Proceedings of the Madras Government, Revenue Department,
1st October 1872.

No. 5. Read the following Endorsement of the Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, No. 18-1,144 :—

Read the following Circular letter from the Secretary to the Government of India, Department of Agriculture, Revenue, and Commerce, (Forests,) to the Local Governments and Administrations, dated Simla, 19th September 1872, No. 18-1,135—1,143.

I AM directed to forward for information and distribution the accompanying copy of a despatch from Her Majesty's Secretary of State, No. 10, dated 31st July last, together with its enclosures, containing suggestions by Dr. Brandis, Inspector-General of Forests, as to the best means of affording to Forest Officers on leave opportunities of making themselves acquainted with the systems of transporting timber in use in Germany and Switzerland and with the different methods of impregnating timber.

2. I am directed particularly to request that care may be taken that *every Forest Officer* is supplied with a copy.

COPY (with enclosures) forwarded to the Governments of Madras and Bombay for information.

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

No. 6. ORDER THEREON, 1st October 1872, No. 1,369.

Forests, No. 1.

COMMUNICATED to the Board of Revenue for information with copies for distribution.

2. Copy to Inspector of Forests.

(True Extract.)

(Signed) W. HUDLESTON,
Secretary to Government.

To the Board of Revenue.
„ the Inspector of Forests.

Exd. F. R. Bantleman.

INDIA OFFICE;
London, the 31st July 1872.

Forests.
No. 10.

To His Excellency the Right Hon. the Governor General of India in Council.

MY LORD,—I have to acknowledge the receipt of Your Excellency's despatch dated 3rd May (No. 6, Forests,) 1872, recommending that forest students should be afforded opportunities of making themselves acquainted with the systems of transporting timber in use in Germany and Switzerland, and with the different methods of impregnating timber.

2. You will perceive from the enclosed letter* and paper of suggestions drawn up by Dr. Brandis that the wishes of your Government have to some extent been anticipated. The arrangements for giving more prominence to the study of timber transport and impregnation were made in Germany some time ago; and with regard to France, Dr. Brandis is now in communication with the Director of the Forest School at Nancy on the subject.

* 11th July 1872.

3. Forest Officers on leave will also be encouraged to study the systems of timber transport in Europe, as their knowledge of Indian methods will enable them to see at once to what points they should pay special attention, with a view to gaining useful hints and obtaining ideas for improving local arrangements. Copies of Dr. Brandis's suggestions will be printed for distribution to Forest Officers on leave to England.

I have the honor to be,

MY LORD,

Your Lordship's most obedient, humble Servant,

ARGYLL.

Suggestions regarding the study of the arrangements for the transport of wood and timber and the impregnation of timber in Germany and some parts of Austria by Forest Officers on leave and candidates for employment in the Indian Forest Service.

I DO not propose in the following pages to gave a description of any new arrangements for the carriage of wood and timber and for the impregnation of timber; all I undertake to do is to offer suggestions regarding certain localities which should be visited, in order to collect information that may be suggestive to Forest Officers in India, and, with few exceptions, I shall limit my remarks to those places with which I am personally acquainted.

2. The Black Forest (Schwarzwald) in Wurtemberg and Baden is one of the most instructive forest regions in this respect. The country is hilly, difficult, and large quantities of long and heavy logs are exported from it annually. The floating of timber has gradually diminished with the increase of railways, but on the rivers Kinzig and Nagold, and their tributaries, large timber is still floated to a considerable extent, and under arrangements which are extremely instructive. July, August, and September are the best months to study the floating on these small rivulets, the peculiarity being that by storing up water in tanks and reservoirs an artificial flood is produced, which floats down the long narrow rafts, several hundred yards long, though the flood itself is not more than about twice the length of the raft. I do not know of any forest district in India where the same arrangements could be made; but circumstances regarding the carriage of timber are never the same in any two places. People who have studied the

transport of timber in Europe will, when brought to India, see that they have only learnt how difficulties of a similar nature have been overcome under circumstances totally different.

