Dietrich Brandis, *Report on the Teak Forests of Pegu* (1856)

Abstract

Born in Bonn in the Rhineland and educated at the University of Bonn, Dietrich Brandis (1824–1907) made his career in the British Empire. The botanist Brandis was among those Germans with professional qualifications who brought German traditions of scientific forest management into the service of British overseas colonization. He eventually rose to become the Inspector General of the Forestry Service in British India. Before that Brandis worked as a forestry official in the neighboring British colony of Pegu (Burma, now Myanmar), from which stage of his career the present document derives. This report and planning document, written by Brandis in English, lays out his recommendations for the development of Burmese teak forests and conveys his ideas about the proper and sustainable use of natural resources for economic goals, based on a best-practice scientific understanding of plant ecology. As in other contexts, the hallmark of German forest management was the concept of "conservation" (to maintain and maximize utility) rather than "preservation" (demarcating certain natural areas as off-limits to human penetration and economic development), at a time when British officials like other observers were beginning to worry that natural resources such as timber and coal might not prove inexhaustible. One might think of teak today for the most part as a luxury tropical wood used in the making of furniture, but at the time it was also a strategically important resource for the construction of ships in the British Royal Navy. The document is illustrative for a variety of other reasons as well: it reveals, for example, Brandis's views on indigenous peoples and working with indigenous laborers. Furthermore, it discusses the treatment of natural resources that had previously belonged to the King of Burma and that figured in folkloric and religious beliefs. The document additionally offers reflections on the potential differences between scientific forestry in Europe and in colonial settings.

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3. System proposed for the working of the forests.

29. We now proceed to discuss in particular the manner in which it is proposed to carry out the principle above mentioned, *every year to remove one twenty-fourth of those trees that at the beginning of the working term belonged to the 1. class, or measured six feet and above in circumference*. It would be a process neither simple nor easy in its execution, and very difficult in supervision, if one twenty-fourth of all first-class trees were actually every year to be felled in every district.

30. In order, therefore, to facilitate the execution of this principle, it is intended to divide the whole country in which teak forests exist into six large divisions, one of which only shall be worked at a time. A statement of these divisions, together with their area, the probable amount of first-class trees contained in them, and the number of logs yearly to be expected from them, if all can be made available, has been given in Table IV.

31. These divisions have been formed, as much as possible, in accordance with the great geographical features of the country. Thus I., II., III., belong to the Irrawaddy, V. and VI. to the Sittang Valley, and IV. comprehends the southern forests, situated on those rivers that join neither the Sittang nor the Irrawaddy itself, but empty themselves into separate branches of the large delta of the latter river. The divisions have further been formed with a view to give them, as much as possible, an equal area, or, at least, a somewhat similar amount of timber available, and to permit of the timber from one division

either being collected in one place or being floated to Rangoon through one and the same channel.

32. The course of operations will be the following: —

1. *Marking*.—All trees measuring six feet in girth and above the first division will be marked, in 1857, in such a manner that the marks shall remain visible for 24 years. As the increase of teak of that size is slow (only about 12 inches in girth in 24 years, or two inches in radius), this operation can be carried out without injuring the tree.

2. *Girdling*.—One fourth of the trees thus marked will be girdled immediately, by a circular cut through the bark, about one inch into the wood. The result of this operation is the death of the tree, and the gradual seasoning which is necessary in this climate. These two operations will, as shown in the table, take place in the I. and II. Divisions in 1857, in the VI. in 1861. The trees will also be allowed to stand three years before felling, which is one year longer than what is generally considered to be sufficient for seasoning in this climate. The only exception to this rule will be the first working of the Tharawaddy Forest, where the trees will be felled two years after girdling, because it would not be advisable longer to delay the beginning of the regular working system.

3. *Felling*.—This operation has hitherto been performed in a very wasteful manner. In order to facilitate the labor of cutting, a scaffold was erected around the trunk, often 10 feet high or more, so that in districts that have been worked extensively forests of stumps, not seldom from 10 to 15 feet high, are remaining, the relics of wasted treasures. A sudden transition to the most rational mode of felling, that is, cutting the tree close to the ground, or even digging out the entire stem together with a portion of the roots (a practice that is being introduced to some of the German forests), would be impracticable, for hardly would any Burman wood-cutter be found willing to execute such orders. We must, for the present, therefore, limit our improvements to the rule which already forms an article of every forest contract concluded for this and the next year, viz., *that no tree, the lower part of which is not hollow, is to be felled higher than one cubic foot from the ground*. The first felling of the timber will, in the first division, take place in 1859, and in the sixth or last in 1864.

