. This operation will be of a more simple character on level or gently and uniformly sloping ground where the division lines may be straight, than in a hilly country but it cannot as a rule be completed before the topographical survey of a forest is commenced. In many instances the topographical survey must serve to facilitate this operation by laying down on the map the position of permanent points or lines likely to be useful in sub-dividing the forest. Some of these will be artificial, such as boundary marks, walls, bridges, roads, and paths; others—and these will often be the more valuable of the two classes—are natural land-marks, such as ridges, rocks, high banks, jheels, streams, their junction, and the like. The selection of the topographical features to be entered on the map which this will involve, renders it desirable that the topographical forest survey should be conducted by an establishment trained for this special work.

In some cases the demarcation of the forest may not be completed at the time the survey is made, and thus there will be constant calls for the additional survey of boundary and sub-division lines, after the survey of any forest district has for the time being been completed.

With the view to the entering afterwards of additional detail on the maps, it is essential that those points and lines which are surveyed should be laid down with as much accuracy as possible, and that a complete record should be kept of the procedure. The first survey of a forest will often lay down the position of a few points and lines only, but whatever work is done must be done accurately, so that it need not be done over again by others, and may furnish safe starting points for the survey of additional detail at a future time.

9. After these general remarks, it will be best to review the work to be done in each province *seriatim*.

Work to be done in the Punjab.

In the Punjab, the survey of the Khagan and Siran ranges and of the Bassahir Deodar Forests has been contemplated. Of the former, a 2-inch scale map by the Revenue Survey Department, as well as a survey of the forest boundaries, already exists, and the reserves can be entered on that map without requiring additional work in the field.

Regarding the Bassahir Forests it has lately been suggested in a report submitted to the Government of India by the Inspector General of Forests, not to undertake a complete topographical survey of those forests for the present, but to prepare instead sketch maps of certain parts which are to be specially examined.

Pending the issue of further orders by the Government of India on these projects, no plans regarding these two districts need be framed.

In the plains it is probable that detailed maps of several plantations will be required, and that the maps of those rakhs, which are to be worked in regular rotation, will have to be compiled by the Forest Survey Department. On these subjects it will be well for the Conservator to place himself in direct communication with the Superintendent of Forest Surveys, before any projects for work are submitted to Government.

North-West Provinces.

10. In the North-West Provinces are two districts for which forest maps are urgently required, in addition to the Dehra Dún. The first is a portion of the tract of submontane Sál Bamboo and mixed forest between the Ganges and Sárda, in the Dúns and Sewaliks of Garhwál and Kumaun. The map is at present required principally for those Sál Forests the improvement and regular management of which is to be taken in hand at once, and it is also intended to facilitate the demarcation of village areas and village Forests in the Patlidún. The recent Great Trigonometrical Survey of that district will greatly facilitate this work. At the same time it seems desirable that the valuation survey of the forests commonly called the Kumaun Iron Company's grant, which has been undertaken by the Forest Department of the North-West Provinces, and is now being carried on independently of the Forest Survey, should be placed under the direction of the Superintendent.

The second work in the North-West Provinces is the forest on the Deoban range, which supplies Chakráta with fuel. The forest area which will be required for this purpose, is estimated at 10,000 acres, but it is spread over an extent of country of about 50 square miles. In this forest every stick that can be produced will be utilized, and on that account a detailed map on a large scale will be required. As Colonel Walker is about to commence a survey of the whole of Jaunsár on the 2-inch scale, the Deoban Forests may be undertaken by the Forest Survey in co-operation with his Department.

As these Garhwál and Deoban Forests are in close proximity to the Dún, it will probably be practicable to commence the work simultaneously with the completion of the Dún Survey. This will have a further advantage, that the establishment will for a longer time be mainly employed in Sál forests, and will become thoroughly familiar with the features which demand particular attention in that class of forest.

Oudh, Bengal, and Assam. Ajmere and Mhairwára.

11. In Oudh, Bengal, and Assam we are not aware of any immediate work to be done by the Forest Survey. In Oudh the maps of the Revenue Survey Department are sufficient for the present, though they will soon require more filling in of detail, and in Bengal maps of the reserves are being prepared by the local officers under the direction of the Conservator of Forests.