3. Regarding land transport, three points are of special importance in the Schwarzwald; first, the moving of the heavy logs down to the nearest road or slide; secondly, the construction of timber roads; thirdly, the use of these roads and of other places as timber slides. In the Black Forest all fellings, as a rule, take place in summer, and the timber is being brought to the roads until autumn; but the construction of slides and the sliding down takes place in October and November. The most conveniently situated locality to study these matters is Rippoldsau, a small watering place situated in the midst of a rich and well managed forest district belonging to the Prince of Fürstenberg, which is surrounded by other exceedingly instructive forests belonging to Baden and Wurtemberg, partly state, partly communal forests. The system of timber roads in the Rippoldsau district is admirable. To study the system of land and water transport employed in the different forest districts of the Black Forest, it would be necessary to devote part of August, September, October, and November to it, and to visit during that time the forest districts near the following places, Rippoldsau being a convenient place as head quarters: in Wurtemberg, Freudenstadt, Wildbad; in Baden, the valley of the Murg, St. Blasien. Recommendations to the chief forest authorities of the kingdom of Wurtemberg, the Grand Duchy of Baden, and the Prince of Fürstenberg would be requisite. I do not know of any forests as extensive as the Black Forest, where the moving of long and heavy timber over difficult ground by means of simple appliances is done in a manner equally efficient, economical, and with the same care for the young growth of the forest.

4. In Bavaria two extensive forest tracts are specially important for the transport of timber. In the "Baierische Wald," which covers the hills north of the Danube between Passau and Regensburg, the arrangements made to facilitate the floating on the rivers Ilz and Regen and their tributaries are worth studying, and in the Eastern Bavarian Alps (Salinenbezirk) both the land and water-carriage of the wood required to feed the salt works of Berchtesgaden, Reichenhall, Traunstein, and Rosenheim is instructive. July and August are, I believe, the best months for these districts. However, there is this drawback, that a small proportion only of the wood is timber; most of it consists of small pieces for burning. Nevertheless, a great deal that is suggestive for our Himalayan forests may be learnt in the Bavarian Alps. Introductions to the chief forest officer in Bavaria would be needful.

5. In Austria the most instructive arrangements for the transport of wood with which I am personally acquainted are those made to provide the large quicksilver works of Idria with wood for fuel. I visited them in 1865, and Forest Officers who have time to spare during their leave will do well to devote a week to their study. Idria is about 30 miles distant from Loitsch, the nearest station on the Trieste-Laibach Railway. The wood is carried on temporary tramways, which are built with great care over most difficult ground, whenever fellings commence in any forest tract, and which are broken up, and the timbers which form the roadway and viaducts sent down, after they have served the purpose of carrying the yield of the forest tract felled to one of the small streams down which the wood is floated to the works. The works constructed for storing up water in these streams, and for regulating their course, are as instructive as the system of these temporary timber tramways. A recommendation to the chief forest authorities at Vienna would be needful.

6. In the Italian Alps, north of Venice, the carriage of timber (not of firewood) offers much that is interesting and suggestive to Indian Forest Officers. The forests are the property of the communes, towns, and villages in the valleys of the rivers Piave and Tagliamento and their feeders. The timber which is yielded by these forests is shipped at Trieste and Venice, and is an important source of supply for the countries near the eastern part of the Mediterranean. I visited these forests in 1865, and found that the lumberers of Friaul were extremely skilful in managing the land and water transport of their timber under exceedingly difficult circumstances. Temporary timber slides, similar to the tramways of Idria, are built down the hill slopes, or on timber viaducts across ravines; and as the operations in one locality are completed, the timber composing these structures is sent down after the rest. Under Austrian rule, these forests were under efficient supervision, which was exercised by the officers of the State Forest Department, and in consequence they yielded a steady annual revenue, from which the communities in those valleys built churches, school-houses, town-halls, and constructed a system of admirable roads. I have rarely been struck more forcibly by the beneficial effects of well-managed communal property upon the well-being of the population of small towns and villages than in this instance, and on this account also a visit to these forests by Indian Forest Officers would be useful. I have not heard that the legislation which places these communal forests under the control of public officers has been changed since the country has fallen to Italy, at all events there have not probably been any great changes in the land transport of timber.

7. One of the main points to which the attention of Forest Officers visiting the localities mentioned should be directed is the use of the different sorts of levers and other tools which the lumberers employ. Some of these tools may merit imitation in India. The pick-lever (sapine) is one of the most important, and the different forms of it, which are used in the Schwarzwald, the Bavarian Alps, Idria, and Friaul, should be carefully studied.

8. In France much in the way of timber transport is to be learnt on the Vosges and in Corsica; but the working of the forests in that country is entirely in the hands of timber traders, and so far only under the control of the Forest Department as the protection of the growing timber demands it. Under these circumstances the study of these matters in Germany and Austria is easier. A visit to the forests of *Pinus Laricio* in Corsica, which are worked by lumberers who come across for the purpose from Italy, would, however, be instructive in this as well as in other respects.