4. *Removal of the Timber*.—The time for the three operations already described is the dry season; for the removal of timber, however, the rains are the most advantageous part of the year, for, carts and wheels being quite useless in this country without roads, the logs must be dragged over the ground, and this work is far easier over ground that is saturated with water, and therefore offers less friction to the gliding over it of heavy masses, than on uneven dry soil. The deep furrows in the ground that pervade all forests lately worked, very strikingly remind us of the traces which the heavy sledges laden with timber leave behind them on the snow in Europe. Yet snow covers the rough ground with roads far better than those formed by the rains of the south-west monsoon, in the heavy clay soil of Burmah. The rainy season has, moreover, this advantage, that numerous water-courses, which are quite dry in the north-east monsoon, contain sufficient water to float timber to the main stream in the rains, or to the main tributaries. The fourth operation differs also in this respect from the three former, that whereas those can and must be completed in the same season in which they have been commenced, the removal of the timber from the forests is a long an uncertain work, depending for its success, in a great measure, on the amount of rain, and the consequent larger or smaller amount of water in the streams and streamlets. Besides which, it is necessarily affected by the greater or less degree of sickness almost invariably prevailing at that season among the men as well as among the elephants employed in forest work. It is evident that the removal of the whole of one year's fellings will, in general, require more than one, not seldom three or four, working seasons.

33. After the completion of the first quarter of the *first* term of 24 years, the operations of which are exhibited in Table IV., the second girdling will commence in 1862, and the second felling in 1865. After the operations of the second quarter shall have been completed, one half of the trees marked in the

beginning will have been removed; after the end of the third, three fourths; and after the end of the fourth, or after 24 years, none of the trees that now measure six feet and above will be left standing.

34. The results of the *second* marking, which is to form the beginning of the *second* term, will then show whether in the different districts an increase or a decrease of 1. class trees has taken place, or, in other words, whether the period of 24 years allowed for the renewal of the forests has been sufficient or not.

4. Comparison of this system with those usual in Europe.

35. The system here proposed is widely different from those generally pursued in most forests of the Continent of Europe, but there are three circumstances of decisive importance which, for the present, render it impossible to regulate the teak forests in Burmah according to the rule of a scientific forest administration.

36. *First*. The European forests consist either of one kind of trees only, or of a few kinds not very different in their value as timber. In the teak forests of Burmah, however, teak forms only a small proportion of the forest; the greater part of which consists of various trees, mostly growing much faster than teak, and much more able to propagate themselves by natural means, but almost all of which are, in comparison with teak, at present of very little or no value. The operation of thinning, therefore, which in Europe is one of the most important modes for obtaining timber from a forest, and which in the young teak forests of Bombay has for several years past been carried on with decided success, would in this country have no meaning at all. Nor would it be practicable to adopt the system of clearing certain portions of the forests, with a view to renew them either by natural propagation or by planting.

37. The *second* point is, that the forest administration in Europe is based on well explored laws for the yearly increase of the different trees, in different soils and localities, a knowledge which, as regards the teak tree in this country, is as yet imperfect.

38. The *third* point is, the impossibility of obtaining such assistants as are practically acquainted with the management of forests, and the difficulty of making natives and other subordinates strictly adhere to any instructions that are not in accordance with what they have been accustomed to consider right and proper.

39. We may, however, hope that the three causes mentioned, which at present render a forest administration on scientific principles in Burmah impossible, will in time be removed. It is to be hoped that our efforts to change by degrees the general features of the Burmese teak forests, and to render them, if not actually *pure* forests, at least more consolidated and less scattered than they are at present, will not remain entirely unsuccessful. We may further expect that, after the completion of at least twice the term of 24 years, we shall be sufficiently acquainted with the rate of growth of teak in different localities, to substitute for the present artificial system a more natural one. We may then dispense with the expensive and cumbersome operation of marking, and adopt for those forests that are not to be worked by thinning, or by cutting out whole portions with a view of replanting them, the method of felling yearly (or from time to time) such a number of trees of the larger sizes as shall correspond to the increase of teak to be expected in that particular forest in the given period. We may also hope that in time a sufficient number of assistants will have received such a training as will enable them to carry out the more difficult instructions of another system with accuracy and independent judgment.

