

THE STUDY OF THE EVERGREEN VEGETATION OF MAHABALESHWAR AREA

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ABSTRACT

Mahabaleshwar plateau lies in the Western Ghats, 76 miles from Poona on South West. The altitude of the plateau is 4300' to 4800'. The rainfall of Mahabaleshwar is from 250" to 300". The plateau is formed of Deccan Trap and on account of high rainfall conditions, lateritic soils are found in most of the places.

The vegetation of Mahabaleshwar is an evergreen forest consisting of the following species:

Memecylon umbellatum Burm., *Olea dioica* Roxb., *Syzygium cumini* (L.) Skeels., *Terminalia chebula* Retz., *Actinodaphne angustifolia* Nees., *Randia brandisii* Gamble.

The shrub layer has the following important species:

Lasiosiphon eriocephalus Decne., *Zizyphus rugosa* Lam., *Pavetta indica* L. *Allophyllus cobbe* Blume, *Colebrookea oppositifolia* Sm.

The herbaceous layer consists mainly *Pteris quadriaurita* Retz., *Pteris aquilina* L. *Crotalaria retusa* L. and *Bryophyllum pinnatum* Oken.

The trees are mainly 15-20 meters high, with their trunks and branches being covered over with mosses, orchids and epiphytic ferns.

Vegetation studies were made from the Lingmala fall, Arther's Seat road, Mahad road and Panchagani and the main part of the plateau.

Where the tree vegetation has been destroyed a scrub forest consisting of the following species occurs:

Pteris quadriaurita Retz., *Pteris aquilina* L. *Crotalaria retusa* L. *Solanum giganteum* Jacq., *Pavetta indica* L. *Ageratum conyzoides* L. *Asplenium falcatum* Lam.

This vegetation is a biotic controlled seral community and the evergreen forest is the climax.

Introduction

Mahabaleshwar is a famous South Indian hill-station situated in the Javli Taluka of North Satara District (Lat. 17°51' N and Long. 73°30' E). It is 75 miles on the south-west of Poona and 33 miles on the north-west of Satara, by road.

Topographically, Mahabaleshwar is a large plateau in the Western Ghats comprising the ranges of the Sahyadris; the average elevation of the plateau being 1,360 meters above sea level.

Climatic Conditions

The plateau receives 633 cms. of rainfall at Mahabaleshwar proper, 168 cms. at Panchgani, and only 76 cms. at Wai on the leeward side of the westerly monsoon. The highest record of rainfall at Mahabaleshwar proper is 919 cms. in the year 1882. The rain-fall is chiefly monsoonic from the south-west monsoon winds; the rainy season begins early in June and ends in the middle of October. The western slope receives the highest amount of rainfall and the plateau forms a sort of rain shadow on the eastern side, which comprise of central and eastern part of North Satara District, southern and eastern part of Poona District and the whole Sholapur District.

Due to its high altitude, the climate is bracing and healthy except in rainy season i.e., from June to October, with equable temperatures.

The rainfall data together with conditions of cloud, winds, thunders, hail, dust storms, squall, fog, etc. are given in Table 1.

Table 1 shows that the rainfall at Mahabaleshwar is mainly restricted to 5 months—June to October. July is the wettest month the average rainfall being 257.25" and mean number of rainy days in July is 30.1. The rainy season prolongs up to November, and the climate is humid during a larger part of the year. The period of 4 months from December to March is comparatively dry. The months of June, July and August are marked with high wind, while fog is prevalent from June to September.

The data for rainfall are worked out in Fig. 1 in rainfall patterns. The temperature, pressure, humidity and vapour pressure data for Mahabaleshwar are given in Table II.

Temperature of Mahabaleshwar is quite agreeable, mean monthly temperatures fluctuating between 55°F to 80°F. April is the hottest month, the mean of daily maximum temperature in April being 85.4°F. The coldest month is January, the mean maximum and minimum temperatures being 74.4°F and 57.1°F.

The figures of relative humidity show the dampness of climate during June to October. The relative humidity in July, August and September is 100. Vapour pressure suddenly increases in the month of April (17.6 mb.) and in June it reaches the highest i.e., 21.6 mb. After monsoon, the vapour pressure again decreases and the

TABLE I

Station : Mahabaleshwar.
Lat. 17°56' N., Long. 73°40' E.

CLIMATOLOGICAL TABLE

Altitude : 4534 ft.
Based on observations from 1881 to 1940.

Month.	CLOUD AMOUNT		RAINFALL						Mean wind speed.	WEATHER PHENOMENA*					
	All clouds.	Low clouds.	Mean Monthly total.	Mean No. of rainy days.	Total in wettest month with year.	Total in driest month with year.	Heaviest fall in 24 hours.	Date & year.		Precipitation .01" or more.	Thunder.	Hail	Dust storm.	Squall.	Fog.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Tenths of sky.		in.	in.	in.	in.	+ in.		m.p.h.						
Jan.	I	1.2	0.5	0.14	0.2	2.63	0	0.02	19	5.9	0.6	0.2	0	0	0.4
	II	2.1	1.3	—	—	1926	—	—	1940	—	—	—	—	—	—
Feb.	I	0.7	0.5	0.10	0.1	1.70	0	1.14	25	5.8	0.5	0.1	0	0	0.5
	II	1.8	1.2	—	—	1917	—	—	1938	—	—	—	—	—	—
Mar.	I	0.9	0.6	0.17	0.4	2.28	0	0.78	13	6.6	0.3	0.6	0	0	0.5
	II	2.3	1.5	—	—	1923	—	—	1933	—	—	—	—	—	—
Apr.	I	2.1	1.7	1.18	1.5	16.30	0	3.74	19	7.0	2	2	0	0	1.3
	II	3.6	2.2	—	—	1899	—	—	1937	—	—	—	—	—	—
May	I	3.6	3.1	1.60	2.4	5.77	0	2.45	9	8.5	4	3	0.1	0	3
	II	3.1	2.1	—	—	1893	—	—	1930	—	—	—	—	—	—
June	I	8.9	4.9	42.69	22.2	110.54	7.63	12.22	27	10.2	25	0.7	0	0	26
	II	9.5	5.5	—	—	1882	1891	—	1936	—	—	—	—	—	—
July	I	10.0	4.0	105.33	30.1	191.61	42.69	11.26	12	12.8	31	0	0	0	31
	II	10.0	1.0	—	—	1896	1899	—	1939	—	—	—	—	—	—
Aug.	I	9.8	6.2	73.11	29.8	157.77	29.73	12.95	5	10.8	31	0	0	0	30
	II	10.0	7.8	—	—	1900	1899	—	1933	—	—	—	—	—	—
Sept.	I	8.7	6.3	28.74	22.6	70.64	5.79	12.88	15	7.8	24	2	0	0	25
	II	9.7	7.1	—	—	1883	1896	—	1930	—	—	—	—	—	—
Oct.	I	4.7	2.4	6.35	7.9	37.63	0	7.54	1	7.6	10	4	0	0	8
	II	5.2	3.5	—	—	1938	—	—	1938	—	—	—	—	—	—
Nov.	I	2.8	1.6	1.56	2.4	6.76	0	4.18	2	7.5	3	1.1	0	0	3
	II	3.3	1.9	—	—	1931	—	—	1931	—	—	—	—	—	—
Dec.	I	1.8	1.1	0.26	0.6	3.97	0	1.56	19	7.1	0.6	0.5	0	0	0
	II	3.1	2.1	—	—	1884	—	—	1933	—	—	—	—	—	—
Annual Total or mean	I	4.6	2.7	261.23	120.2	402.41	139.57	12.15	—	8.1	132	14	0.1	0	129
	II	5.3	3.1	—	—	1896	1899	—	—	—	—	—	—	—	—
No. of Years	I	10	5	60	60	60	60	12	—	5	10	10	10	10	10
	II	5	5	—	—	—	—	—	—	—	—	—	—	—	—

* Frequencies above 2.0 are given only on whole numbers.

+ Based on X data, 1929-1940.

'I' refers to 0800 hours Indian Standard time and 'II' refers to 1700 hours Indian Standard time.

months November-March are low vapour pressure months.

Fig. 2 is a climatograph of Mahabaleshwar.

Geology and soil conditions

Geologically, the plateau is formed of the Deccan Trap. The strata of basalt are overlain and inter-

TABLE II
CLIMATOLOGICAL TABLE

Station : Mahabaleshwar.

Lat. 17°56' N.

Long. 73°40' E.

Altitude (AMSL) 4534

Month	Pressure Mean at station level.	AIR TEMPERATURE										HUMIDITY	
		Mean dry bulb °F.	Mean wet bulb °F.	Mean (of)		Mean (of)		Extreme				Relative Humidity %	Vapour Pressure
				Daily Max. °F.	Daily Min. °F.	Highest in the month °F.	Lowest in the month °F.	Highest recorded °F.	Date and year	Lowest recorded °F.	Date and year		
i	2	3	4	5	6	7	8	9	10	11	12	13	14
	mb.												mb.
Jan.	I 865.3 II 863.6	58.1 68.8	50.1 58.0	74.4 —	57.1 —	79.8 —	50.4 —	84 —	30 1938	44 —	30 1936	55 48	9.3 11.9
Feb.	I 864.4 II 862.9	59.2 73.8	50.0 59.3	77.3 —	58.2 —	82.2 —	50.3 —	84 —	22 1938	48 —	10 1940	50 41	8.3 11.4
Mar.	I 863.9 II 862.3	65.4 77.1	52.9 62.8	82.4 —	62.6 —	88.2 —	54.6 —	91 —	29 1934	49 —	20 1940	40 42	8.4 13.3
Apr.	I 863.6 II 861.5	72.2 81.0	57.9 67.5	85.4 —	66.1 —	91.6 —	57.8 —	97 —	3 1934	54 —	19 1938	39 51	10.1 17.6
May	I 861.8 II 860.1	71.5 78.8	61.8 69.2	83.8 —	63.8 —	91.3 —	58.7 —	94 —	7 1935	57 —	21 1935	57 62	12.8 20.2
June	I 859.4 II 858.9	64.6 68.1	64.1 66.5	70.5 —	62.5 —	80.9 —	59.6 —	87 —	2 1934	59 —	27 1940	98 95	20.1 21.6
July	I 858.2 II 857.1	64.0 64.2	64.0 64.2	65.4 —	62.3 —	69.3 —	59.3 —	75 —	3 1932	57 —	4 1934	100 100	20.2 20.3
Aug.	I 859.3 II 858.0	63.0 63.9	63.0 63.9	65.6 —	61.5 —	71.0 —	69.2 —	78 —	3 1932	57 —	31 1940	100 100	20.5 20.5
Sept.	I 861.3 II 859.7	62.5 60.8	62.5 64.9	67.8 —	60.8 —	74.5 —	56.8 —	78 —	30 1940	54 —	27 1935	100 96	19.1 20.5
Oct.	I 863.5 II 861.5	63.5 71.2	59.8 64.0	74.2 —	61.3 —	79.4 —	56.2 —	82 —	13 1939	52 —	26 1931	80 69	15.9 17.2
Nov.	I 864.6 II 863.1	60.0 70.3	54.5 59.3	74.0 —	58.8 —	78.1 —	54.0 —	80 —	12 1937	51 —	24 1938	69 51	12.0 12.7
Dec.	I 865.2 II 863.8	57.4 67.6	51.1 57.2	72.7 —	58.5 —	77.5 —	51.2 —	80 —	31 1938	48 —	23 1940	58 50	9.3 11.6

mixed at places with red iron clay, consequently the colour of the soil at most places is red or brownish red. Laterite has also been found at places capping the basalt.

Due to heavy rains on the plateau innumerable streams and nalas flow in almost all directions. Four main rivers Krishna, Koyna, Savitri, Venna—arise from the Mahabaleshwar area. Of these the Krishna is one of the largest rivers in Southern India; its length being about 800 miles. There are several important falls and number of points which emphasise the radial drainage and erosion pattern of the area.

Maharaja of Satara had built a large lake (Photo 1) called Venna lake on the top of the plateau, which is fed by perennial springs. This adds to the natural beauty of Mahabaleshwar town, and supplies water for gardening. The river Venna flows out of this lake.

Erosion of the soil is noticed during the monsoons when red water flows in all directions. The dense cover of vegetation greatly retards the erosion.

The soils are generally red, at some places lateritic. In the forest areas there is a good amount of humus, but in scrub vegetation humus is rather scanty. Other areas in the forest have no humus at all and are rocky.

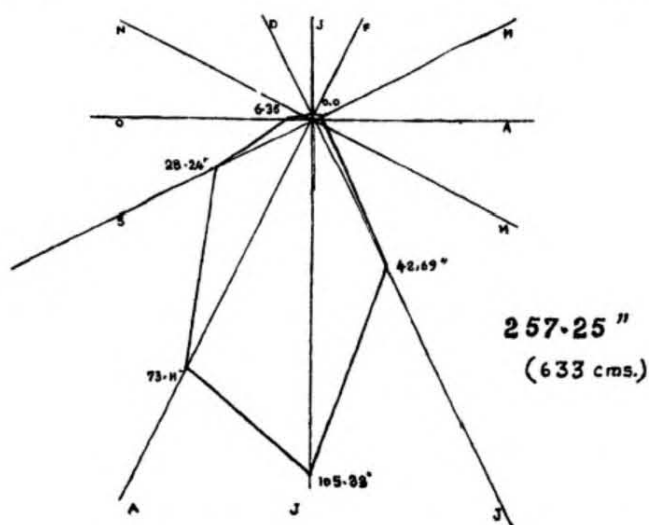


Fig. 1. Rainfall pattern of Mahabaleshwar.