12. In Ajmere and Mhairwára maps will be required of the recently formed reserves. As protection and exclusion of fire will be the main work in these reserves for a considerable time to come, it will suffice at present to use the 1-inch scale map prepared by the Topographical Survey. Forest boundaries and other detail that may be required in the reserves can probably be surveyed and entered on those maps by the Topographical Survey Department, and it is recommended that the Surveyor General may at once be moved to have this done, as the operations are now in progress.

Central Provinces and Berar.

In the Central Provinces and Berar we understand that arrangements for the survey of the reserves have been made with the Revenue and Topographical Survey Department, and that no action is at present required there by the Forest Survey; but in order to prevent any misapprehensions on the subject, it is recommended that the attention of the Surveyor General should be drawn to it at an early date. In this case, as well as in the case of the Ajmere and Mhairwára reserves, the Superintendent should be consulted regarding the preparation of these forest maps.

Coorg and Mysore.

In Coorg it has been ordered that the reserves should be surveyed by the Madras Revenue Survey, and Captain Bailey is in communication with the Conservator on the subject.

From Mysore no requisition for aid in the preparation of forest maps has, as far as we know, been made.

Burma.

13. With regard to Burma, the orders of the Government of India are that, as soon as the work now in hand in North-Western India is completed, the Forest Survey Department shall be transferred to Burma, to undertake the preparation of the needful maps of the reserves. According to the last annual report, the area finally demarcated by the close of 1873-74 amounted to 279·34 square miles, principally situated in the Prome and Tharawaddi divisions, small areas only having been demarcated in the other divisions. But even in Prome and Tharawaddi the selection of the Government reserves is as yet far from completed, nor has the question been settled whether maps will be required of all reserves or only of a limited area to be called special reserves. Under these circumstances it is hoped that it may be possible to complete what has to be done in the Deoban Forests and Kumaun, before the demand from Burma becomes urgent. When commenced, however, the survey of the reserves in Burma will be a large original work, which will employ a large staff for a series of years.

The result is, that if these suggestions are accepted, the completion of the Dún Survey and the work in the Kumaun and Garhwál Sál Forests and the Deoban Circle, will be the main task for the next two or three years; that the Burma reserves will be the next large work to be undertaken, but that at the same time the Superintendent of the Forest Survey will be called upon to give advice and assistance to Conservators of Forests in other provinces.

Proposals for new surveys how to be made.

14. It now remains to suggest in what manner new proposals for work to be undertaken by the Forest Survey should be made and considered previous to their being submitted for the orders of the Government of India.

It appears to us that as a rule it should be the duty of the Conservator or other Head of the Forest Department in each province to take the initiative in this matter. He should frame the proposals in communication with, and with the advice of, the Superintendent of Forest Surveys, and then submit them to the local Government. All proposals will thus reach the Government of India through the regular channel, and at the same time the advantage will be gained of having each project in the first instance considered in detail by the local officers and the Head of the Forest Survey. In order to facilitate this, personal interviews between the Superintendent of Forest Surveys and Conservators should as much as possible be encouraged; and the Superintendent should be authorized to visit any forest district the survey of which is considered necessary by the Conservator, if desired to do so by the local Government concerned, provided the needful arrangements can be made without detriment to the work actually in hand.

Relations of the Superintendent to local Governments.

15. Local Governments might be invited to consult the Superintendent on all questions connected with forest surveys, and the Superintendent would give his best attention to such references. It appears to us essential that the Superintendent should be placed in a definite official relation to the Government of the province where he is working. He should submit through the Conservator periodical reports concerning the progress of his work. In order to obtain the needful information regarding the boundaries of Government forest lands, and (for working plans) regarding forest rights, the Superintendent and his officers must be in constant communication with the provincial forest and civil officers, and for that purpose also it is necessary to regulate his official relation to the Conservator and the local Government of the province where he is working.

Working plans.

