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MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. <i>1095</i>	Press ~~Mis.~~
<i>413-414</i>	
Dated <i>25-4-</i>	<i>1865.</i>

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Proceedings of the Madras Government, Public Works Department,
25th April 1865.

No. 413. Read the following Proceedings of the Governor General of India in Council, Public Works Department, (Military Works,) dated Fort William, 20th March 1865, Circular No. 24:—

Planting trees near Barracks for European Troops.

Read the following papers:—

Endorsement No. 5,506 A, dated 16th December 1864, from the Officiating Secretary to the Government, North Western Provinces, and enclosures.

Public Works Department letter No. 9 M, dated 4th January 1865, to the President of the Sanitary Commission for Bengal.

Letter No. 109, dated 4th March 1865, from the President of the Sanitary Commission for Bengal, forwarding a report on the general subject of planting trees near Barracks for European Troops.

OBSERVATIONS.—The Government, North Western Provinces, having submitted a correspondence in which an objection was raised to the planting of trees in the neighbourhood of the European Infantry Lines at Agra, the opinion of the Sanitary Commission for Bengal was invited on the general question relative to the desirability or otherwise of such a measure being carried out at all Military Stations.

2. The Sanitary Commission is in favor of the measure, and the Governor General in Council approves of the general suggestions and recommendations of the Commission offered in the Report above referred to.

ORDER.—Ordered, that the foregoing observations and a copy of the Sanitary Commission's Report, together with the Memorandum by Dr. Cleghorn appended thereto, be forwarded to all Local Governments and Administrations noted in the margin, for information and guidance.

Governments of Madras, Bombay, Bengal, N. W. P., and
Punjab.
Chief Commissioners of Oudh, Central Provinces, and British
Burmah.
Governor, Straits Settlements.
Resident at Hyderabad.
Agents, Governor General, for Central India, and Raj-
pootana.

(Signed) E. C. S. WILLIAMS, Captain, R. E.,
Under Secy. to the Govt. of India.

To the Secretary to Government of Madras, in the Public Works Department.

Enclosure to Public Works Circular No. 24 of 1865.

Minute No. 12, dated 12th January 1865.

Extract from the Proceedings of the Sanitary Commission for Bengal.

Read letter No. 9 M—19, dated 4th January 1865, from the Secretary to the Government of India, in the Public Works Department, referring for the opinion of the Commission a communication from the Government of the North Western Provinces, No. 5,506 A, dated 16th December last, relative to the desirability or otherwise of planting trees in the European Infantry Lines at Agra.

Should the opinion of the Commission be favorable to the measure, it is requested to state what kinds of trees are to be preferred.

It appears that the Board of Health at Agra, on the 5th July 1864, brought to the notice of the Brigadier General Commanding the Agra Brigade, the great advantage that would, in its opinion, accrue from a row of trees being planted in the front of the European Infantry lines on the border of the parade ground, and also a row of trees on the west boundary of cantonments, from the rifle-butts to the bazaar of the European Infantry lines.

*Proceedings of the Madras Government, Public Works Department,
25th April 1865.*

The Executive Engineer, under the orders of the Brigadier General Commanding, prepared

* The trees were to be planted in a double line, forming an avenue 25 feet wide, the trees in each line being 30 feet apart, and so arranged that those in one line should correspond to the centre of the inter-spaces of the opposite line, &c., alternatively.

an estimate* for planting rows of trees as proposed, and the Brigadier General, in forwarding them to the Superintending Engineer, stated that he highly approved of the proposed measure, which had met with the approval of Dr. Murray, the Inspector General of Hospitals, North Western Provinces, and of Surgeon Major Homan, and the Brigadier General expressed his own opinion, that the idea that standard trees are unhealthy has long ago been completely exploded. He writes, "when they grow, so as to interfere with the ventilation, or free circulation of air, the boughs to the height of 10 or 15 feet can be lopped, while the shade of trees would be of the greatest comfort to the soldiers, sitting out to clean their accoutrements, enjoying their pipes, playing quoits, and other out-door games, thus relieving the monotony of the inside of a barrack during the long Indian day. The shade outside, too, would induce the men to abandon the habit of lo'ling about all day in a listless manner on their beds."