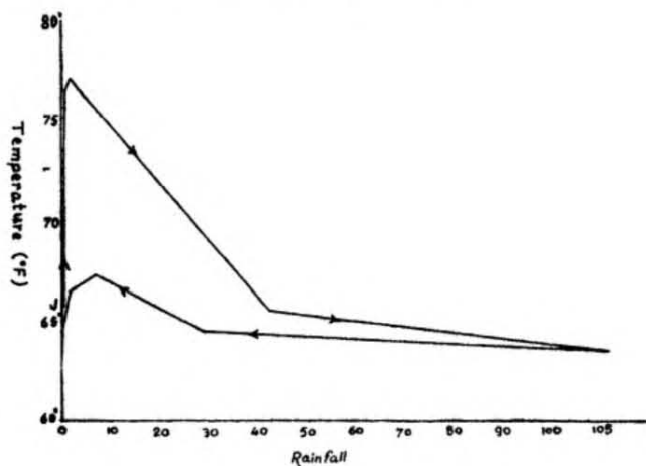


Fig. 2. Climatograph of Mahabaleshwar.

Biota

The permanent population of Mahabaleshwar is 5,000 according to 1921 census; and it increases considerably during the summer. Four tribes namely Kolis, Kulvadis, Dhångars and Dhavads are the original inhabitants of the area whose main occupation is agriculture.

Old Mahabaleshwar, which is about 4 miles from the town is attached with a great religious, historical and geographical importance. The temple of God 'Shiv' or 'Shankar' is regarded by the Hindus as one of the few 'Kshetras' (holy places) from ancient times. In historical times, Shivaji Maharaj and Maratha sardars used to visit Mahabaleshwar Mandir and take inspiration from it. The famous historical fort 'Pratapgad' and the famous forest of Javali is situated in the vicinity of Mahabaleshwar.

Geographically, old Mahabaleshwar is the place of origin of five rivers namely Krishna, Koyana, Savitri, Venna and Gayatri out of which Krishna and Koyana

are large and important rivers. A temple known as Panchganga Temple is built on the supposed spot of the origin of these rivers.

The history of the area indicates that there must have been great pressure of population on the evergreen forest which has been felled at many places. The scrub is biotic in origin mainly coppice growth. The presence of patches of *Pteridium* over large areas indicates the clear felling of the evergreen forest areas, probably for fuel for the local population. Cattle population is not large but goats and sheep are in plenty and they are seen to adversely affect the vegetation. The forests are reserved and are under the Department of Forests.

Vegetation

The vegetation of Mahabaleshwar has been studied previously by Blatter (1909-10), Birdwood (1887), T. Cooke (1887, 1896) etc. The forest working plan of Satara District deals with tree species in considerable details (Singh, 1935). Gazetteer of Satara District also furnishes a list of plants occurring in the Mahabaleshwar area.

However, no systematic and exhaustive account of the ecology of this interesting area has so far been published. In the present paper, detailed account of the vegetation and flora will be given.

In his book on "Preliminary Survey of Forest Types of India" Champion (1938) has mentioned the existence of a Tropical evergreen forest at Mahabaleshwar, but has not given any detailed description.

In this paper therefore, the following types of vegetation have been dealt with

- (1) Evergreen High forest.
- (2) Evergreen scrub.
- (3) Open treeless terrace areas.



Ph. 1. View of Venna Lake and the adjoining forest with open patches. In the fore-ground are trees of *Eugenia*, *Randia* and *Glochidion*.

1. Evergreen High Forest

studied from four places namely, Lingmala, Hirda Bungalow, Panchgani Road and Chinaman's Fall. The data are given in Table III.

This type is the commonest in the plateau and was

TABLE III

VEGETATION DATA OF EVERGREEN FOREST OF THE DIFFERENT LOCALITIES IN MAHABALESHWAR AREA

LOCALITY	Hirda bungalow to Venna Lake.	Lingmala Forest	Panchgani Road	Chinamans water-fall
ROCKS AND GEOLOGY	Trap rock covered with reddish brown clay. Lateritic conditions prominent near Venna Lake.	Trap basalt covered with reddish sticky clay. Protrusions of rock and rounded boulders are common.	Trap overlain by reddish iron clays. Trap exposed at places.	Trap basalt rock which is exposed at places.
SOIL	Reddish brown clay mixed with gravel. In most places, soil is moist due to the vicinity of the lake and water streams. Dry dead decaying leaves form a carpet above (2 cms. thick).	Reddish sticky clay with small amount of gravel. Moist soil near nallas and in the pockets. Dry decaying leaves and twigs present.	Reddish gravelly and somewhat sticky clay.	Chocolate reddish soil over the slopes. Dry decaying leaves and twigs forming a carpet about 2 cms. thick.
ASPECTS	Almost a plain area rising by hardly 5° towards north-west.	Northern slope (about 30°) ending in vertical cliffs towards Venna valley near Lingmala falls. (Vertical descend of about 40 meters).	Almost plain but uneven area with gullies ending in hilly slopes towards north west.	Western slope (about 45°) from plateau (1500 meters) to the valley (1,300 meters) vertical cliffs near Chinaman waterfall.
NAME OF COMMUNITY	EUGENIA-MEMECYLON-ACTINODAPHNE COMMUNITY	EUGENIA-TERMINALIA-MEMECYLON COMMUNITY	EUGENIA-MEMECYLON-RANDIA COMMUNITY	EUGENIA-ARTOCARPUS COMMUNITY
NUMBER OF QUADRATS STUDIED	20 (3 meters square)	20 (3 meters square)	10 (3 meters square)	10 (3 meters square)
TREES	Percentage of the total number of quadrats in which the given species occur :			
1. <i>Actinodaphne hookeri</i> Meissn.	55	45	60	—
2. <i>Artocarpus hirsuta</i> Lam.	—	5	—	60
3. <i>Bridelia retusa</i> Spr.	—	85	—	—
4. <i>Syzygium cumini</i> (L.) Skeels.	75	10	80	70
5. <i>Eugenia</i> sp.	—	—	—	—
6. <i>Ficus glomerata</i> Roxb.	—	10	20	—
7. <i>Glochidion hoheneckeri</i> Bedd.	25	10	—	—
8. <i>Mangifera indica</i> L.	—	10	—	—
9. <i>Memecylon umbellatum</i> Burm.	60	50	70	—
10. <i>Olea dioica</i> Roxb.	15	30	—	—
11. <i>Pygeum gardneri</i> Hook. f.	—	—	—	10
12. <i>Randia dumetorum</i> Lam.	45	35	70	30
13. <i>Symplocos beddomei</i> Clarke.	—	5	—	—
14. <i>Terminalia chebula</i> Retz.	20	80	—	30
SHRUBS AND CLIMBERS				
15. <i>Allophylus cobbe</i> Blume.	60	25	20	50
16. <i>Athylosea lineata</i> Wight & Arnot.	—	—	10	—
17. <i>Canthium umbellatum</i> Wight.	—	15	—	—
18. <i>Capparis pedunculosa</i> Wall. var. <i>longispina</i>	20	—	60	—

19. <i>Clematis wightiana</i> Wall.	—	—	10	—
20. <i>Clerodendrum serratum</i> Spreng.	—	10	—	—
21. <i>Colebrookia oppositifolia</i> Smith.	20	—	10	40
22. <i>Crotalaria retusa</i> L.	40	5	—	—
23. <i>Gymnosporia</i> (ovata ?)	—	10	—	20
24. <i>Elaeagnus latifolia</i> L.	—	25	20	40
25. <i>Indigofera pulchella</i> Roxb.	—	20	—	—
26. <i>Lasiosiphon eriocephalus</i> Decne.	45	35	—	—
27. <i>Leucas ciliata</i> Benth.	40	10	—	—
28. <i>Maesa indica</i> Roxb.	5	20	—	30
29. <i>Murraya koenigii</i> Spreng.	—	—	—	30
30. <i>Pavetta indica</i> L.	55	45	70	—
31. <i>Piper hookeri</i> Miq.	10	—	—	70
32. <i>Piper</i> sp.	—	—	—	40
33. <i>Pogostemon plectranthoides</i> Desf.	55	25	30	—
34. <i>Pteris aquilina</i> L.	15	10	40	—
35. <i>Pteris quadriaurita</i> Retz.	5	15	—	—
36. <i>Rauwolfia densiflora</i> Benth.	10	—	5	—
37. <i>Rubia cordifolia</i> Linn.	15	—	50	—
38. <i>Rosa multiflora</i>	—	5	—	—
39. <i>Scutia indica</i> Brongn.	20	15	30	40
40. <i>Smilax macrophylla</i> Roxb.	5	35	30	—
41. <i>Solanum giganteum</i> Jacq.	10	—	30	—
42. <i>Solanum indicum</i> L.	10	15	—	—
43. <i>Strobilanthes perfoliatus</i> T. Anders.	—	—	—	40
44. <i>Strobilanthes reticulatus</i> Stapf.	—	—	—	30

HERBS

45. <i>Achyranthus aspera</i> L.	—	15	—	—
46. <i>Anisochilus</i> sp.	—	20	—	—
47. <i>Apluda varia</i> Hack.	—	5	10	—
48. <i>Arides maculosum</i>	10	—	—	—
49. <i>Arundinella spicata</i> Dalz.	20	—	—	—
50. <i>Blepharis asperima</i> Nees.	10	30	—	—
51. <i>Bryophyllum calycinum</i> Salisb.	10	—	—	—
52. <i>Cheilanthes farinosa</i>	—	—	10	—
53. <i>Dendrobium barbatulum</i> Lindl.	10	—	—	—
54. <i>Euphorbia rothiana</i> Spreng.	20	10	—	—
55. <i>Girardiana zeylanica</i> Decne.	5	—	—	—
56. <i>Leucas stelligera</i> , Wall.	30	—	—	—
57. <i>Nephrodium cicutarium</i> Hook.	—	20	—	20
58. <i>Pleopeltis linearis</i>	—	20	—	—
59. <i>Polygonum plebejum</i> R. Br.	—	—	10	—
60. <i>Rungia parviflora</i> Nees.	—	25	—	20
61. <i>Cynoglossum</i> spp.	10	—	—	—
62. <i>Sporobolus</i>	15	35	—	—
63. <i>Themeda triandra</i>	—	—	10	10

SEEDLINGS AND SAPLINGS

<i>Actinodaphne hookeri</i> Meissn.	35	25	20	—
<i>Allophylus cobbe</i> Blume.	15	—	10	—
<i>Artocarpus hirsuta</i> Lam.	—	—	—	60
<i>Capparis pedunculosa</i> Wall. var. <i>longispina</i> .	—	10	—	—
<i>Colebrookia oppositifolia</i> Sm.	10	—	10	—
<i>Crotalaria retusa</i> L.	—	10	—	—
<i>Eugenia jambolana</i> Lam.	—	—	—	—
= <i>Syzygium cumini</i> (L.) Skeels.	45	50	60	20
<i>Elaeagnus latifolia</i> L.	—	—	20	10
<i>Lasiosiphon eriocephalus</i> Decne.	10	—	—	—
<i>Mangifera indica</i> L.	—	10	—	—
<i>Memecylon umbellatum</i> Burm.	45	35	40	—
<i>Pavetta indica</i> L.	15	5	10	—
<i>Piper hookeri</i> Miq.	5	—	—	50
<i>Pogostemon plectranthoides</i> Desf.	10	—	20	—
<i>Randia dumetorum</i> Lam.	—	20	—	10
<i>Terminalis chebula</i> Retz.	20	40	—	—

In the evergreen forest a number of communities are recognised the description of which is given below:

A. *Syzygium-Memecylon-Actinodaphne* Community

This community is of common occurrence at Mahabaleshwar. This is the commonest type developed in an almost plain area with uneven surface and small gullies. A gentle slope of about 5° towards north-west direction (i.e., towards the Venna river) is found in the forest area.

The soil varies considerably from bare rocky surfaces of decomposing basalt to deep reddish clay found in situ. The clay is mixed with a considerable amount of gravel, and the decaying humus is also in plenty. The soil is moist and sticky in most of the area. The depth of the soil varies from 1/3 meter to about 1 meter or even more.

The forest is considerably dense near the hirda bungalow with a thick undergrowth of shrubs and herbs, height of the main trees varying from 5-6 meters to about 15 meters. The highest trees are generally *Syzygium cumini*. The dominant tree species are *Syzygium cumini*, *Memecylon umbellatum* and *Actinodaphne hookeri* occurring in 75%, 60% and 55% of the total number of quadrats respectively. The girth of the trees is not much, the maximum girth being 2 meters at the most, and that is only in case of *Syzygium cumini*, near ground level. Average girth of *Memecylon edule* and *Actinodaphne hookeri* is about 1 meter, and the average height varies between 3 to 6 meters.