16. As the preparation of the forest maps is intimately connected with the preparation of working plans, and as the Forest Survey Department will eventually be employed to assist in the preparation of working plans, it is necessary here to explain what we recommend as the procedure to be followed in these matters. At the outset we desire to state that regular working plans which provide for a long series of years are, with few exceptions, out of the question at present in India. Regular working plans are required for the Deoban Forests, the plantations in the Punjab plains, and possibly for the Ahiri Forests and some other compact forest tracts of a similar

character, but as a rule we must at present limit our work to providing for each forest a plan of operations for the next few years.

Our knowledge of the rate of growth and the requirements of the trees which compose our forests is in most cases as yet too incomplete to go further, and more than all, the demand for timber wood and forest produce, which is the natural basis of every working plan, is changing from year to year, and it is impossible to foresee now, what this demand will be a few years hence.

In Pegu for instance, teak was the only saleable wood twenty years ago; now there is a considerable and annually growing trade in several woods of other kinds. In North-West India the demand for *Pinus longifolia* and *Pinus excelsa* wood is of comparatively recent origin, and the North Kanara Forests, the splendid timber of which was formerly almost regarded as unsaleable, now export timber to the annual value of four lakhs a year to the cotton districts of Dharwar and Belgaum. This change, and in most cases large increase in the demand for forest produce, have been experienced almost everywhere, where Government forests have been separated from private and village forests. The consequence of this state of things is, that a forecast for a longer period than a few years is out of the question.

Preliminary working plans.

17. Plans of operations for short periods, however, are necessary everywhere, and they must provide for the organization and improvement of the forests as well as for their working. Such projects we propose to call preliminary working plans. In this, as in the case of forest maps, Conservators must take the initiative, but in whatever way any project to frame a preliminary working plan may be brought forward, one thing is essential, that the working out and framing of such plans must be done by the local forest officers either alone or with the advice and aid of the officers of the Forest Survey Department. Such work must as a rule not be entrusted to one man, but should be done jointly by a number of forest officers forming a commission for that purpose. As instances may be mentioned the two preliminary working plans for the Sutlej and Deobun working circles, which were prepared within the last few months on the spot by the local officers of the Punjab and North-West Provinces with the assistance of the Inspector General of Forests, and an officer specially deputed for this purpose (Mr. B. Ribbentrop). Whether in future the Inspector General of Forests, or the Superintendent of Forest Surveys, or both, or other specially qualified officers will generally be associated in such work with the local officers, it is essential that the data should be collected and all preparatory work be done by the local officers, and that the proposal to undertake such a work should emanate from the Head of the Forest Department in each province. To which authority these working plans should be submitted for sanction, is a subject which requires further consideration.

Co-operation of Forest Survey Department may not be required in all provinces.

18. In some provinces the local officers are competent to prepare, without the assistance of the Forest Survey Department, such forest maps as may at the time be required, and to frame the needful plans of operations. In such cases the co-operation of the Forest Survey Department will not be required, though all operations should be carried on in consultation with the Superintendent of Forest Surveys. But it will be evident from what has been said that the operations of the Forest Survey Department must gradually spread over a large area, and that work will often have to be done in several provinces at the same time. It is therefore necessary to explain how sufficient officers can be provided to carry on the topographical survey and to assist in the preparation of working plans simultaneously in several provinces. How we propose to effect this will be explained in the next chapter.

III.—PERMANENT AND TEMPORARY STAFF, AND TRAINING OF FOREST OFFICERS FOR THE WORK.

Permanent staff.

19. In addition to the Superintendent, two permanent officers are sanctioned, both at present Assistant Conservators. With this staff it would probably not be practicable to undertake more than one survey at a time. If it is intended to make satisfactory progress with the work sketched in the preceding chapter, then it is necessary to increase the number of officers.

It is unlikely that a sufficient number can, for a long time at least, be added to the permanent imperial establishment, or that the strength of the subordinate establishment can be sufficiently augmented.

It is also certain that sufficient officers cannot be found who are at the present moment qualified to undertake the charge of a detached party. Several of the younger forest officers on the Government of India list are believed to have a good general theoretical knowledge of surveying; but however well taught they may prove to be, it is essential that before employment they should be attached for some time to the head-quarters of the Survey Branch, to learn the system there adopted, in order that uniformity of procedure throughout all the forest surveys may be ensured.