Colonel Wells, C. B., Commanding the Royal Welsh Fusiliers, who sat as President of the Board of Health, when it made the recommendation that trees should be planted, subsequently changed his opinion, and strongly opposed the measure. This seems to have led to the question being referred to a Special Station Committee, which assembled at Agra on the 5th November 1864, composed as follows:—

PRESIDENT.

COLONEL S. WELLS, C. B., 1—23rd, Royal Welsh Fusiliers.

MEMBERS:—

SURGEON MAJOR LAING, 1—23rd, Royal Welsh Fusiliers.

LIEUTENANT COLONEL JOHNSON, Royal Artillery.

SURGEON MAJOR HASTINGS, Officiating Garrison Surgeon.

MAJOR FURLONG, Superintending Engineer, 3rd Circle, D. P. IV.

CAPTAIN E. HARRISON, Royal Artillery.

Dr. John Murray, the Inspector General of Hospitals, North Western Provinces, being present to give the Committee the benefit of his advice.

The majority of the Committee—that is, all the members except Colonel Wells, C. B., and Surgeon Major Laing—was of opinion that "trees not nearer than 80 feet to the barracks would not be prejudicial to the health of the soldier, but would greatly contribute to his comfort at all seasons if kept properly thinned and pruned."

Colonel Wells, C. B., and Surgeon Major Laing recorded their dissent on the following grounds:—1st.—insufficient evidence to prove satisfactorily that trees planted close to barracks—that is within 80 feet—would be beneficial to the soldier's health; 2nd, because they think that trees planted to the east or west of barracks at a distance of one hundred yards, and intercepting the prevailing winds, must injuriously affect the ventilation; 3rd, that shade could better be afforded by small clumps of trees planted one hundred yards to the north or south of the barracks; 4th, as regards the barracks at Agra, their experience of the last two years convinces them that the double row of trees proposed must eventually tend, from increasing the stagnation about the double verandah barracks, to increase sickness instead of lessening it.

In forwarding the correspondence to the Government of the North Western Provinces, the Superintending Engineer, Major Furlong, states, "that the Committee fully argued out all the objections of the dissentient members, as well as the chemical features of the case, which the dissentients at first alone attacked," and mentions that Major General Sir Robert Napier, K. C. B., and Colonel Strachey, the Secretary to the Government of India in the Department of Public Works, on passing through Agra "agreed as to the advantages and utility of trees."

*Proceedings of the Madras Government, Public Works Department,
25th April 1865.*

OPINION.

I. As to whether trees should be planted in the neighbourhood of Barracks for European Troops, the Commission considers that their presence would be beneficial rather than the reverse provided that evergreen varieties be selected, and that they may be maintained in a healthy condition by being well separated and properly pruned, so as to ensure free access of sunlight and air, and so arranged as not to intercept the prevailing winds reaching the Barracks; and thus concurs with Dr. Chevers* that "all the substantial evidence, hitherto adduced, confirms

* Means of preserving the health of European Soldiers in India.

"the opinion that the presence of large and

"healthy trees, well separated and thoroughly sunned and perfumed, neutralize malaria, and improve the condition of the atmosphere by cooling it, and preserving its moisture, by absorbing carbonic acid, and generating oxygen."

II. The Commission, while it sees no present sanitary objection to the proposed arrangement—and does not anticipate any hereafter that cannot be remedied by thinning—coincides with all that the Brigadier General Commanding the Agra Brigade has urged in its favour, as affording an inducement to the Soldiers to abandon the habit of lo'ling about all day in a listless manner on their beds.

III. With regard to the distance from the buildings at which trees should be planted, the Commission thinks that the interval for rows or clumps should not be less than fifty yards. In the case of single trees planted between barracks, the interval might be reduced, if necessary, to thirty yards.

IV. As to how far apart from each other the trees should be planted, the Commission considers that the line intervals should not be less than fifty feet, and that when a second row is planted, the intervening avenue should not be less than thirty feet. It is not desirable that more than two parallel rows should be planted at such intervals.

V. As to the side or sides of the barrack buildings on which the trees should be planted, the Commission is of opinion that well separated avenues of not more than two rows may be placed to the windward or leeward of barracks, but that clumps of trees should only be planted in situations where their presence will not intercept the prevailing winds reaching any part of a line of barracks.