Among the other trees occurring in this forest, *Randia dumetorum* is the commonest; its percentage occurrence being 45. This is a small tree (or large shrub) with nearly horizontal branches which are armed with strong straight nearly opposite spines. The tree hardly reaches upto 5 meters in height and the girth is about 15-30 cms. Most of the trees were in late fruiting stage in the month of December.

Tree species present in small percentage are *Glochidion hohenackeri* Bedd. (25%), *Olea dioica* (15%), and *Terminalia chebula* (20%). *Glochidion hohenackeri* is somewhat glabrous, middle-sized tree reaching the height of about 5 meters. It flowers at the end of November and fruits in the middle of December.

Terminalia chebula Retz. which is very abundant in other forests of Mahabaleshwar, is not so common in this area. It is a moderate-sized, much branched tree and its fruits are economically important.

Epiphytic orchids and ferns are not common, but the branches of the trees are laden with hanging mosses 5 to 15 cms. in length, and hanging freely from the branches.

Undergrowth of shrubs and herbs is considerably thick in some patches near nalas and water streams and where enough sunlight is available. Main constituents of the shrub undergrowth are *Allophylus cobbe* Blume, *Crotalaria retusa* L., *Pogostemon plectranthoides* Desf., *Lasiosiphon eriocephalus* Decne., *Pavetta indica* L., and *Leucas ciliata* Benth. *Pogostemon* is a gregarious shrub with violet flowers reaching to the height of about 3

meters. *Lasiosiphon eriocephalus* occurs in 45% of the total quadrats, and at places it grows into a small handsome tree. It generally thrives on the edges of the forest and flowers almost throughout the year.

Pavetta indica L. is equally common as *Pogostemon plectranthoides*, both of them occurring in 55% of the total number of quadrats. It is a stout bushy shrub about 1 to 2 meters tall, and flowers in the month of April and also during the monsoon period; the late fruiting stage is reached in December.

Crotalaria retusa L. which is common everywhere at Mahabaleshwar, and especially abundant in this area, attracts attention by its beautiful bright yellow flowers. In Cooke's 'Flora of the Presidency of Bombay' (1903),



Ph. 2. A robust shrub of *Crotalaria* having bright yellow flowers.

Crotalaria retusa L. is described as 'a robust undershrub 2-4 ft. high', but the authors have seen many of these shrubs growing to 6 ft. or 2 meters, or even more. (Photo 2) shows a flowering and fruiting plant which is more than 3 meters in height. Along nala on the edges of the forest, a tall handsome herb is frequently met with. This is *Lobelia nicotianaefolia* belonging to the natural order Lobeliaceae.

Although climbers are not very abundant in this forest, several climbers or straggling shrubs were recorded. Names of these and the % number of quadrats in which they occur are given below:

<i>Allophylus cobbe</i>	60	
<i>Capparis pedunculosa</i>	20	(var longispina)
<i>Piper hookeri</i>	10	
<i>Rubia cordifolia</i>	15	
<i>Scutia indica</i>	20	
<i>Smilax macrophylla</i>	5	

Among these *Piper*, *Rubia* and *Smilax* can be correctly called as climber. *Allophylus cobbe* Blume is a small tree or a large shrub often climbing to a considerable height, i.e., about 5-7 meters. *Capparis pedunculosa* Wall., var. *longispina* Hook. f. is an erect spiny shrub with wiry branches climbing on shrubs and small trees. *Scutia indica* Brongn. is also a straggling shrub and the branches are armed with recurved prickles.

The high evergreen forest is not continuous and uniform, over large areas but open treeless patches of variable sizes are present. The presence of these is due probably to basalt and biotic interference. (Photo 3) shows a large open patch in which several trees, of *Syzygium cumini*, *Actinodaphne hookeri* and *Glochidion hohenackeri* are growing in the centre of the open patch. Herbaceous growth in this patch is scanty. Two grasses *Arundinella spicata* Dalz. and *Sporobolus* species are abundant, but are not able to grow fully due to grazing.



Ph. 3. Evergreen scrub vegetation near Venna Lake.

Open patches deep inside the forest which are not easily accessible sustain a better type of herbaceous vegetation. In such areas, *Leucas stelligera* Wall. is the commonest herb forming communities mixed with grasses and other herbs. (Photo 4). Among the grasses *Sporobolus*, *Arundinella*, *Themeda*, and *Eragrostis* are abundant in this community.

Herbaceous undergrowth is poor in dense forests, while open patches and areas along nalas etc. have considerable herbaceous vegetation. Besides *Leucas stelligera* which occurs in 30% of the quadrats, the following other herbs are also present:—

<i>Euphorbia rothiana</i>	20%
<i>Girardiana zeylanica</i>	5%
<i>Bryophyllum calycinum</i>	10%
<i>Blepharis asperima</i>	10%
<i>Arundinella spicata</i>	20%
<i>Cynoglossum spp.</i>	10%

The vegetation is more or less similar all over in evergreen forests, but there are some differences here and there in these different areas, which are described below:—

2. *Syzygium-Terminalia-Memecylon* Community at Lingamala Forest

The evergreen forest at Lingmala is more dense than that in Hirda Bugalow area. The prominent feature of this forest is the abundance of *Terminalia chebula* Retz. occurring in 80% of the total number of quadrats studied. This may be due to biotic interference since the forests of Hirda are of medicinal value.

Syzygium cumini is the most common species in this community occurring in 85% of the total quadrats studied.



Ph. 4. Vegetation of *Leucas stilligera* in open greasy scrub.

Memecylon is less common here than in community 1, while the percentage of *Olea dioica* increases from 15 to 30.

Following are the species not recorded in *Syzygium-Memecylon-Actinodaphne* community:—

- | | |
|---------------------------------|----------------------------------|
| 1. <i>Bridelia retusa</i> | 7. <i>Indigofera pulchella</i> |
| 2. <i>Mangifera indica</i> | 8. <i>Rosa multifera</i> |
| 3. <i>Symlocos beddomei</i> | 9. <i>Achyranthes aspera</i> |
| 4. <i>Canthium umbellatum</i> | 10. <i>Nephrodium cicutarium</i> |
| 5. <i>Clerodendron serratum</i> | 11. <i>Pleopeltis linearis</i> |
| 6. <i>Elaeagnus latifolia</i> | 12. <i>Rungia parviflora</i> |

Among these *Elaeagnus latifolia*, which is totally absent in community 1, occurs here in 25% of the total quadrats. It is a large shrub with straggling branches.

The epiphytic fern *Pleopeltis linearis* is fairly common along with the mosses. The undergrowth is rich with a number of species. Epiphytic Orchids are present in some trees.

3. *Syzygium-Memecylon-Randia* Community

This forest is comparatively less dense than the other two communities, and is met with along the Panchgani road. The main tree species constituting the community are *Syzygium cumini* (80%), *Memecylon umbellatum* (70%) and *Randia dumetorum* (70%). *Randia dumetorum* differentiates the community by its higher percentage.

4. *Syzygium-Artocarpus* Community

This community occurs in the forest near Chinamans water falls over the slopes of the hills. *Artocarpus hirsuta* which is almost absent in other areas of Mahabaleshwar is abundant here occurring in 60% of the quadrats studied. Although it is so abundant, very few trees reach the height of *Syzygium cumini*. The average height of full grown trees ranges between 5-8 meters. The seedlings of *Artocarpus* are abundant (60% of the quadrats) showing high rate of regeneration. Climbers of *Piper* sp. are also abundant in the forest.

Another striking feature of this Community is the presence and abundance of *Strobilanthes* sp. in the undergrowth. *Strobilanthes perfoliatus* occurs in 40% of the quadrats and it is extremely abundant in some patches over the slopes. *Strobilanthes reticulata* (30%) is less common than *Strobilanthes perfoliatus* and it grows on the edges of the high forests.

Succession

The *Syzygium-Memecylon-Actinodaphne* community seems to be the Climatic Climax in the area on ferruginous soil capping the basalt. When basalt occurs somewhere near the surface *Terminalia chebula* is prominent in the country.

The *Syzygium-Memecylon-Randia* community is due to often exposure of basalt and biotic interference.

The nature of *Syzygium-Artocarpus* community is not fully understood. It is on the slopes which are mainly formed of basalt rock.

Evergreen Scrub Vegetation

(*Randia dumetorum*—*Syzygium Cumini*—*Pavetta indica*)

At Mahabaleshwar, evergreen scrub is not so common as the high evergreen forest. It occurs frequently at places where either a poorer and shallower type of soil is unable to sustain high forests, or the original high forest is disturbed due to some biotic factors. Along the Panchgani road, scrub is the only vegetation left now.

The scrub is not evenly and continuously dense. On the other hand, it leaves smaller or larger open patches in between the areas of dense vegetation.

Ecological study was conducted at Lingmala forest and along the Panchgani-Mahabaleshwar Road. The presence of tree species like *Memecylon umbellatum*, *Actinodaphne hookeri* and *Randia dumetorum* and the abundance of *Syzygium cumini* indicates that this is practically a degraded evergreen high forest. The soil in these patches of vegetation is more rocky with outcrops of basalt coming on the surface. At some places amygdaloid rocks have decomposed to form a perfectly poor type of soil. Abundant growth of the gregarious shrubs of *Pavetta indica*, *Randia dumetorum*, *Scutia indica*, *Zizyphus rugosa*, makes it difficult for the trees to come up the canopy and the latter do not reach big dimensions.

Among three main species, namely *Randia dumetorum*, *Syzygium cumini* and *Pavetta indica*, *Randia dumetorum* is the most common; its percentage occurrence-being 80. It is a large shrub sometimes growing into a small tree. The average height of the shrub is 2 to 4 meters and the girth near the ground is about 1/3 meter.

Pavetta indica and *Syzygium cumini* occur in 70% and 60% of the total number of quadrats studied. Stunted trees of *Syzygium cumini* hardly attain a height of 3 meters or so.

Stunted shrubs of *Memecylon umbellatum* are much branched and bushy. Seedlings of *Memecylon* are also frequently met with in these scrub areas.

Both *Zizyphus rugosa* Lamk. and *Scutia indica* Brongn. are straggling, armed shrubs, the branches of which are armed with recurved species are sometimes climbing over other shrubs. *Scutia indica* is abundant at Mahabaleshwar in Evergreen forest also.

Most of the plants in the scrub vegetation bear epiphytic orchids like *Aërides*, *Dendrobium*, *Oberonia*, etc.

From these areas, trees have been felled and now tall growth of *Pteridium* is present. Here and there some shrubs of *Pavetta*, *Randia*, *Lasiosiphon* etc. may be present but otherwise there is nothing but the Bracken fern, which may often grow to a height of 2½ meters or so. Other plants in these forests are as follows:

Pteris quadriaurita Retz., *Chielanthes farinosa*, *Chielanthes albo-marginata*, *Canscora diffusa*, etc.

Vegetation of Open Scrub

The formation of this community is due to indiscriminate felling of trees and shrubs and leaving the area open to grazing. The erosion has exposed basalt rocks from beneath and the soil is gravelly, with scanty humus.

Almost pure community of the 'Bracken fern'—*Pteris aquilina* is predominant and was studied at three different places—(i) Lingmala-Satara Road, (ii) Bhekavali and (iii) Arther's seat. In the first two localities, a composite herb *Conyza stricta* enters into the community with abundance.

Pteris aquilina L. is a robust fern growing upto 7'-8' high and is extremely abundant in open patches at Mahabaleshwar. The fronds are decompound, almost triangular in the form with small leathery pinnules.

Conyza stricta is a pretty herb with yellow flowers

growing upto 3'-4' and in abundance. It ranks next to *Pteris aquilina*. In Lingmala area, it occurs in 95% of the total quadrats studied while *Pteris* occurs in 80%. In Bhekavali area where the scrub extends to a large area, *Conyza* is present in 60% of the quadrats studied.

Swertia decussata is a beautiful herb in the scrub with white flowers occurring frequently in quadrats. Among the other herbs, *Leucas stelligera* is common in all the communities, occurring in 45%, 20% and 35% of the quadrats in three respective localities.

Euphorbia rothiana occurs in 20% of the quadrats in Arther's seat area in the scrub.

Large shrubs of *Zizyphus rugosa*, *Lasiosiphon eriocephalus*, *Randia dumetorum* and *Crotalaria retusa* are scattered here and there occurring in low percentages in the scrub. Among the grasses which are present in the community, *Sporobolus*, *Arundinella*, *Apluda* and *Chloris* are abundant.

TABLE IV
Vegetation data of open scrub communities

LOCALITY	Lingmala—Satara Road	Bhekavali	Arther's Seat
ROCK & GEOLOGY	Trap rock covered with reddish brown gravelly soil. Rock is exposed at places. Soil is shallow. Lateritic soil met with here and there.	Light brown gravelly and rocky soil.	Red clay mixed with gravel. Shallow soil marked with boulders of various sizes. Lateritic soil frequently occurs over the gentle slopes.
Aspects	Almost a plain but uneven area. Scrub restricted to a small area.	Gentle slope towards north-east. Uneven rocky area. A vast area extending to about 1½ miles in length, and 3-4 furlongs in breadth.	Area marked with gentle as well as steep slopes. Fern communities generally present over gentler slopes only. Steep slopes have a vegetation of <i>Strobilanthes</i> species.
No. of quadrats studied	40 quadrats of ¼ meter sq.	40 quadrats of ¼ meter sq.	30 quadrats of ¼ meter sq.