Temporary staff.

20. Under these circumstances, we suggest that a few of the more promising younger forest officers should be temporarily withdrawn from those provinces from which they can best be spared, and be attached to the Survey Branch for purposes of instruction, their pay and allowances being provided from the local budgets.

The officers thus attached should remain for at least twelve months, and in some cases this period might be advantageously extended so as to secure from them before they leave some useful work in addition to their own instruction. When the first of the officers so attached to the Survey Branch shall have returned to his own province, another should be sent to take his place, and thus in course of time a considerable number of the younger men would be instructed. It is proposed to execute the surveys of the forests in each province mainly through the agency of local officers who have, in the manner explained, been for some time attached to the Forest Survey, with the assistance of the officers of the permanent establishment, when their services are available, and under the professional direction of the Superintendent of Forest Surveys.

From the sketch of the work to be done given in the previous chapter, it will be evident that with the exception of the Burma reserves the operations of the Forest Survey will not, for the present at least, include many original works of large extent.

A selection of the officers thus instructed will therefore it is hoped be found competent to undertake the work which has to be done.

Advantages of employing local officers.

21. In many respects this system will be found to possess advantages over the employment solely of officers belonging to an imperial establishment.

The conduct of forest surveys will always differ materially from that of others which embrace large continuous tracts of country, whereas blocks of forest are usually more or less scattered, and have to be taken up piecemeal. A forest survey moreover requires the selection of such topographical detail to be shown on the map as may be most useful for forest purposes. Lastly, the survey of the forests must go hand in hand with their sub-division into blocks and compartments and with the preparation of working plans. In many respects therefore the professional and local knowledge of provincial officers utilized in the manner here suggested will be of great value.

The subordinate establishments must chiefly be organized in each province.

22. A further advantage will be that the subordinate establishments required for each work can more readily be organized in each province, and that much expense will thus be saved.

It will however be necessary to maintain a permanent subordinate establishment to be available for service in any province, and with their aid it will be possible to train the local subordinate establishments.

The officers and subordinates of the permanent staff will, if these suggestions are accepted, be the means of forming a number of provincial establishments that will we trust be found equal to the large and manifold task to be accomplished. The maintenance of an efficient permanent staff is indispensable for the success of this scheme; the main duty of the permanent staff will be to enforce a high standard of accuracy and uniform procedure in all topographical work, to maintain a professional connection with the great branches of the Imperial Survey Department, and to secure the observance of correct principles in the preparation of working plans.

Selection of local officers.

23. Regarding the selection of the local officers to be attached from time to time to the Forest Survey, we would recommend that Conservators should place themselves in communication with the Superintendent of Forest Surveys, but all formal proposals in that respect should be submitted in the usual course by local Governments to the Government of India.

Some practical difficulty may arise in carrying out the scheme, from the fact that the young officers will be put to a good deal of unavoidable expense

by their temporary removal from their provinces, and in consideration of this it is proposed to grant an allowance of Rs. 500 to each officer on completion of his course of instruction, the payment being dependent on his receiving a certificate of qualification from the Superintendent of Forest Surveys. More than three or four men could not be under instruction at the same time; the total annual outlay on this account, therefore, would not exceed Rs. 2,000.

IV.—LOCATION OF THE HEAD-QUARTERS OF THE FOREST SURVEY.

Permanent head-quarter office necessary.

24. It is essential that all original maps and records be kept permanently in one place, guarded from risk of fire and insects, and that they be kept in systematic order so as to be readily accessible; also that copies of all existing forest maps however rough they may be, of those districts in which the forest survey has commenced work, or regarding which the Superintendent's advice is asked, be deposited there, together with all working plans and documents relating to them.

To a great extent we propose to localise the agency for the topographical forest survey and the preparation of working plans, but it is necessary that all original maps and records be kept in one place, and that for the permanent staff there should be a permanent and conveniently situated central office.