VI. As regards the kind of trees that should be planted, the Commission is of opinion that they should be evergreen, as being capable of affording shade, and a cheerful appearance throughout the whole year. Of these, the peepul (*ficus religiosa*); the neem (*azadirachta indica*); sissoo (*dalbergia sissoo*); and the am or mangoe (*mangifera indica*) are the most suitable, planted either in succession of one kind, or in series of two, three, or four kinds.

Since the foregoing Minute was recorded, the Commission has been favored with the following communication on the selection, cultivation, planting, and conservation of trees for cantonments in the North Western Provinces.

Memorandum on the planting of trees in Cantonments of the North Western Provinces, drawn up at the request of Secretary of the Sanitary Commission by DR. H. CLEGHORN, Conservator of Forests, on Special Duty.

Avenues are of great importance in cantonments, and along the trunk roads of the country; in some districts they are nearly as essential to the health and convenience of travellers as the smooth surface of a metalled road. Those who have seen the rows of trees planted along the Jubbulpoor and Mirzapoor road, and the ancient avenues in Mysore, Malabar, &c., cannot fail to appreciate their value and importance. General Frederick Cotton, some years ago, made enquiries with a view to ascertain how much further bullocks could travel on a shady road, than on a highway exposed to the sun.

2. *Selection of Trees.*—As regards suitable trees, the object is to obtain shade and to preserve moisture, whilst, at the same time, we seek to obtain some return for the expense of plant-

Proceedings of the Madras Government, Public Works Department,
25th April 1865.

ing. The varieties should be chosen with reference to the soil, and local experience should be consulted in the selection. The fruit of the mango, soap-nut, and tamarind near large towns yield a considerable revenue, and the wood of the following kinds is always saleable:—siriss, sissoo, tamarind, casuarina, and mulberry. Periodical returns may be expected from the disposal of loppings and thinnings. In Madras, Rupees 1,000 to Rupees 1,500 a year was realized by sale of loppings of a double avenue about six miles long.

No.	Botanical.	English.	Hindustani.	Remarks.
1	<i>Ficus indica</i> ...	Banyan ...	Bur or Burgh.	The largest and most shady of avenue trees. Many fine trees in the North West Provinces.
2	— <i>religiosa</i> ...	Peepul ...	Pipul ...	The poplar leaved fig-tree, some fine trees near tombs at Agra.
3	— <i>tiela</i> ...			The wood of all Ficuses is of very little value.
4	<i>Mangifera indica</i> ...	Mango ...	Am ...	A very large tree, widely diffused—fruit valuable, wood cheap.
5	<i>Guatteria longifolia</i> ...		Devadaru	A highly ornamental tree, which might be planted more than at present.
6	<i>Tamarindus indica</i> ...	Tamarind	Amli ...	Many fine trees at the Taj. This tree has an umbrageous head, but is difficult to rear in some parts of the North West Provinces. The heart-wood much prized.
7	<i>Dalbergia sissoo</i> ...	Sissoo ...	Sishum ...	This tree is now much planted on the roads at Agra and Allahabad, the wood is valuable for many purposes.
8	<i>Acacia speciosa</i> ...	Siriss ...	Siriss ...	A large handsome tree of rapid growth, much planted in avenues.
9	— <i>elata</i> ...		Doon Siriss	This beautiful tree is much planted on the roads of the outer hills.
10	<i>Bauhinia variegata</i> ...	Neem ...	Kuchnar ...	This handsome tree is common in some cantonments.
11	<i>Eugenia jambolana</i> ...		Jamun ...	A common avenue tree in the North West Provinces.
12	<i>Azadirachta indica</i> ...	Neem tree	Nim ...	Common in avenues, loses its leaves in the hot season.
13	<i>Millingtonia hortensis</i>	Cork-tree..		A quick-growing tree, fragrant and handsome, but easily blown down by high winds—the wood worthless.
14	<i>Casuarina muricata</i> ...			This tree forms good but not shady avenues; the wood is very hard, and used for many purposes.
15	<i>Morus latigata</i> ...	Mulberry	Toot ...	Common in gardens and avenues, leaves deciduous.
16	<i>Sapindus emarginatus</i> ..	Soap-nut	Ratha ...	A shady tree met with about villages, wood of little use, but the fruit yields a most profitable return.
17	<i>Bassia latifolia</i> ...		Mohwa ...	Forms good topes, wood useful.