Percentage of the total number of quadrats in which the species occur :

Species	Lingmala—Satara Road	Bhekavali	Arther's Seat
<i>Pteris aquilina</i> L.	80	100	100
<i>Conyza stricta</i> Wall.	95	60	10
<i>Swertia decussata</i> Nim.	25	15	—
<i>Leucas stelligera</i> Wall.	45	20	35
<i>Pteris quadriaurita</i> Retz.	—	10	5
<i>Pogostemon plectranthoides</i> Desf.	5	—	20
<i>Randia dumetorum</i> Lam.	10	5	30
<i>Lasiosiphon eriocephalus</i> Decne.	5	10	25
<i>Crotalaria retusa</i> L.	10	5	15
<i>Sporobolus minutifolius</i> Link.	25	20	—
<i>Arundinella spicata</i> Dalz.	10	—	10
<i>Apluda varia</i> Hack.	—	5	—
<i>Curcuma</i> sp.	20	—	—
<i>Vicoa auriculata</i> Cass.	40	—	20
<i>Strobilanthes reticulatus</i> Stapf.	—	—	15
<i>Strobilanthes perfoliatus</i> Anders.	—	—	25
<i>Polygonum chinense</i> L.	—	—	25
<i>Zizyphus rugosa</i> Lam.	5	5	—
<i>Euphorbia rothiana</i> Spreng.	—	20	—
<i>Aspidium cicutarium</i> Sw.	—	10	—
<i>Chloris barbata</i> Sw.	5	—	—
<i>Rungia parviflora</i> Nees.	5	—	—

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Appendix I gives a list and brief description of 380 species.

APPENDIX I

LIST OF SPECIES OCCURRING AT
MAHABALESHWAR

RANUNCULACEAE

1. *Clematis gouriana* Roxb.: Cooke's Flora, Vol. I, p. 2. A large climber in evergreen forest & scrub. White flowers on moist, red, gravelly soil. Mahabaleshwar—Puri, Mahajan.
2. *C. wightiana* Wall.: Cooke's Flora, Vol. I, p. 3. A beautiful woody climber, common at Mahabaleshwar on the edges of evergreen forest. Mahabaleshwar—Puri, Mahajan.

MENISPERMACEAE

3. *Stephania hernandifolia* Walp.: Not recorded in Cooke's Flora. A slender twiner in evergreen forest with small yellowish flowers. October. Holiday Camp—Mahajan, 27142.
4. *Cocculus macrocarpus* Wight & Arnot.: Not recorded in Cooke's flora. A large climber in evergreen forests, small yellow flowers in large panicles. Birdwood, Mahabaleshwar.
5. *C. hirsutus* Diels.: Not given in Cooke's Flora. A struggling shrub on the edge of evergreen forest and scrub, occasional. Birdwood, Mahabaleshwar.
6. *Cyclea peltata* Hook. f. & Thoms.: Not given in Cooke's Flora. A slender climbing shrub, very rare. Birdwood, Mahabaleshwar.

PAPAVERACEAE

7. *Argemone mexicana* L.: Not recorded in Cooke's Flora. A prickly herb with yellow flowers. Frequent in waste places. Introduced species. Near Bazzar—Mahajan.
8. *Cardamine subumbellata* Hook. f. & Thoms.: Cooke's Flora, Vol. I, p. 30. A small herb, abundant in the crevices of wall stones along road to Wilson Point. Wilson Point Road—Mahajan, 27169.
9. *Capsella bursa-pastoris* Medik.: Cooke's Flora, Vol. I, p. 30. Erect herb, white flowers, a weed in cultivated fields at Mahabaleshwar.

10. *Nasturtium officinale* R. Br.: Not given in Cooke's Flora. 'Water-cress', grown in gardens. Birdwood, Mahabaleshwar.

CAPPARIDACEAE

11. *Capparis spinosa* L.: Cooke's flora, Vol. I, p. 44. A spiny shrub on trap rock, white flowers; Jany.-March. Mahabaleshwar-Mahad Road—Puri, (290)
12. *C. pedunculosa* Wall. var. *longispina* Hook. f. & Thoms.: Cooke's Flora, Vol. I, p. 48. A spiny shrub with weak straggling branches. Abundant in evergreen forests. Flowers March. Malcolum peth forest—Puri, 190; Hirda Bungalow—Mahajan, 13037; Dhobi's falls road Mahajan, 24478; Bombay Point—Mahajan, 24653.

BIXACEAE

13. *Flacourtia latifolia* T. Cooke: Cooke's flora, Vol. I, p. 56. A small spiny tree common in evergreen scrub and forest all over Mahabaleshwar Plateaux. Hirda Bungalow to Venna-Lake—Puri, 163; Lingmala Road—Mahajan, 13067; Gureghar (Panchagani Road)—Mahajan, 6894; Bombay Point—Mahajan, 24660.

PITTOSPORACEAE

14. *Pittosporum floribundum* Wight. & Arnot.: Cooke's Flora, Vol. I, p. 58. Small tree in evergreen forest. Flowers: April-Sept. Mahabaleshwar.

POLYGALACEAE

15. *Polygala persicariifolia* DC.: Cooke's Flora, Vol. I, p. 59. A herb with rose coloured flowers, frequent along roads and on the edges of evergreen forest. Flowers: August-Sept. Lingmala—Puri, 25650.

PORTULACACEAE

16. *Portulaca oleracea* L.: Not recorded in Cooke's flora. A perennial fleshy herb in moist situation. Birdwood, Mahabaleshwar.

CARYOPHYLLACEAE

17. *Stellaria media* Cyrill.: Cooke's flora, Vol. I, p. 64. An introduced annual herb on Mahabaleshwar.
Mahabaleshwar.
18. *Polycarpon loeflingiae* Benth.: Cooke's Flora, Vol. I, p. 65. A perennial herb in open patches, occasional.
Cooke, Mahabaleshwar.

MALVACEAE

19. *Sida acuta* Burm.
Syn. *Sida carpinifolia* L.: Not recorded by Cooke.
Mahabaleshwar, Birdwood.
20. *S. veronicifolia* Lam.: Not recorded in Cooke's Flora. A perennial much-branched herb, rare. Flowers: February.
Mahabaleshwar, Mahajan.
21. *Hibiscus rosa-sinensis* L.: A tall shrub with red flowers. Planted along the hedge of bungalows.
Mahabaleshwar, Mahajan.

TILIACEAE

22. *Grewia microcos* L.: Not recorded by Cooke. A shrub in the evergreen forest, frequent.
Mahabaleshwar—Birdwood.
23. *Triumfetta bartramia* L.: Syn. *Triumfetta rhomboidea* Jacq. Not recorded in Cooke's Flora. A tall herb ($\frac{1}{2}$ to 2 meters high) frequently met with in the hedges of cultivated fields and on the edge of evergreen scrub. Moist, red, lateritic soil.
Lingmala—Mahajan, 24602.
24. *Erinocarpus nimmonii* Grah.: Cooke's Flora, Vol. I, p. 146. A small tree in the evergreen forest, rare.
25. *Eleocarpus oblongus* Gaertn.: Cooke's Flora, Vol. I, p. 152. Tree in the evergreen forest, very rare.
'Lingmala & near Temple Hill'—Birdwood.
26. *E. serratus* L.: Not recorded in Cooke's Flora. Tall tree in the evergreen forest rare on shallow, moist lateritic clay, rocks exposed. Fruiting: April.
Lingmala—Puri, 240.

LINACEAE

27. *Linum mysurense* Heyne.: Cooke's Flora, Vol. I, p. 155. Annual slender herb, yellow flowers, abundant along roads, in open patches and in *Pteris aquilina* communities. Flowers: October.
Venna Lake—Mahajan, 13031, 24694;

Bombay Point—Mahajan, 24670; Lingmala, Mahajan, 27176.

28. *Reinwardtia trigyna* Planch.: 'Large-flowered yellow flax, planted in gardens'.
Mahabaleshwar—Birdwood.

GERANIACEAE

29. *Oxalis corniculata* L.: Cooke does not give any localities, but remarks as 'common everywhere' (Vol. I, p. 167). A small herb in moist soil, yellow flowers, common along roads.
Lingmala—Mahajan; Wilson point road—Mahajan.
30. *O. martiana?*: Species not given either in F.B.I. (J. D. Hooker) nor in Cooke's Flora. Herb with bulbous roots, radical leaves and violet flowers, abundant along a nala. Flowers: April.
Lingmala—Puri, 231.
(The identification of this plant is doubtful as there are no sheets in Poona herbarium).

BALSAMINACEAE

31. *Impatiens acaulis* Arn.: Cooke's Flora, Vol. I, p. 170. A beautiful perennial herb with pink flowers. Common at Mahabaleshwar along roads and on the edges of evergreen forest.
'Not so rare at Mahabaleshwar where it grows on wet rocks near streams',—Birdwood.
32. *I. dalzellii* Hook. f. & Thoms: Cooke's Flora, Vol. I, p. 173. A herb easily recognisable from other balsams by its yellow flowers. Fairly common in the gutters along roads and on the edges of evergreen forest. Moist red, lateritic soil. Flowers: October.
Gureghar (Panchgani Road)—Mahajan, 6896; Holiday Camp, Mahajan, 27129; Lingmala—Mahajan, 27172.
33. *I. balsamina* L.: Cooke's Flora, Vol. I, p. 174. A herb in moist places along roads and pools, violet flowers. Moist, gravelly lateritic soil. Fruiting: Jan.
Kshetra Mahabaleshwar—Mahajan, 13217.
34. *I. kleinii* Wight & Arnot.: Not recorded in Cooke's Flora. A delicate herb with violet or pink flowers; abundant along roads. Flowers: September. Moist, red, sticky soil.
Gureghar (Panchgani Road)—Mahajan, 6881.

RUTACEAE

35. *Evodia roxburghiana* Benth.: Cooke's Flora, Vol. I, p. 177. A small tree on the edge of the evergreen forest, rare. Moist, red, lateritic soil.
Lingmala—Puri, 204.
36. *Glycosmis pentaphylla* Corr.: Not recorded in Cooke's Flora. A small tree in the evergreen forest.
Mahabaleshwar—Birdwood.

37. *Murraya exotica* L.: Cooke's Flora, Vol. I, p. 182. A small tree in evergreen forest over slopes. Flowers: June-Sept.
38. *M. koenigii* Spreng.: Cooke's Flora, Vol. I, p. 182. A shrub in the undergrowth of evergreen forest. Flowers: Feb.-Apr.
Arther's seat—Puri, 332.
39. *Atalantia racemosa* Wight & Arn.: Cooke's Flora, Vol. I, p. 187. A small spiny tree in the evergreen forest. Occasional. Moist, red, gravelly soil.
Malcolm Peth Forest—Puri, 341 ; Bombay Point—Mahajan, 24665.
40. *A. monophylla* Corr.: Not recorded in Cooke's Flora. A large shrub or small tree in the evergreen forest, rare.
Mahabaleshwar—Birdwood.

OLACACEAE

41. *Mappia foetida* Miers: Cooke's Flora, Vol. I, p. 225. A large shrub or small tree in the evergreen forest, flowers yellowish white, with a foetid smell. Common along roads & on the edges of evergreen forest. Reddish brown, coarse clay, stones and humus abundant. Flowers: October.
Holiday Camp—Mahajan, 27132 ; Hirda Bungalow—Mahajan, 24681 ; Babington Point Road—Mahajan, 24714 ; Bombay Point Road—Mahajan, 6866, 27132.

CELASTRACEAE

42. *Gymnosporia rothiana* Laws.: Cooke's Flora, Vol. I, p. 232. A large thorny shrub or small tree in the evergreen forest, occasional at Hirda Bungalow, along Babington Point Road and Bombay Point Road. Fruiting in October, ripe fruits reddish in colour. Moist, red, hard, gravelly soil.
Arther's seat—Puri, 326, 338 ; Lingmala—Puri, 191, 228 ; Mahajan, 13071 ; Hirda bungalow—Mahajan, 13039, 24680 ; Babington Point Road—Mahajan, 24713.

RHAMNACEAE

43. *Zizyphus rugosa* Lam.: Cooke's Flora, Vol. I, p. 243. A large straggling armed shrub often growing into a second-storey tree. Abundant in evergreen scrub and frequent in high forest. Whitish flowers: April.
Hirda Bungalow to Venna Lake—Puri, 148 ; Gureghar (Mahabaleshwar-Panchgani Road)—Mahajan, 6915.
44. *Scutia indica* Brongn.: Cooke's Flora, Vol. I, p. 244. A spiny shrub with weak, spreading branches, abundant in evergreen forest and frequent in evergreen scrub. Flowers: Feb.-March.
Hirda Bungalow to Venna Lake—Puri, 162 ; Hirda Bungalow—Mahajan, 13035 ; Holiday Camp—Mahajan, 27139.

VITACEAE

45. *Vitis elongata* Wall.: Cooke's Flora, Vol. I, p. 256. A large climber in the evergreen forest at Mahabaleshwar.
46. *Leea sambucina* Willd.: Cooke's Flora, Vol. I, p. 260. A shrub on the edges of evergreen forest at Mahabaleshwar.