9. Wire tramways for the carriage of small wood have been successfully established in the French Alps, and I understand also in Hungary,* and a visit to them might be instructive. I have never yet myself had an opportunity of seeing one employed for this purpose; nor am I personally acquainted with lumbering operations in Norway and Canada, which, I have no doubt, would afford much instructive information to Indian Forest Officers.

10. I now proceed to offer some suggestions regarding the study of the impregnation of timber. Of the numerous methods that have at various times been tried, there are, in my opinion, only two which are likely to meet our requirements in the Indian forests. The first is know as Boucherie's system. Timber, fresh felled, not dry, is impregnated with a solution of sulphate of copper, under a certain amount of hydrostatic pressure, the tanks being raised about 30 feet above the pieces to be impregnated. This method has been found to answer best for the impregnation of telegraph posts, and is largely used for that purpose in France and Austria. For various reasons, mainly because our forests are scattered over a large extent of country, and not sufficiently compact, does this method not appear to be as suitable in India as the following. The second is impregnation in air-tight cylinders. The wood, which is ready cut (sleepers, posts, planks, or other scantling), is first dried completely, and then placed in the cylinders, which are first evacuated, so as to diminish the resistance which the air in the pores of the wood would offer, after which the fluid is admitted and forced into the wood under considerable pressure. The principal kinds of antiseptic fluids employed under this system are—creosote (obtained by the distillation of coal tar), chloride of zinc, and sulphate of copper. Besides these substances, corrosive sublimate is used on some of the German railways (Nassau and Baden).

11. Boucherie's process must be studied in France or Austria, but the pneumatic process for creosote may be studied quite as well in England. Such apparatus for the impregnation of beams, railway sleepers, and other scantling with creosote are numerous. On the Continent I may mention the following establishments, which are well worth seeing:

Creosote.—Rheinische Eisenlahn, Nippes, near Cologne. I visited this establishment last year, and found the arrangements excellent and most instructive.

Chloride of zinc.—Brunswic and Hildesheim, near Hanover. I do not know these establishments myself, but understand that they are well worth a visit.

Sulphate of copper is still used in pneumatic apparatus (cylinders of copper) on some of the North German lines, but I have not yet been able to ascertain particulars regarding existing establishments. In 1865 it was also in use on the North Italian lines, the impregnating apparatus being at Verona.

Corrosive sublimate is used at the impregnating establishment of the Nassau lines at Limburg, not far from Coblenz. I regret that I have never yet had an opportunity of visiting this establishment, and I am not acquainted with the apparatus employed, but I have lately seen a report regarding the duration of sleepers impregnated with that substance on the Nassau lines, which appeared to be favourable.

12. In conclusion I may mention that in 1871 the following antiseptic substances were used by the lines of the Association of German Railways:

Chloride of zinc on	22 lines.
Sulphate of copper on	19 „
Creosote on	15 „
Corrosive sublimate on	14 „

In England creosote is, I believe, the substance mainly used for the impregnation of railway sleepers.

D. BRANDIS.
Inspector General of Forests to the Govt. of India (on leave).

LONDON;
The 10th July 1872.

NOTE.—The following is a list of books which will be found useful for those who apply themselves to these subjects:

1. Gayer, Forstbenutzung, 2nd edition, Aschaffenburg, 1868.

2. Fortliche Mittheilungen des Königl. Baierischen Ministerial Forst Bureau Band III. Heft 2, München, 1860 (Contains: Artikel über Holz aufbereitung und Landtransport.)

* While writing this, I learn of a different kind of tramway for the carriage of timber, with very narrow gauge, near Teschen, in Austrian Silesia, which may be the commencement of important inventions in that respect.

3. Buresch. Darstellung der verschiedenen Verfahrungsarten und Apparate welche zum Imprägniren des Holzes Auwendung gefunden haben. Dresden, 1860.

Dated 58, Elgin Crescent, Notting Hill, the 11th July 1872.

From—D. Brandis, Esq., Inspector General of Forests (on leave).

To—The Under Secretary of State for India.

In obedience to your letter of 31st May, requesting remarks or suggestions regarding the measures needful to further the study of the continental systems of timber transport and method of impregnation by Forest Officers on leave and candidates preparing for forest service in India, I have the honor to submit a report which I have drawn up on the subject, and would suggest that it be printed and distributed to Forest Officers on leave in Europe, and that copies be sent to the Government of India with the present communication.