3. [†] *Seedlings*.—With one or two exceptions as the peepul, banyan, and others of the *ficus* tribe, these trees should, as a rule, be raised from seed. Seeds and seedlings are commonly procurable, wherever there are public gardens, and advantage should be taken of the rainy seasons to plant out trees, and to form nurseries which may be attached to jail-gardens, police-stations, &c., to a larger extent than at present.

4. *Collecting of Seeds*.—The tree seeds should be collected when ripe, generally during the cold weather. Few kinds preserve their vitality for a year, and the per-centage of failures increases with the length of time, the seeds remain in store. The best way of keeping them

Proceedings of the Madras Government, Public Works Department,
25th April 1865.

is to place them in ghurras, or bags of newspaper, which is less liable to be attached by insects than country paper; they should be arranged upon shelves in a dry-room, and occasionally inspected.

5. *Formation of nursery*.—The ground selected should be near wells, and after being broken up to the depth of 10 or 12 inches, the seeds should be sown in rows. If of a large size and of a hard nature, as neem or tamarind, they may be covered up to the depth of half an inch, and small seeds proportionably less. The young seedlings may be thinned out to the distance of 6 or 7 inches, but, if intended to remain in the bed for 18 months or two years, 8 or 10 inches will be found suitable, as it will admit of each plant being taken up with a good ball of earth above the roots. Seedlings are generally fit for planting out after they have been one year in the nursery, during which they have four months of rain, and eight months of watering. The earth should be dug and kept free of weeds, and the trees carefully tended for four years after transplanting.

6. *Planting*.—For topes or avenues, seedlings should be planted in a *quincunx* arrangement, and may be put in at fifteen or twenty feet apart, and thinned out when the lateral branches interfere with each other. Thirty feet apart is a good distance eventually, and, when there is space, a double row should be planted which forms a shady archway for pedestrians. The size of the pits depends upon the age of the seedlings when transplanted, and upon the nature of the soil. In Meean Meer cantonment, where the soil is very hard, kunkur pits were made three feet square, and filled with good soil, and in this case, the tree is less liable to be blown down by high winds. At 1 year or 18 months with an average soil, pits 1½ feet wide and deep are generally sufficient.

7. *Groves or Clumps*.—It is often more convenient to plant trees in groves or clumps than in avenues. Planting, tending, and watering is cheaper when the work is not distributed over long lines. Circumstances and the character of the localities available must be considered in deciding whether trees are to be planted in avenues, or in groves, or clumps.

8. *Fences*.—In cantonments thorn fences or mud walls are indispensable, these should be made by contract and kept up for five years.

9. *Watering*.—In the arid climate of Upper India it is essential to provide for watering in arboricultural estimates, but much depends upon the locality, the nature of the soil, and the kind of tree. (The tamarind of all others requires water). In a light sandy soil water should be given every day during the hot months, or every second day, and in the evening rather than in the morning. For this purpose ghurras, puckallee-bullocks or water barrels may be required according to circumstances.

10. *Pruning*.—This operation is usually much neglected, and when practised the *modus operandi* is very rude. Unskilled coolies chop off branches with blunt axes, injuring and disfiguring the trees. Avenues should always be pruned in the cold weather, and the best implements are a hand-saw for the lower branches, a chisel and mallet for those above reach. All dead branches, large or small, should be sawn off. From neglect, or unskilled pruning, many promising trees are disfigured or destroyed. A few Native mallees should be trained at the public gardens, or canal plantations, to execute the necessary operations during the cold season. A good maistry gardener should then have the oversight, and it would be his duty to keep the avenue complete.

CHAS. CURRIE, *Offg. President,*
Sanitary Commission for Bengal.

No. 414.

ORDER THEREON, 25th April 1865, No. 1,095.

Communicated to the Military Department,
and to the Superintending Engineers.

MILITARY WORKS, No. 22.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Military Department.
„ Superintending Engineers.
Ed. S. T. Augustin.

1865-2
 Pro: 1865 for April
 1/2074

Military Works
 142

Military Works.
 CIRCULAR NO. 24.

To

FROM

SECY. TO GOVT. OF INDIA,
 IN THE PUBLIC WORKS DEPT.

Dated 20th March, 1865.

Received 11 April 65

8 1/2

Planting trees near Barracks for European
 troops.

1095-2
 1095-

Communicated to the
 Military Department & the
 Adminstring Engineers

To the Military Dept.
 2082
 2082

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With an order

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