SAPINDACEAE

47. *Allophylus cobbe* Blume: Cooke's Flora, Vol. I, p. 265. A large climbing shrub or small tree in the evergreen forest ; especially common on the edges of the evergreen. Moist, red, lateritic soil, mixed with gravel.
Hirda Bungalow to Venna Lake—Puri, 153, 164 ; Chinaman's fall—Puri, 270 ; Bombay Point—Mahajan, 24656 ; Dhobi's falls—Mahajan, 24764.
48. *Nephelium longana* Camb.: Cooke's Flora, Vol. I, p. 267. A large tree along road on the edge of evergreen forest. Fruiting: April.
Mahad Road—Puri, 307.

ANACARDIACEAE

49. *Mangifera indica* L.: Cooke's flora, Vol. I, p. 273. Widely cultivated throughout India. Frequently occur on the edges of the evergreen forest. Flowers and young fruits: April.
Lingmala—Puri, 217, Mahajan, 13073 ; Bombay Point—Mahajan, 24657.

PAPILIONACEAE

50. *Crotalaria filipes* Benth.: Cooke's Flora, Vol. I, p. 293. A herb with prostrately spreading branches and yellow flowers.
Birdwood, Mahabaleshwar.
51. *C. triquetra* Dalz.: Cooke's Flora, Vol. I, p. 295. A herb branched from the base, pale yellow flowers.
Birdwood, Mahabaleshwar.
52. *C. nana* Burm.: Cooke's Flora, Vol. I, p. 296. An annual erect herb, frequent in open patches.
Birdwood, Mahabaleshwar.
53. *C. retusa* L.: Cooke's Flora, Vol. I, p. 298. A tall handsome shrub (1-2½ Meters high) with bright yellow flowers. Very common on the edge of evergreen forest, in open patches and in evergreen scrub areas.
Lingmala—Puri, 209 ; Mahajan, 27179.
54. *C. vestita* Baker: Not recorded in Cooke's Flora. A herb in open patches in the evergreen forest.
Birdwood, Mahabaleshwar.
55. *Indigofera pulchella* Roxb.: Cooke's Flora, Vol. I, p. 320. A much-branched tall (growing up to 3 meters high), shrub in evergreen scrub and on the edges of evergreen forest, frequent. Violet flowers: January. Fruiting: April.

- Lingmala—Puri, 243, Mahajan 13063 ; Mahad Road—Puri, 198.
56. *Smithia purpurea* Hook.: Cooke's Flora, Vol. I, p. 237. An erect herb with purple flowers.
57. *S. setulosa* Dalz.: Cooke's Flora, Vol. I, p. 337. Herb with bright yellow flowers. Birdwood, Mahabaleshwar.
58. *S. blanda* Baker var *racemosa* Baker Syn. *Smithia hirsuta* Dalz. A small herb in wet sandy soil along nala, frequent. Yellow flowers: October. Dhobiman's fall—Mahajan, 24749.
59. *S. bigemina* Dalz.: Cooke's Flora, Vol. I, p. 338. Herb growing along with *Cyperaceae* and *Gramineae* in wet, shallow, reddish, sandy soil along roads, abundant. Flowers yellow, the largest petal (Standard) having two red spots. Flowers: October. Dhobiman's fall—Mahajan, 24747 ; Venna Lake—Mahajan, 24705 ; Holiday Camp—Mahajan, 27167.
60. *Alysicarpus belgaumensis* Wight: Cooke's Flora, Vol. I, p. 350. An erect herb (15 to 30 cms. tall) with reddish yellow flowers, abundant in open grasslands and occasional in the crevices of trap rock. Moist, red, coarse, clay. Flowers & Fruits: October. Dhobiman's falls—Mahajan, 24762 ; Holiday Camp—Mahajan, 27148.
61. *A. belgaumensis* Wight var. *racemosa* Baker Cooke's Flora, Vol. I, p. 351. A small herb (5 cms. to 15 cms. tall) with somewhat prostrate spreading branches, reddish yellow flowers, resembling those of *A. belgaumensis* Wt. Occasional in open grasslands. Moist, red, coarse, clay. Flowers: October. Holiday Camp—Mahajan, 27149.
62. *Desmodium triflorum* DC.: Cooke's Flora, Vol. I, p. 355. A small trailing herb in open patches. Pink flowers: October. Mahabaleshwar.
63. *D. rotundifolium* Baker: Cooke's Flora, Vol. I, p. 357. A much-branched herb in evergreen scrub. Mahabaleshwar.
64. *D. parviflorum* DC.: Birdwood. Not recorded in Cooke's Flora. An erect herb having numerous stems. Mahabaleshwar.
65. *Grona dalzellii* Baker: Cooke's Flora, Vol. I, p. 368. A herbaceous twiner in the evergreen forest. Flowers Blue: Sept.-Oct. Mahabaleshwar.
66. *Phaseolus sublobatus* Roxb.: Cooke's Flora, Vol. I, p. 377. A perennial herb in open patches, sometimes climbing. Flowers: Aug.-Sept. Mahabaleshwar.
67. *P. khandalensis* Santapau Syn. *Phaseolus grandis* Dalz.: Not recorded in Cooke's Flora. An erect herb having pale yellow flowers. Mahabaleshwar, Talbot, 4467.
68. *P. trinervius* Heyne.: Not recorded in Cooke's Flora. A small herb with yellowish flowers. Birdwood, Mahabaleshwar.
69. *Vigna capensis* Walp.: Cooke's Flora, Vol. I, p. 379. A herbaceous twiner on the edges of the evergreen forest. Flowers reddish yellow, common. Lingmala—Mahajan, 27197; Gureghar (Panchgani Road) Mahajan, 6882.
70. *Atylosia lineata* Wight & Arnot.: Cooke's Flora, Vol. I, p. 382. A much branched shrub in evergreen scrub and on the edges of the evergreen forest, very common. Moist, lateritic, gravelly soil. Flowers and Fruits: April. Mahabaleshwar—Mahad Road, Puri—309 ; Lingmala—Puri, 202.
71. *Cylista scariosa* Roxb.: Cooke's Flora, Vol. I, p. 386. A woolly twiner with yellow flowers.
72. *Moghamia strobilifera* St. Hill. ex. Jacs. Syn. *Flemingia strobilifera* R. Br.: Cooke's Flora, Vol. I, p. 390. A much branched shrub with bluish flowers and greenish white bracts.
73. *Pisum sativum* L.: Cooke's Flora, Vol. I, p. 420. The cultivated pea. Extensively cultivated in Mahabaleshwar area. Lingmala Road—Mahajan, 13065.
74. *Cassia tora* L.: Cooke's Flora, Vol. I, p. 420. Annual herb with yellow flowers.
75. *Acacia concinna* DC.: Not recorded in Cooke's Flora. A large straggling shrub armed with recurved prickles, common in the semi-evergreen forest over the slopes. Flowers reddish: April. Mahabaleshwar—Mahad Road—Puri, 295.
76. *A. intsia* Willd.: Cooke's Flora, Vol. I, p. 450. A large, straggling armed shrub.

ROSACEAE

77. *Pygeum gardneri* Hook.: Cooke's Flora, Vol. I, p. 458. A second-storey tree in the evergreen forest, occasional. White flowers with yellowish centre ; Red, lateritic, gravelly soil. Flowers: Oct. Fruits: Jan. Arther's seat—Puri, 324 ; Bombay Point—Mahajan, 24672. (Over steep slope, exposed to heavy wind, dry soil) ; Hirda Bungalow—Mahajan, 13058.
78. *Rubus moluccanus* L.: Cooke's Flora, Vol. I, p. 459. A shrub with recurved prickles, very rare.
79. *R. lasiocarpus* Smith.: Cooke's Flora, Vol. I, p. 460. A prickly shrub extensively cultivated in gardens near Venna Lake & Lingmala, for its edible fruits known as 'Mahabaleshwar Raspberry'. It is also naturalised at places on the edges of the evergreen forest. Near Venna Lake—Mahajan.

80. *Pyrus communis* L.: Cooke's Flora, Vol. I, p. 462. A small tree planted on the edge of the evergreen forest along road. White flowers: Feb. Fruiting: April.

Lingmala (Near Forest Rest House)—Puri, 219; Mahajan.

81. *Fragaria vesca* L.: Not recorded in Cooke's Flora. A small herb growing in moist, cool localities.

Birdwood, Mahabaleshwar.

82. *Rosa* sp.: Tall shrub, reddish, pink flowers, naturalised at places on the edge of evergreen forest.

Lingmala—Puri, 235, Mahajan.

CRASSULACEAE

83. *Bryophyllum calycinum* Salisb.: Cooke's Flora, Vol. I, p. 465. A succulent glabrous herb, common in moist localities on the edge of the evergreen forest and along nalas. Yellowish, or reddish purple flowers in large panicles. Wet, reddish, lateritic, gravelly soil. Flowers: Jan.-April.

Malcolum peth Forest—Puri, 175; Venna Lake—Mahajan, 13012; Bombay Point Road—Mahajan.

COMBRETACEAE

84. *Terminalia chebula* Retz.: Cooke's Flora, Vol. I, p. 478. A moderate sized tree in the evergreen forest, very common at Mahabaleshwar. Moist, red, lateritic soil. Small, yellowish flowers: April. Fruits: Oct.-January.

Lingmala—Puri, 212; Mahajan, 13070, 24603; Wilson Point to Lingmala—Mahajan, 27173; Bombay Point—Mahajan, 24666.

MYRTACEAE

85. *Syzygium cumini* (Linn.) Skeels.

Syn: *Eugenia jambolana* Lamk. Cooke's Flora, Vol. I, p. 493.

A large tree, very common in evergreen forests, perhaps the dominant tree in most of the areas over Mahabaleshwar plateau. Small, yellowish white flowers: April.

Lingmala—Puri, 238, 213 (Seedlings); Mahad road—Puri, 314; Lingmala road—Mahajan, 13062 (abundant); Gureghar (Panchgani road)—Mahajan, 6919; Bombay Point—Mahajan, 24663; Dhobi's fall—Mahajan, 24765.

86. *S. aromalicum* Merr.: Not recorded in Cooke's Flora.

Syn: *Eugenia caryophyllata* Thunb.

A small tree, planted.

Birdwood-Mahabaleshwar.

MELASTOMACEAE

87. *Memecylon umbellatum* Burm.

Syn: *Memecylon edule* Roxb. Cooke's Flora, Vol. I, p. 503.

A small tree with beautiful violet or blue flowers, very common in the evergreen forests all over Mahabaleshwar plateaux. Moist, lateritic gravelly soil. Flowers: Mar. Fruit: April.

Hirda bungalow to Venna lake—Puri, 152; Arther's seat—Puri, 331 (Seedlings); Lingmala—Puri, 238; Mahajan, 24648; Bombay Point—Mahajan, 24648; Dhobiman's Falls—Mahajan, 24767.

88. *M. talbotianum* Brandis.: Cooke's Flora, Vol. I, p. 507. A small tree on the edge of the evergreen forest, frequent, easily recognisable from *M. umbellatum* by its yellowish fruits. Moist, lateritic, gravelly soil. Flowers: April.

Lingmala—Puri, 214.

LYTHRACEAE

89. *Rotala tenuis* Kochne.

Syn. *Ammania tenuis* Clarke. A small herb on wet rocks along nalas, abundant. Pink flowers: Feb.

Dhobiman's falls—Mahajan (abundant in small patches).

90. *Ammania baccifera* Linn.: Common on rocks near water; called as 'Heather' by visitors.

Birdwood—Mahabaleshwar.

91. *A. floribunda* Clarke.: Cooke's Flora, Vol. I, p. 507. Herb in large patches on wet rocks along nalas.

Mahabaleshwar—Mahajan.

92. *A. salicifolia* Monti.: Not recorded in Cooke's Flora. A herb (30 cms. to 60 cms. high) in wet localities, along nalas, occasional. Fruit: Feb.

Mahabaleshwar—Mahajan.

93. *Woodfordia floribunda* Salisb.: Not recorded in Cooke's Flora. A shrub on the edge of evergreen forest, very rare. Only one shrub has been observed in Mahabaleshwar area, and its identification is rather doubtful. In some respects it matches with the specimen of *Lagerstroemia parviflora*. Moist red clay mixed with gravel, rocks exposed at places.

Lingmala to Satara Road—Mahajan, 24604.

CUCURBITACEAE

94. *Trichosanthes palmata* Roxb.: Cooke's Flora, Vol. I, p. 526. A large climber in evergreen forests, occasional. Moist red, gravelly soil.

Lodwick Point Road—Mahajan, 24733.

95. *Melothria purpusilla* Cogn.: Cooke's Flora, Vol. I, p. 540. A monoecious climber on *Carvia callosa* or *Randia dumetorum* on the edges of the evergreen forest, occasional. Small yellowish white flowers, globular fruits. Moist lateritic gravelly soil. Flowers: Oct.

Holiday Camp—Mahajan, 27141 ; Bombay Point Road—Mahajan, 24639.

96. *M. heterophylla* Cogn.: Cooke's Flora, Vol. I, p. 540. A diocious perennial climber on the edge of the evergreen forest. Occasional.
Mahabaleshwar—Mahajan.