40. The measures for accomplishing the first point will be discussed in the second part of this Report; the object of the second will be attained partly by scientific researches on the rate of growth of teak in tender and riper age, as well as under different local and climatic circumstances, partly by a strict adherence to the plan proposed, for at least twice 24 years. A commencement of the scientific researches with regard to the growth of teak and other trees was made in April last, in the Toungoo forests, and the observations connected with it will be continued at the end of every dry season. The third point, the training of the

assistants, can only be accomplished through the work itself. Even the present system offers opportunities enough for the assistants to exercise their judgment, and to prove their accuracy; for, although the rule is a very simple one, that in every district of the trees marked in the beginning of the term, first one fourth, then one third, then one half, and at last the remainder is to be girdled, the modifications to which it must necessarily be subjected render its practical application somewhat difficult.

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45. Now, as on this area 2423 class 1. trees were observed, there were seen about 80 trees of six feet girth and above in one square mile, a proportion which, I believe, tolerably well represents the average distribution of class 1. trees over the whole of our forests.

It must, however, not be forgotten that these trees are by no means equally distributed over the whole of the forest districts, and that many miles in the forests will be found entirely without any teak, while in other parts teak forms a very considerable proportion of the trees in the forest.

Of the latter we will mention a few instances, as they serve to prove that teak can in this country form pure or nearly pure forests. The King of Burmah, and several governors of the different districts, appear to have had the wisdom to declare certain forest districts in their country reserved districts, and to forbid the felling of teak in the same.

In some cases teak was even planted. This is the origin of a number of small teak forests that are to be found in the lower portions of the province. The finest of these is the royal forest at Emmah in the Prome District, 20 miles from the Irrawaddy, an isolated teak forest, covering about one square mile, and containing about 1,300 first-class trees of fine growth and great value. In this forest, a religious superstition has, perhaps, in a greater measure than even the King's command, secured the protection of teak against injury. Nobody ventures even to remove a leaf, from fear that the gnats or genii of the forest will punish the offender. The forest is situated in the midst of a comparatively fertile and well populated country; hence all the other trees in it are cut down for firewood, so that the forest is gradually becoming more and more a pure teak forest.

Another instance is the Tahpoon Forest, in the Tharawaddy District, a forest smaller in extent, and much less pure than the former, for it covers only half a square mile, and contains about 150 class 1. trees, which would be 300 to the square mile.

I will now give an instance in a larger forest district which has not been improved by plantation nor protected against injury, in which the number of class 1. teak trees has lately been ascertained, independently of my own observations, and which may serve to prove that the result given above comes near to the truth. This is the lower part of the Thoukyagat Forest near Toungoo. Its length is about eight, its average breadth, three miles, it covers therefore 24 miles. The number of 1. class trees in this forest has been estimated by my assistant at Toungoo, after visiting every part of the same himself, at 2,000 trees. This gives 83 trees to the square mile.

46. Taking 80 as the average amount if 1. class teak trees on the square mile, the number of those trees in a certain forest district, the area of which is known, can easily be ascertained. The results of these calculations are exhibited in Tables IV. and V.

47. It will be seen that Table IV. gives the amount of 1. class teak trees in all forest districts together, equal to 584,960. This number is considerably higher than that given in the Tabular Statement annexed to the Report of 1855, which shows only 43,500 trees of six feet in girth and above.

48. But it must be remembered, that the latter statement includes neither the southern forests nor the

forests west of the Irrawaddy, and further, that it was made exclusively from the returns obtained from the Goungways or native subordinates of the Department. These are very useful in their way, but their statistical returns of the forests are, in most cases, far from accurate. This is evident from Table V. of this Report, where the results of my observations and the numbers given by the Goungways are compared with each other.

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52. I fear that, in most cases, the numerical returns of the Goungways are more the result of general opinions entertained by them, or concocted during their *dolce far niente* with their friends and relations, than of actual observation.

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Source: *Report on the Teak Forests of Pegu*, with a Memorandum on the Teak in the Tharawaddy Forests. By Dr. Brandis. London: Eyre and Spottiswoode, 1856, pp. 13–17.

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