COMPOSITION OF THE DRY EVERGREEN FOREST ON KAW TAO.

By A. Kerr.

As a result of the visits paid to Kaw Tao by Dr. Hugh M. Smith and myself, several papers on the natural history of the island have appeared in this Journal. A projected paper, giving a list of the flowering plants of the island, has never been completed, chiefly on account of the high proportion of undescribed species in the collections. About 330 species of flowering plants were obtained. Though it cannot be claimed that this includes all the species on the island, it probably represents not less than 80% of them. It will not be wide of the truth if one estimates that this island, with an average length of about 5½ and width of 2½ kilometres, has approximately 400 species of flowering plants. The undescribed species are gradually being dealt with, as the various families are worked up for the *Florae Siamensis Enumeratio.*

Recently Dr. H. R. Fletcher has completed the determinations of the Siamese species of *Diospyros*, an important genus on the island, and this enables me to give an account of an attempt made in September 1928 to estimate the quantitative composition of the dry evergreen forest which covers the greater portion of Kaw Tao. A general description of this forest has been given in a previous paper in this Journal (vii. 143). It may be repeated here that it consists of small to medium-sized trees, with very little undergrowth. Its composition throughout the island appears to be remarkably uniform. However, the area investigated was so small that too much weight must not be placed on the figures given below. They do, nevertheless, show some points of interest which I think would still remain in a more extensive investigation. It also seems worth while to give these figures for the reasons that very little work of this kind has been done in Siam, and that the forest on Kaw Tao has not been appreciably altered by the activities of man. Such untouched forests are, indeed, becoming more and more restricted.

The part of the forest chosen for the examination appeared typical. It was situated on a slight slope, about 10 metres altitude

above sea-level, and 200-300 metres distant from the sea-shore. In starting the work, a square plot, 20 metres each way, was measured off and marked. This square was then divided into five strips, each 4 metres in width. The counting of all the plants on each strip took much longer than was expected. In the time available it was possible to complete it on only two of the 4-metre strips. In the accompanying table the results of this count are given. The numbers on each strip are noted separately, under columns A & B, while the combined counts of the two strips are in a third column. Every plant large enough for the leaves to be recognised was counted, which means that numbers of seedling trees, some only a few centimetres high, are included. No terrestrial ferns were on the strips, nor were any epiphytic ferns or phanerogams noted on the trees counted. The components of each strip have been divided into four categories, according to their height and girth. The largest tree on the two strips was a specimen of *Diospyros retrofracta*, 1.14 metres in circumference at breast level, and about 20 metres in height. The next in size was a *Taraktogenos ilicifolia**, 0.80 metres in circumference.

The paucity of herbaceous plants is remarkable. The only one, an aroid not in flower, was almost certainly *Pseudodracontium Harmandii*, a common plant on the island. This paucity is principally due to the cutting off of light from the forest floor by the evergreen canopy. That this is so, is shown by the readiness with which herbs spring up when a gap is made in the canopy by the falling of a tree.

Noteworthy, again, is the preponderance of the first two species on the list; together they account for nearly 90% of the erect woody plants. In the last category, that is for trees over 30 cm. in circumference, this preponderance is lost. The numbers are too small to allow much significance to be attached to this. Such a preponderance of one or two species in a broad-leaved tropical forest is not, indeed, rare. In the dipterocarp forests of Northern Siam

*In the previous paper this tree appeared under the name *Hydnocarpus ilicifolia*.

figures approaching this are not uncommon (see Kerr in J. S. S., viii. 2). It is probable, too, that similar counts might be obtained in the Melaleuca forests of Peninsular Siam, and in some of the mangrove forests.

It is of interest to compare these figures with counts made in other tropical forests, even though such forests are of quite different type, growing under different conditions. To facilitate such a comparison the chief figures of the Kaw Tao plot have been calculated approximately to the number per hectare, as follows:

4400 trees over 4m. in height.

19,250 plants of all sizes.

Whitford (Philip. Journ. Sc., i. 373 et seq.) made counts in several types of primary forest on the Lemao Forest Reserve, Philippine Islands. His figures are for areas of various sizes. When these are reduced to numbers per hectare, different types of forest show from about 400 to 1600 trees of 4m. and over per hectare. The highest figure, 1600, was from a Dipterocarpus-Shorea forest, where two species, a *Dipterocarpus* and a *Shorea*, together accounted for 27% of all the trees on the plot.

Burkill in Singapore (Gard. Bull. Str. Settlements, ii. 145) examined a piece of secondary forest about thirty years old. His figures, similarly reduced, give about 3000 trees, 18 feet in height and over, and 243,000 plants of all sizes to the hectare.

All these plots show a smaller number of trees per unit area than the Kaw Tao plot; the larger number of trees on which being due, no doubt, to their small size. The high number for plants of all sizes on the Singapore plot is due chiefly to plants under 2 feet in height, of which category there were about 219,000 to the hectare. Burkill states, however, that herbs under the trees were few; the commonest being *Tacca cristata*, while grasses and sedges, absent on the Kaw Tao plot, were present on one spot.

Kaw Tao

Contents of sample plot in Dry Evergreen Forest.

(A count of plants on two strips, A & B, each 20 × 4 metres)

SPECIES	Under 1 metre high			Over 1 metre and under 4 metres high			Over 4 metres high and under 30 cm. in circumference			Over 4 metres high and over 30 cm. in circumference			Totals
	A	B	Total	A	B	Total	A	B	Total	A	B	Total	
Erect Woody plants													
Diospyros retrofracta ..	37	21	58	26	20	46	13	15	28	1	1	2	134
Taxotrophis ilicifolia ..	41	20	61	20	3	23	14	9	23	0	1	1	108
Drypetes sp.	0	2	2	1	2	3	1	1	2	0	0	0	7
Tarenna adangensis ..	0	5	5	1	0	1	0	0	0	0	0	0	6
Taraktogenos ilicifolia ..	0	0	0	0	0	0	0	0	0	2	3	5	5
Diospyros depravata	0	0	0	0	0	0	0	1	1	2	0	2	3
Celtis (?) sp.	0	0	0	0	0	0	0	0	0	1	1	2	2
Actephila sp.	0	0	0	1	0	1	0	0	0	0	0	0	1
Tarenna sp.	0	0	0	0	0	0	0	0	0	0	1	1	1
Drypetes sp.	0	0	0	0	0	0	0	0	0	1	0	1	1
Chrysophyllum Roxburghii	0	0	0	0	0	0	1	0	1	0	0	0	1
Amoora sp.	0	0	0	0	0	0	0	0	0	1	0	1	1
Memecylon edule	0	0	0	0	0	0	0	0	0	0	1	1	1
Not recognised	0	2	2	0	0	0	0	0	0	0	0	0	2
Woody climbers													
Strychnos sp.	7	3	10	0	0	0	0	0	0	0	0	0	10
Capparis diffusa	2	1	3	1	0	1	0	2	2	0	0	0	6
Bauhinia calcicola	0	0	0	0	0	0	2	0	2	0	0	0	2
Tetrastigma sp.	0	0	0	0	0	0	1	0	1	0	0	0	1
Sp. not recognised	0	0	0	0	0	0	11	3	14	0	0	0	14
Sp. not recognised	0	1	1	0	0	0	0	0	0	0	0	0	1
Herbaceous Plant													
Pseudodracontium Harmandii ?	1	0	1	0	0	0	0	0	0	0	0	0	1
Totals ..	88	55	143	50	25	75	43	31	74	8	8	16	308