BEGONIACEAE

97. *Begonia crenata* Dryd.: An ornamental plant, planted in gardens.
Birdwood, Mahabaleshwar.

FICOIDEAE

98. *Mollugo hirta* Thunb.: Cooke's Flora, Vol. I, p. 557. An annual herb with prostrately spreading branches, rare.
Mahabaleshwar.

UMBELLIFEREAE

99. *Centella asiatica* Urban. Syn. *Hydrocotyle asiatica* Linn.: Cooke's Flora, Vol. I, p. 562. A creeping herb with pink flowers. Frequent in moist situations near nalas.
Mahabaleshwar.
100. *Pimpinella monoica* Dalz.: Cooke's Flora, Vol. I, p. 566. A tall herb on the edges of the evergreen forest. Flowers white: Nov.
Mahabaleshwar—Mahajan.
101. *P. tomentosa* Dalz.: Cooke's Flora, Vol. I, p. 566. A tall herb (about 1 m. high) over slopes along river bed, occasional. Moist, lateritic, gravelly soil. Flowers white: Oct.
Venna River—Mahajan.
102. *Haracleum concanense* Dalz.: Not recorded in Cooke's Flora.
Birdwood, Mahabaleshwar.

RUBIACEAE

103. *Wendlandia notoniana* Wall.: Cooke's Flora, Vol. I, p. 584. A large shrub on the edge of the evergreen forest, occasional. Flowers: Feb.
Mahabaleshwar—Mahajan.
104. *Anotis lancifolia* Hook. f.: Cooke's Flora, Vol. I, p. 593. Herb along the lake, flowers pink to purple in colour. Moist red, coarse clay. Frequently occurring in Gramineae & Cyperaceae patches. Flowers: Oct.
Venna Lake—Mahajan, 24687.
105. *A. calycina* Wall.: Not recorded in Cooke's Flora. A small herb in the crevices of wall stones along road, fruiting, occasional. Moist, red, clayey soil.
Near 'Araam Hotel'—Mahajan, 27165.
106. *Oldenlandia corymbosa* L.: Not recorded in Cooke's Flora. Common at Mahabaleshwar on the sides of the path in October.
Birdwood.

107. *Randia brandissi* Gamble

Syn. *Randia dumetorum* Lamk.: Cooke's Flora, Vol. I, p. 599. A small tree or a large shrub with large nearly opposite spines. Extremely abundant and common all over Mahabaleshwar plateaux in evergreen forest as well as in scrub areas. Yellowish white flowers: Mar.-June. Fruit: April-Oct.

Hirda bungalow to Venna lake—Puri, 165 ; Panchgani Road—Puri, 343 ; Gureghar (Panchgani Road)—Mahajan, 6912 ; Holiday Camp—Mahajan, 27136 ; Bombay Point—Mahajan, 24676 (extremely abundant).

108. *Canthium diococcum* (Gaertn.) Merr.: Cooke's Flora, Vol. I. A large shrub or a second storey tree in the evergreen forests, frequent. Moist red clay mixed with gravel and humus. Frequent in the interior of the forest, but fairly common on the edges.

Lingmala—Puri, 207, Mahajan, 27190 ; Babington Point Road—Mahajan, 24718 ; Dhobi's falls road—Mahajan, 24774.

109. *Ixora nigricans* R. Br.: Cooke's Flora, Vol. I, p. 609. A large shrub with white flowers, occasional on the edges of the evergreen forest. Flowers: More or less throughout the year.
Mahabaleshwar.

110. *Pavetta indica* L.: Cooke's Flora, Vol. I, p. 612. A robust shrub on the edges of the evergreen forest as well as in the open patches. White flowers, common. Flowers: April.

Hirda Bungalow to Venna Lake—Puri, 150 ; Lingmala—Puri, 216 ; Mahad Road—Puri, 272 ; Dhobi's falls road—Mahajan, 24732.

111. *Psychotria truncata* Wall.: Cooke's Flora, Vol. I, p. 616. A robust shrub or a small tree with white flowers, frequent in the evergreen forest, particularly abundant on the edges of the forest. Moist deep brown coarse clay. Fruit: Oct.

Chinaman's falls—Puri, 253 ; Near Polo ground—Mahajan, 24789 ; Tiger path—Mahajan, 24791.

112. *Vangueria spinosa* Roxb.: Not recorded in Cooke's Flora. A large thorny shrub in evergreen forest and scrub, rare.

Birdwood, Mahabaleshwar.

113. *Rubia cordifolia* L.: Cooke's Flora, Vol. I, p. 625. A large perennial climber on the edges of evergreen forest and along roads, at places it goes on the top of the tall tree. Very common all over Mahabaleshwar plateaux. Moist reddish clay mixed with gravel. Flowers: Oct.-Jan.

Arther's seat—Puri, 335, 16730 ; Wilson Point Road—Puri, 9203 ; Holiday Camp—Mahajan, 27138 ; Bombay Point Road—Mahajan, 24715 ; Tiger Path—Mahajan, 24794 ; Babington Point Road—Mahajan, 24715 ; Satara Road—Mahajan, 24607 (common on *Zizyphus*)

COMPOSITAE.

114. *Centratherum tenue* Clarke: Cooke's Flora, Vol. II, p. 7. An erect herb with purple flowers. Mahabaleshwar.
115. *C. phyllolaenum* Benth.: Not recorded in Cooke's Flora. A tall herb in the evergreen forests, rare. Birdwood, Mahabaleshwar.
116. *Lamprachenium microcephalum* Benth.: Cooke's Flora, Vol. II, p. 8. A tall herb in dense evergreen forest over gentle slope and on the edges of the evergreen forest, frequent. Moist reddish brown course clay, trap rock exposed at places. Flowers: Oct.-Nov. Wilson Point Road—Puri, 9213; Hirda Bungalow—Mahajan, 24682; Dhobiman's falls—Mahajan, 24756.
117. *Adenoon indicum* Dalz.: Cooke's Flora, Vol. II, p. 9. An erect herb with purple flowers, frequent on the edges of the forest over the slope. Lingmala, Mahajan, 13077.
118. *Vernonia divergens* Edgew.: Cooke's Flora, Vol. II, p. 11. A tall perennial shrub (about 8' high) in open evergreen scrub, occasional. Whitish Flowers: Jan. Mahad Road—Puri, 301; Lingmala—Mahajan, 13089; Mahabaleshwar—Mahad Road—Puri, 301.
119. *V. indica* Clarke: Cooke's Flora, Vol. II, p. 11. An erect undershrub (3'-5' high) with purplish flowers. Mahabaleshwar.
120. *Adenostemma viscosum* Forst.: Cooke's Flora, Vol. II, p. 13. A tall herb (4'-5') along road and in the undergrowth of the evergreen forest, white flowers. Abundant in cool, shady places. Moist, red, gravelly soil. Flowers: Oct. Bombay Point Road—Mahajan, 24643.
121. *Ageratum conyzoides* L.: Not recorded in Cooke's Flora. An annual erect herb (about 1 m. high) with beautiful pale blue flowers. Abundant near fields and along the compounds of the Bungalows, otherwise a rare plant over Mahabaleshwar plateaux. Flowers: Apr.-Oct. Chinaman's fall—Puri, 256; Lingmala—Mahajan, 27194.
122. *Dichrocephala latifolia* DC.: Cooke's Flora, Vol. II, p. 14. A small annual herb, found as a weed in the fields at Mahabaleshwar.
123. *Cyathocline purpurea* Kuntze.: Cooke's Flora, Vol. II, p. 15. A delicate odorous herb usually met with in moist localities along roads and nalas. Flowers purple: Jan. Chinaman's falls—Puri, 266; Mahad Road Puri, 286; Satara road—Puri, 286.
124. *Conyza stricta* Willd.: Cooke's Flora, Vol. II, p. 17. An erect herb (1/3 m. to 1 m. high), extremely abundant in evergreen scrub and in *Pteris aquilina* communities; rarely met with in a grassland in an open patch in evergreen forest. Bright yellow flowers: Jan., Apr., Oct. Hirda Bungalow—Puri, 144; Venna Lake—Puri, 159, Mahajan, 13024; Lingmala falls—Mahajan, 13090; Holiday Camp—Mahajan, 27146.
125. *Blumea oxydonta* DC.: Not recorded in Cooke's Flora. A pubescent herb with prostrate branches, frequent in the bed of the nala near a field. Reddish moist alluvial soil. Chinaman's falls—Puri, 259, Mahajan.
126. *B. malcomii* Hook.: Cooke's Flora, Vol. II, p. 22. A stout herb clothed with soft white wool, fairly common along roads and water streams. Moist, red, gravelly soil. Flowers: Oct. Panchgani Road—Mahajan, 24711 (near Venna lake).
127. *Vicoa cernua* Dalz.: Cooke's Flora, Vol. II, p. 32. A slender herb having yellow flowers. Mahabaleshwar.
128. *Gnaphalium indicum* L.: Not recorded in Cooke's Flora. A small pubescent herb with shining yellowish flowers, frequently met with in moist places along nalas. Mahabaleshwar—Mahajan.
129. *Tridax procumbens* L.: Not recorded in Cooke's Flora. A herb with pale yellow flowers. Birdwood, Mahabaleshwar.
130. *Caesulia axillaris* Roxb.: Not recorded in Cooke's Flora. A tall fleshy herb with white axillary flowers. Occurs in moist places, very rare. Mahabaleshwar—Mahajan.
131. *Spilanthes acmella* Murr.: Cooke's Flora, Vol. II, p. 42. An annual herb in waste places, rare. Mahabaleshwar, Mahajan.
132. *Artemisia parviflora* Buch.-Ham.: Cooke's Flora, Vol. II, p. 47. A tall herb in open patches over the slopes at Mahabaleshwar.
133. *A. vulgaris* L.: Cooke's Flora, Vol. II, p. 47. A tall much branched herb in open patches over the slopes, abundant at Mahabaleshwar.
134. *Gynura angulosa* DC.: Cooke's Flora, Vol. II, p. 49. A tall rather fleshy herb with orange flowers, occasional on the edges of evergreen forest. Flowers: Oct. Lingmala: Puri; Mahajan, 24608 (Rare).
135. *Senecio grahamii* Hook. f.: Cooke's Flora, Vol. II, p. 52. A much branched herb with bright yellow flowers, common on the edges of the evergreen forest and in open patches. Moist, gravelly, lateritic soil. Flowers: Oct. Venna lake—Mahajan, 13030; Wilson Point Road—Mahajan, 9209; Malcolm Peth forest—Puri, 186; Lingmala—Puri, 25608; Dhobi's falls—Mahajan (frequent).
136. *S. belgaumensis* Clarke: Cooke's Flora, Vol. II, p. 53. An annual erect herb with bright yellow flowers. Mahabaleshwar.

137. *Echinops echinatus* Roxb.: Cooke's Flora, Vol. II, p. 54. An annual herb in drier areas. White flowers in spiny heads.
Mahabaleshwar—Mahajan.
138. *Tricholepis glaberrima* DC.: Not recorded in Cooke's Flora. A big spreading herb with violet flowers in prickly heads.
Birdwood, Mahabaleshwar.
139. *T. amplexicaulis* Clarke: Not recorded in Cooke's Flora. A tall herb along the road, rare. Fruit: Jan.
Arther's Seat Road—Mahajan, 13210.

CAMPANULACEAE

140. *Lobelia trigona* Roxb.: Cooke's Flora, Vol. II, p. 72. An annual herb with bluish flowers.
Mahabaleshwar.
141. *L. nicotianaeifolia* Heyne.: Not recorded in Cooke's Flora. A very tall (upto 3 meters tall) and robust perennial herb along nalas and on the edges of evergreen forest, frequent.
Mahabaleshwar: Mahad road—Puri, 279, 306.
142. *Lobelia trialata* Buch.-Ham.: Cooke's Flora, Vol. II, p. 72. An annual herb, bluish or violet flowers.
Mahabaleshwar.
143. *Wahlenbergia gracilis* Sch.: Cooke's Flora, Vol. II. A small perennial herb having blue flowers, rare. "In the rocky bed of the Venna river above the fall"—Graham.

PLUMBAGINACEAE

144. *Plumbago zeylanica* L.: Cooke's Flora, Vol. II, p. 78. A perennial spreading herb, white flowers in spikes.
Mahabaleshwar.
145. *Centunculus tenellus* Duby.: Cooke's Flora, Vol. II, p. 80. An annual herb having white flowers.
Lingmala, Woodrow.

MYRSINACEAE

146. *Maesa indica* Wall.: Cooke's Flora, Vol. II, p. 82. A large shrub or small tree in the evergreen forest, fairly common. Small white flowers in compound axillary racemes. Moist lateritic gravelly soil. Flowers: Jan.-Feb. Fruit: April.
Mahad Road—Puri, 310; Arther's Seat—Puri, 329; Chinaman's falls—Puri, 249; Venna lake—Mahajan, 13027; Panchgani road—Mahajan, 13098; Bombay Point—Mahajan, 24651; Lodwick Point Road—Mahajan, 27435.
147. *Embelia ribes* Burm.: Cooke's Flora, Vol. II, p. 84. A scandent shrub with large branches and

small greenish flowers, frequent in the evergreen forest.

Mahabaleshwar.