For this purpose a permanent Forest Survey Office is necessary, and the choice of localities seems to lie beween Dehra Dún and Calcutta. Dehra possesses greater advantages for the following reasons:—

(1.) It is centrally situated for the forests of the Punjab, North-Western Provinces, Oudh, Central Provinces, Ajmere and Berar; Calcutta being nearer to Bengal, Assam, and Burma, but more difficult of access from all the others. During the next few years, while the main field work will be in North-West India, Dehra is the best place for recess quarters; after that, while the Burma reserves are being surveyed, Rangoon will probably be selected as the recess quarters for the staff employed in that province, but even during that time all maps and records of the Forest Survey must be kept somewhere, and some work will necessarily go on in other provinces, and for these reasons a central office must be maintained.

(2.) The climate is good, and the houses and living are cheap.

(3.) The forests in the vicinity of Dehra offer great advantages for the establishment of a forest school. Here is found a large extent of compact forest, in which the settlement of grazing privileges (one of the most instructive operations of Forestry) will be progressing for some time to come. The Sál forests of Garhwál which differ materially from those of the Dún, and the plantations of the Punjab are close by, as also are the hill forests of Jaunsár, including the Deoban working circle.

The Deoban working circle and the plantations of the Punjab will probably be the first forest districts in India worked under a regular working plan. No place in India more favourably situated could be selected; and as soon as the maps of the Dún forests are completed, and the Deoban forests are in full working order for the supply of fuel to Chakráta, the establishment of a forest school at Dehra may be commenced. The location of the Forest Survey Office in the same station would then be a matter of great advantage.

Forest Library.

25. As a preparatory measure in this direction, a forest library should be attached to the Survey Office, to contain a complete collection of all published reports and other documents on Indian forests, as well as selected works of English and Continental Forest literature. A collection of specimens of timber and forest produce from the forests of North-West India, made without much expense, should also be commenced, and if this is done, the Forest Survey Office will be a most useful institution for Forest officers of Central India, the Punjab, and North-Western Provinces. All this requires the establishment of a permanent office, and the provision of the means has now to be considered.

Rent of office.

26. At present matters stand as follows:—

During seven months of the field season a small house is rented at Rs. 20 a month, and during five months of the recess a larger house is taken at a rental of Rs. 60, total Rs. 440 per annum. But the inconvenience of moving from one to the other is great.

Eventually it may be an advantage to build an office in the vicinity of that of the Great Trigonometrical Survey, whence most of the data will be obtained and much time and trouble would be saved by being near the office in which the maps are photozincographed. This however must be left for future consideration, after the survey of the principal Burma reserves shall have been completed. At present we only suggest to rent the requisite accommodation throughout the year, say for the next three years. The outside rent of a suitable house would be Rs. 1,200 a year, and this sum can be provided without increasing the sum at present allotted for the annual expenses of the Forest Survey. It is however probable that the outlay on this account can be considerably diminished by sub-letting part of the house during the recess months. Sanction would be requisite at present for a maximum outlay on this account of Rs. 100 per mensem from 1875-76 to 1877-78.

The establishment of a permanent office for the Forest Survey would place the whole professional work of the Forest Department in the provinces under the Government of India upon a more satisfactory footing. For many provinces it would be a place of reference on professional questions. Such an office does not exist at present, and its advantages cannot be overrated.

DEHRA; 6*th Jan.* 1875.

D. BRANDIS.

C

1875.

GOVERNMENT OF INDIA.

DEPARTMENT OF REVENUE, AGRICULTURE AND COMMERCE.

FORESTS.

MEMORANDUM BY D. BRANDIS, INSPECTOR GENERAL OF FORESTS, DATED THE 6TH JANUARY 1875.

Operations of the Forest Survey.

Rev 3408/75

O. S. G. P.—No. 1601a, R., A. & C.—17-8-75.—250.

No. 1331

6th September 75.

Read Govt of India Resolution
d: 3rd August 75. No. 20/857-873
On the future Operations
of the Forest Survey
Department.

Brandis

Communicated to
the Board of Revenue
and the Inspector of Forests
And also to Colonel
Kepey Deputy Supt.
Ker: Survey with
Reference to para 2 B
F.O. d: 4th/76 No: 1329.

2. It is observed
that this Resolution
is communicated
to this Government
"for information" only

Sd
Atk

002—12-3-65.