2. Regarding the special study of these subjects by the candidates now under preparation on the Continent, I am in communication on the subject with Forst-Director Burckhardt and M. Nanquette, and shall report again as soon as our plans on the subject are further advanced. The five men of 1870, who will complete their studies in Germany in September next, are now about to proceed to the Schwarzwald, accompanied by Forst-Director Burckhardt, in order, among other things, to make themselves acquainted with the system of land and water transport of timber employed there, which I consider is specially instructive for Indian officers. This is in accordance with arrangements made by me with Forst-Director Burckhardt last year, and I have now suggested to him whether it might be useful to select the two most promising of these five men, and to extend their time by three months, with the view of their seeing the land transport of wood on slides in the Schwarzwald in November, and to visit several other forest districts in South Germany. I have made a similar suggestion to M. Nanquette.

3. For the study of the different methods used for impregnating timber by some of our forests students, I made arrangments last year in Germany, and have now also written to Nancy about it. Forst-Director Burckhardt informs me that the five men of 1870 have studied the impregnation by means of chloride of zinc, which is in use on the Hanover lines, and three of the men of 1871 are now devoting a considerable portion of their time to the study of chemistry at Tharant to enable them to study with greater advantage the different methods employed for the impregnation of timber. This proposal was, after I had made the preliminary arrangements with the authorities in Germany, submitted by me in February last, for the sanction of His Grace the Secretary of State for India, and approved in your letter to my address of the 26th February.

4. From these remarks it will be seen that I had anticipated the wishes of the Government of India with regard to the young men studying in Germany, and had, during my stay there last year, made such arrangements as I considered desirable to give more prominence to the study of timber transport and the impregnation of timber. I should not consider it right to advocate any considerable modification of the system of their studies on that account. I hold it to be the main aim and object of their professional education that they should be well grounded in the auxiliary sciences, and acquire a good knowledge by practical work of the general principles which guide a rational administration of large forests. The two years and a half of their training are just sufficient for that purpose, and it would not, in my opinion, be right to interfere with existing arrangements to any great extent.

5. A far more useful plan would, in my opinion, be to encourage and facilitate the study of timber transport in Europe by a few of those officers who have had practical experience in those forests where heavy timber is carried and floated under difficult circumstances, such as Burmah and some of the Himalayan forests. Officers should be selected who have a sufficient knowledge of engineering to understand the points which require most attention. They should also be competent to prepare the needful plans and drawings, and their reports might then, if considered satisfactory, be published at Government expense and distributed to Forest Officers in India. Officers of practical experience in Indian forests would be able at once to discover and to explain the peculiar arrangements for the timber transport which may be suggestive of useful methods in India. They would do well to visit many more localities besides those mentioned in the report enclosed, for in no two forest districts are the arrangements for timber transport alike, and they may often find useful hints in places where they were not expected. Our students, who have no idea of an Indian forest, will not know to what points to pay special attention, and much of their time will be lost in studying these matters of detail with the view to their practical application in India.

6. The present proposals of the Government of India relate, I understand, mainly to the Himalayan forests, from which the main supplies of timber have been drawn for the State Railways. I have always held and expressed the opinion that young men sent out from this country for forest service in India should not, in the first instance, be sent to the Himalayan forests, as they do not generally take kindly to the forests in the hot parts of tropical India, after having served in the pleasant climate of the hills. From a private communication lately

1872.

DEPARTMENT OF AGRICULTURE,
REVENUE, AND COMMERCE.

[Forests.]

The

Letter to the Government of India.

No. 10.

Dated 31*st July*
Recd. 26*th Aug.* } 1872.

Rev: 3182/72

Proceedings, May 1872, Nos. 7-10.

SUBJECT.

REPLIES to letter No. 6, dated 3rd May last, recommending that forest students should be afforded opportunities of making themselves acquainted with the systems of transporting timber in use in Germany and Switzerland, and with the different methods of impregnating timber.

Forwards a letter and paper of suggestions by Dr. Brandis on the subject.

No. 3182
Revenue 1872. Sept

DEPARTMENT OF AGRICULTURE,
REVENUE, AND COMMERCE.

[Forests.]

To

Local Governments and Administrations.

18
No. 1135-43

Dated 16 September 1872.
Rec'd 1st Octr.

SUBJECT.

STUDY by Forest Officers of the arrangements for the transport of wood, and the impregnation of timber.