148. *E. viridiflora* Sch.: Cooke's Flora, Vol. II, p. 85. A large climber in the evergreen forest.
Mahabaleshwar.

SAPOTACEAE

149. *Sideroxylon tomentosum* Roxb.
Syn. *Pouteria tomentosum* (Roxb.) Baehn.: A moderate sized tree in the evergreen forest at Mahabaleshwar.
150. *Mimusops elengi* L.: Not recorded in Cooke's Flora. A tree with fragrant flowers.
Mahabaleshwar—Mahajan.

STYRACEAE

151. *Symplocos beddomei* Clarke: Cooke's Flora, Vol. II, p. 109. A small handsome tree, frequently occurring in the evergreen forest, small, white, fragrant flowers. Moist, brown, gravelly soil. Fruit: April.
Arther's Seat—Puri, 325, 16724; Polo ground—Mahajan, 24787; Holiday camp—Mahajan, 27140.
152. *S. laurina* (Retz.) Wall.
Syn. *Symplocos spicata* Roxb.: Not recorded in Cooke's Flora. A large tree in the evergreen forest, small yellowish flowers, young fruits, abundant.
Panchgani road—Mahajan, 13094.

OLEACEAE

153. *Jasminum malabaricum* Wight.: Cooke's Flora, Vol. II, p. 111. A stout climbing shrub on the edges of the evergreen forest, white fragrant flowers, fairly common. Red, lateritic, gravelly soil. Fruit: April.
Venna lake—Puri, 166; Mahad Road—Puri, 271; Bombay Point—Mahajan, 24671; Dhobi falls—Mahajan, 24781.
154. *Olea dioica* Roxb.: Cooke's Flora, Vol. II, p. 118. A moderate sized tree in the evergreen forests, frequent. Moist, red, clay mixed with gravel and humus.
Chinaman's fall—Puri, 250; Lingmala—Mahajan, 27191.
155. *Ligustrum neilgherrense* Wight var. *obovata* Clarke.: Cooke's Flora, Vol. I, p. 119. A large sturdy shrub or a small tree having white flowers. Frequently met with in the evergreen forests all over Mahabaleshwar, abundant in rocky places near Venna lake. Moist, red, gravelly soil. Flowers: Aug.-Nov.
Hirda Bungalow—Puri, 158; Mahajan, 24683; Wilson Point Road—Mahajan—9205, 27166; Tiger Path—Mahajan, 24798.

APOCYNACEAE

156. *Rauwolfia densiflora* Benth.: Cooke's Flora, Vol. II, p. 127. A shrub in the evergreen forest, rare.

Hirda Bungalow—Mahajan, 13036.

157. *Holarrhena antidysenterica* Wall.: Cooke's Flora, Vol. II, p. 133. A large shrub or small tree on the edge of the evergreen forest. White flowers. Flowers: June.
Mahabaleshwar.

ASCLEPIADACEAE

158. *Cryptolepis buehneri* Roem. & Schult.: Not recorded in Cooke's Flora. A large twining climber on the edge of the evergreen forest—frequent. Dry, brown gravelly soil.

Mahad Road—Puri, 319.

159. *Gymnema sylvestre* R. Br.: Cooke's Flora, Vol. II, p. 160. A large woody climber in the evergreen forests, 'Abundant' T. Cooke.

160. *Marsdenia volubilis* T. Cooke

Syn. *Dregia volubilis* Benth. ex. Hook. f.: A large twining climber on trees in the evergreen forests, frequent. Flowers: Yellowish green: April.

Lingmala—Puri, 245.

161. *Tylophora dalzellii* Hook. f.: Cooke's Flora, Vol. II, p. 163. A twining shrub on the edge of the evergreen forests.

162. *Hoya wightii* Hook. f.: Cooke's Flora, Vol. II, p. 169. A climber with thick fleshy leaves. Frequent on the tree and shrubs in the evergreen forests but abundant on the trap rocks along the Mahabaleshwar—Mahad Road. It grows in the crevices of the trap rock and the branches hang down from the woody rootstock.

Lingmala—Puri, 226; Mahad Road—Puri, 288.

163. *Ceropegia lawii* Hook. f.: Cooke's Flora, Vol. II, p. 175. An erect herb with tuberous roots and succulent leaves.

Mahabaleshwar.

LOGANIACEAE

164. *Buddleia asiatica* Lour.: Cooke's Flora, Vol. II, p. 183. A large shrub or a small tree in the evergreen forests.

Mahabaleshwar.

GENTIANACEAE

165. *Exacum petiolare* Griseb. *Exacum pedunculatum* L. var. *petiolare* Tirn.: Not recorded in Cooke's Flora. A small herb as a weed in wheat fields, abundant. Purplish blue flowers. Flowers: Feb.
Rust Research Station—Mahajan.

166. *E. lawii* Clarke.: Cooke's Flora, Vol. II, p. 189. A small herb with bluish purple flowers. 'Very common amongst grasses in October'.

Birdwood.

167. *Canscora diffusa* R. Br.: Cooke's Flora, Vol. II, p. 191. An erect herb having beautiful rose coloured or pink flowers, very common along roads and on the edges of the evergreen forests. Moist, reddish clayey or gravelly soil. Flowers: Oct.-Feb.

Mahad Road—Puri, 289; Wilson Road—Mahajan, 9211; Chinaman's falls—Puri, 265.

168. *Swertia decussata* Nim.: Cooke's Flora, Vol. II, p. 194. A herb with white flowers, fairly common in the evergreen scrub in *Pteris aquilina* communities. Flowers: Jan.

Lingmala—Mahajan, 13088, 13221; 'Abundant in fields between Lingmala & Satara Road.' Birdwood.

BORAGINACEAE

169. *Cynoglossum meeboldii* Brand.

Syn. *Cynoglossum denticulatum* var. *zeylanica*. C. B. Cl.: Cooke's Flora, Vol. II, p. 217. A tall (upto 1 meter high) annual herb on the edge of the forest as well as in the undergrowth, frequent. Bluish flowers and sticky fruits.

Gureghar (Panchgani Road)—Mahajan, 6886.

170. *Adelocaryum coelestinum* (Lindl.) Brand. Syn. *Paracaryum coelestinum* Benth.: Cooke's Flora, Vol. II, p. 218. A tall (3-6 m. high) herb, very common along roads and on the edges of the evergreen forest. The basal leaves are very large and shining and the petioles and the stem is purplish. The flowers are very beautiful, the petals being white with a bright blue centre. Reddish, moist, gravelly soil, humus abundant at places. Flowers: Sept.-Oct. Fruit: Oct.

Gureghar (Panchgani Road)—Mahajan, 6886; Bombay Point Road—Mahajan, 27133; Venna lake, abundant—Mahajan, 24712; Babington Point—Mahajan, 24719; Dhobiman's fall Road—Mahajan, 24785.

171. *Paracaryum malabarica* Clarke: Cooke's Flora, Vol. II, p. 219. A profusely branching erect herb on the edge of the evergreen forest and along the lake often growing in the crevices of stones. It can be clearly differentiated from the former species by its beautiful blue flowers. Moist, red, gravelly soil. A rather rare plant over Mahabaleshwar plateaux. Fruit: Oct.

Venna Lake—frequent—Mahajan, 24706.

172. *P. lambertianum* Clarke: Cooke's Flora, Vol. II, p. 219. An erect herb with pale blue flowers. 'Abundant at Mahabaleshwar on the cliff opposite the Dhobis waterfall below the bungalow known as General Barr's'. T. Cooke.

CONVOLVULACEAE

173. *Porana malabarica* Clarke: Cooke's Flora, Vol. II, p. 226. A climber with white flowers in the lax racemes frequent on the shrubs like *Randia* etc. along roads. Flowers: Oct.
Near Holiday Camp—Mahajan, 27137.
"The snow creeper". Flowers small, funnel shaped, pure white. "In many parts of Mahabaleshwar" H. M. Birdwood.
174. *Ipomea laciniata* Clarke: Cooke's Flora, Vol. II, p. 250. A climber with white flowers. Flowers: Oct.
Mahabaleshwar.
175. *Argyreia hookeri* Clarke: Cooke's Flora, Vol. II, p. 255. A climbing shrub with rose or pink colored flowers. Flowers: Aug.-Sept.
Mahabaleshwar.
176. *A. elliptica* Choisy.
Syn. *Lettosomia elliptica* Wight: Cooke's Flora, Vol. II, p. 259. A large climber having rose colored flowers.

SOLANACEAE

177. *Solanum nigrum* L.: Cooke's Flora, Vol. II, p. 263. An annual erect herb, small white flowers, "Mahabaleshwar in cultivated ground". Cooke.
Venna Lake—Mahajan, 13055.
178. *S. denticulatum* Blume: Cooke's Flora, Vol. II, p. 264. A tall shrub on the edges and in the open patches in the evergreen forest.
179. *S. giganteum* Jack.: Cooke's Flora, Vol. II, p. 266. A tall prickly shrub on the edges of the evergreen forest and occasionally in the undergrowth. Leaves covered with yellowish white woolly, tomentum beneath, flowers bluish violet. Ripe fruits reddish. Moist shallow red clay; rocks exposed. Flowers: Feb. Fruit: Apr.-Sept.
Hirda Bungalow—Puri, 146; Bombay Point Road—Mahajan, 6878; Panchgani Road—Mahajan, 24679.
180. *S. bigenianatum* Nees: Cooke's Flora, Vol. II, p. 264. An erect herb having quadrangular stem and pale flowers.
181. *S. indicum* L.: Cooke's Flora, Vol. II, p. 266. A small prickly shrub on the edge of the evergreen forest. Pale violet petals, yellow stamens, frequent. Moist reddish clay mixed with gravel. Flowers: Oct.
Arther's Seat—Puri, 339; Chinaman's Fall—Mahajan, 13222; Lingmala—Mahajan, 27196.
182. *Datura arborea* L.
Syn. *Brugmania candida*: A tall shrub with large white flowers.

183. *Cestrum nocturnum* L.: Not recorded in Cooke's Flora. A shrub with greenish white to cream colored flowers. Planted in the gardens for its fragrant flowers.
Lingmala Road—Mahajan, 13064.

SCROPHULARIACEAE

184. *Bacopa monnieri* Pennel.: A herb with prostrate-ly spreading branches and white to pink colored flowers, abundant in the moist places.
Birdwood-Mahabaleshwar.
185. *Limnophila indica* (L.) Bruce.
Syn. *Limnophila gratioloides* R. Br.: Cooke's Flora, Vol. II, p. 291. A small herb in moist area. Pink flowers: Nov.-Jan.
Mahabaleshwar.
186. *Lindernia hyssopioides* (L.) Haines
Syn. *Ilysanthes hyssopioides* Benth.: Cooke's Flora, Vol. II, p. 296. An erect herb with blue flowers.
Mahabaleshwar.
187. *L. anagallis* Pennel. var. *grandiflora* Retz.
Syn. *Bonnaya veronicaefolia* Spreng., Var. *grandiflora* Hook. f.: Cooke's Flora, Vol. II, p. 298. A herb with violet flowers, frequent along roads.
Mahabaleshwar.
188. *Striga gesneroides* (Willd.) V. ex. En.
Syn. *Striga orobanchioides* Benth.: Cooke's Flora, Vol. II, p. 302. A small herb (upto 12") having purplish stem and pink flowers, generally parasitic on roots. Flowers: Oct.-Nov.
Mahabaleshwar.
189. *Sopubia delphinifolia* Don: Cooke's Flora, Vol. II, p. 305. A much branched erect herb in wet lateritic soil along streams etc. Numerous rose colored. Flowers: Aug., Oct.
190. *Pedicularis zeylanica* Benth.: Cooke's Flora, Vol. I, p. 309. An annual herb with pink flowers.
Mahabaleshwar.

LENTIBULARIACEAE

191. *Utricularia albo-coerulea* Dalz.: Cooke's Flora, Vol. II, p. 317. A very small delicate herb growing on the wet rocks along streams occasional. Flowers purplish white: Sept., Nov.
192. *U. coerulea* L.: Cooke's Flora, Vol. II, p. 318. A small delicate herb on wet rocks along a nala growing with *Cyperaceae* and *Ammania*. Bluish purple flowers, abundant.
Dhobiman's fall—Mahajan, 24743.

BIGNONIACEAE

193. *Heterophragma quadriloculare* (Roxb.) K. Schum. Syn. *Heterophragma roxburghii* DC.: Cooke's Flora, Vol. II. A moderate sized tree on the edge of the evergreen forest.
Mahabaleshwar.

ACANTHACEAE

194. *Blepharis asperima* Nees: Cooke's Flora, Vol. II, p. 348. A spinous undershrub on the edges of the evergreen forest, rare. Flowers blue. Flowers: Oct.-Dec.
Mahabaleshwar—Cooke.
195. *Astercantha longifolia* Nees: Not recorded in Cooke's Flora. A tall stout spiny herb growing along nalas and in marshy places. Flowers: blue.
Mahabaleshwar—Mahajan.
196. *Hygrophila serpyllum* T. Anders. Cooke's Flora, Vol. II, p. 354. A suberect herb with blue flowers, frequent along road and on the edges of the evergreen forest.
Rust Research Station—Mahajan. Chinaman's falls—Puri, 257.
197. *Micranthus oppositifolia*.
Syn. *Phaulopsis dorsiflora* (Retz.) Santapau.: Cooke's Flora, Vol. II, p. 350. A perennial herb with variable leaves and white flowers.
Mahabaleshwar—Graham, Birdwood, Cooke.
198. *Strobilanthes reticulatus* Stapf.: Cooke's Flora, Vol. II, p. 366. A small much-branched bush ($\frac{1}{2}$ to $\frac{3}{4}$ m. high), with purplish blue flowers, abundant in a small open patch in the evergreen forest over gentle slope. A rather rare plant over Mahabaleshwar plateaux. Moist, red, coarse clay mixed with gravel and stones. Flowers: Oct.
Lingmala—Puri, 25623, 25632; Mahajan, 27198, 27199.
199. *Carvia callosa* (Wall.) Berm.
Syn. *Strobilanthes callosus* Nees.: Cooke's Flora, Vol. II, p. 368. A tall shrub (2.3 m. high) in the undergrowth extremely abundant forming thickets especially over the slopes. Moist, reddish coarse clay mixed with gravel, rocks exposed at places.
Dhobiman's falls—Mahajan, 24744; Dhobiman's Falls Road—Mahajan 24777; Bombay Point Road—Mahajan, 24638.
200. *S. scrobiculatus* Dalz.: Cooke's Flora, Vol. II, p. 369. A small shrub common over the slopes of the hills.
Mahabaleshwar—Ralph, Cooke.
201. *S. exiocephalus* Benth.: Cooke's Flora, Vol. II, p. 372. A straggling shrub having white flowers, frequent.
Near Venna lake—Cooke.
202. *Andrographis echinoides* Nees: Cooke's Flora, Vol. II, p. 374. An erect herb having white flowers, rarely occurs along streams.
Mahabaleshwar—Cooke.
203. *Haplanthes verticillaris* Nees: Cooke's Flora, Vol. II, p. 375. A spiny herb (1/3-1 m. high), frequent along roads, flowers lilac colored.
Lingmala—Mahajan, 13078.
204. *Asystasia violacea* Dalz.: Cooke's Flora, Vol. I, p. 389. A tall herb (1-1½ m. tall) with bluish purple flowers, the largest petal being dark purple, common along roads on the edges of the evergreen forest, sometimes growing together with *Strobilanthes callosus*. Flowers: Oct.
Lingmala—Puri, 25626; Holiday Camp—Mahajan, 27126; Bombay Point Road—Mahajan, 24636.
205. *Lepidagathis cuspidata* Nees: Cooke's Flora, Vol. II, p. 396. An undershrub with white flowers, common on the edges of the evergreen forests.
Hirda Bungalow—Puri, 149; Lingmala—Puri, 205; Arther's Seat—Mahajan, 13207.
206. *Rungia pectinata* (L.) Nees
Syn. *Rungia parviflora* Nees var. *pectinata* Clarke: Not recorded in Cooke's Flora. A small annual herb having semi-prostrate branches and blue flowers.
207. *Dicliptera zeylanica* Nees. Cooke's Flora, Vol. II, p. 403. A herb with semi-prostrate branches and pink flowers, occurs on the edge of the evergreen forest, rare.
Mahabaleshwar—Cooke.
208. *Justicia betonica* L.: Cooke's Flora, Vol. II, p. 407. A herb in open scrub and in *Pteris aquilina* communities, abundant in small patches. Pinkish white flowers. Fruit: Jan.
Arther's seat—Mahajan, 13204.
209. *J. trinervia* Vahl: Cooke's Flora, Vol. II, p. 408. A small herb with a woody rootstock, occasional along the roads.
'Abundant near Elphinstone Point'—Birdwood.
210. *J. procumbens* L.: Not recorded in Cooke's Flora. A herb having diffused slender branches and pink flowers.
Birdwood—Mahabaleshwar.
211. *J. simplex* D. Don: Not recorded in Cooke's Flora. A herb along road and on the edges of the evergreen forest, fairly common in post-monsoon period. Flowers pale violet to pink in color: Oct.
Venna Lake—Mahajan, 24702, 24704; Dhobi's fall—Mahajan, 24754.
212. *Rhinacanthus nasuta* (L.) Kurz
Syn. *Rhinacanthus communis* Nees: Cooke's Flora, Vol. II, p. 415. A small shrub with white flowers.
Mahabaleshwar.

VERBENACEAE

213. *Lantana camara* L.: Not recorded in Cooke's Flora. An introduced shrub with flowers of various colors, frequently met with in scrub and along roads. Flowers: More or less throughout the year.
Mahabaleshwar—Puri, Mahajan.

214. *Callicarpa tomentosa* (L.) Murray
Syn. *Callicarpa lanata* L.: Cooke's Flora, Vol. II, p. 423. A second storey tree in dense evergreen forest over the slopes, occasional. Wet, red, gravelly soil.
Mahabaleshwar, Puri; Chinaman's falls—Puri, 251; Dhobi's falls—Mahajan, 24736.
215. *Vitex negundo* L.: Cooke's Flora, Vol. II, p. 428. A large shrub (sometimes becoming a small tree) on the edges of the evergreen forest and along roads, abundant. Small bluish purple flowers in large compound panicles.
Mahabaleshwar—abundant (Planted), Cooke.
216. *Clerodendron serratum* Spreng.: Cooke's Flora, Vol. II, p. 432. A tall shrub (1-3 m. high), having pale blue flowers, frequent on the edges of the evergreen forest and in open patches. Flowers: Aug.-Sept.

LABIATAE

217. *Plectranthes stocksii* Hook.: Cooke's Flora, Vol. II, p. 446. Herb on the edge of the evergreen forest, often growing upto 1 m. in height. Stem reddish, flowers white with pale violet tinge, abundant. Moist reddish soil, trap basalt exposed at places.
Wilson Point Road—Puri, 9207; Dhobi's fall—Mahajan, 24753; Bombay Point Road—Mahajan, 27130; Lingmala—Mahajan, 27181; Venna Lake—Mahajan, 13011.
218. *Coleus parviflorus* Benth.: Not recorded in Cooke's Flora.
Near Elphinstone Point—Birdwood.
219. *Anisochilus verticillatus* Hook. f.: Cooke's Flora, Vol. II, p. 451. An erect herb with violet flowers.
220. *Pogostemon parviflorus* Benth.: Cooke's Flora, Vol. II, p. 453. A tall shrub (sometimes reaches 2½ m.) on the edges of the evergreen forest in open patches and along roads, abundant.
Mahabaleshwar—Mahajan.
221. *P. plectranthoides* Desf.: Not recorded in Cooke's Flora. A small shrub having pink flowers, frequent along roads. Flowers: Jan.
Lingmala Road—Mahajan, 13060.
222. *Dysophylla salicifolia* Dalz.: Cooke's Flora, Vol. II, p. 457. A herb (about 20 cms. to 40 cms. high) having purple flowers in dense terminal spikes, abundant in the bed of nalas and in wet areas. Flowers: Feb.
Mahabaleshwar—Mahajan.
223. *D. stellata* Benth.: Cooke's Flora, Vol. II, p. 457. A small herb in wet reddish clayey soil along a nala; violet flowers in dense spikes, frequent.
Venna Lake—Mahajan, 24690; Dhobi's falls Road—Mahajan, 24783.

224. *D. myosuroides* Benth.: Cooke's Flora, Vol. II, p. 456. A perennial herb (about 30 cms. high) in moist places.
225. *Colebrookea oppositifolia* Sm.: Cooke's Flora, Vol. II, p. 459. A tall stout shrub, very common along roads and on the edges of the evergreen forest. Greenish white flowers in dense paniculate spikes. Flowers: Jan.-Apr.
Malcolum Peth Forest—Puri, 177; Kshetra Mahabaleshwar—Mahajan, 13218; Bombay Point Road, Mahajan.
226. *Anisomeles heyneana* Benth.: Cooke's Flora, Vol. II, p. 460. A tall herb on rocky soil, whitish flowers, occasional. Fruit: Jan.
Lingmala—Mahajan, 13220.
227. *A. ovata* R. Br.: Cooke's Flora, Vol. II, p. 461. A small shrub with bluish flowers. Common. Flowers: Feb.
Mahabaleshwar—Mahajan.
228. *Leucas stelligera* Wall.: Cooke's Flora, Vol. II, p. 470. An erect herb branched from the base, white flowers in axillary clusters, very common in grasslands, in fern communities, and on the edges of the evergreen forest as well as in open patches. Red, moist, shallow, clayey soil, mixed with gravel.
Wilson Point Road—Puri, 9212; Hirda Bungalow—Puri, 145; Venna Lake—Puri, 13029; Lingmala—Mahajan, 27177; Dhobi's fall—Mahajan, 24761.
229. *L. ciliata* Benth.: Cooke's Flora, Vol. II, p. 471. A tall herb or undershrub (about 1 m. high) on the edges of the evergreen forest and in open patches, common. White flowers in the dense globose ciliate whorls. Moist red calyey soil mixed with gravel. Flowers: Feb., Apr., Oct.
Hirda Bungalow—Puri, 154; Venna lake—Mahajan, 13028; Satara Road—Mahajan, 24606.
230. *Salvia plebeia* R. Br.: Cooke's Flora, Vol. II, p. 474. Herb with white flowers, frequent in moist localities.
In the ravine below cemetery—Cooke.

PLANTAGINACEAE

231. *Plantago major* L.: Cooke's Flora, Vol. II, p. 477. A perennial herb, rare.
Along the banks of the Yenna River—Cooke.

AMARANTACEAE

232. *Celosia argentea* L.: Not recorded in Cooke's Flora. A herb much variable in size, rarely met with in open patches in the evergreen forest and as a weed in gardens and fields. Moist, gravelly, red, clayey soil. Pink Flowers: Oct.
Lingmala falls—Mahajan, 24601; Lingmala Rest House, Mahajan, 27193.

233. *Amarantus blitum* L.: Var. *oleracea* Hook. f.: Not recorded in Cooke's Flora. A fleshy herb on the edge of the evergreen forests, rare. Fruits: April.

Mahabaleshwar—Mahad Road—Puri, 291.

234. *Achyranthes aspera* L.: Cooke's Flora, Vol. II, p. 495. A tall herb on the edge of the evergreen forest, fairly common along the roads, on moist, red, gravelly clay.

Bombay Point Road—Mahajan, 24637.

POLYGONACEAE

235. *Polygonum plebejum* R. Br. Var. *indica* Hook.: Cooke's Flora, Vol. II, p. 513. A herb with spreading prostrate branches and pink flowers, occurs in the moist places along nalas and rivers. Red, gravelly soil.

Hirda Road—Puri, 155; Mahad Road—Puri, 292; Malcolm Peth Forest—Puri, 179.

236. *P. glabrum* Willd.: Cooke's Flora, Vol. II, p. 514. A tall herb (about 1 m. high) having pink flowers in slender racemes abundant in marshy area along the lake. Flowers: Oct.-Jan.

Malcolm Peth forest—Puri, 189; Venna lake, Mahajan, 13050.

237. *P. mite* Sch.: Cooke's Flora, Vol. II, p. 516. An annual herb (about $\frac{1}{2}$ m. high) with pink flowers.

Near the lake above the Chinaman's gardens—Cooke.

238. *P. alatum* Buch.-Ham.: Cooke's Flora, Vol. II, p. 516. A herb with prostrately spreading branches, reddish stem and white axillary flowers. Fairly common in the crevices of stones along roads, moist reddish soil. Flowers: Oct.

Bombay Point Road—Mahajan, 27131, 24634.

239. *P. chinense* L.: A tall herb (up to 2 m. high) on the edge of the evergreen forest and in open patches, common. Whitish flowers: Oct. Moist, reddish gravelly soil.

Wilson Point Road—Puri, 9208; Mahad Road—Puri, 274; Holiday Camp—Mahajan, 27143.

240. *P. serrulatum* Lagasc.: Cooke's Flora, Vol. II, p. 515. A herb (about 1 m. high) in moist localities, occasional. Flowers white.

Mahabaleshwar—Cooke, Birdwood.

241. *P. pedunculare* Wall. Var. *angustissima* Hook. f.: Cooke's Flora, Vol. II, p. 517. An erect, small herb, in moist situations, along streams, flowers white or pink.

Mahabaleshwar—Cooke, Woodrow.

242. *P. barbatum* L.: Not recorded in Cooke's Flora. 'Along Venna Lake,' growing together with *P. glabrum*—Birdwood.

PIPERACEAE

243. *Piper hookeri* Miq.: Cooke's Flora, Vol. II, p. 527. A climber on trees and shrubs in dense evergreen forest, abundant at places. Moist, brown, coarse clay, trap rock exposed.

Tiger Path—Mahajan, 24792.

LAURACEAE

244. *Actinodaphne angustifolia* Nees.

Syn. *Actinodaphne hookeri* Meissn.: Cooke's Flora, Vol. II, p. 537. A top storey tree extremely abundant in the dense evergreen forests around Mahabaleshwar. Becoming almost dominant at places. Flowers: Nov. Moist, red, gravelly soil. Fruit: Mar.-Apr.

Arther's Seat—Puri, 333, 328, 16729; Lingmala—Puri, 208; Wilson Point Road—Puri, 9201; Venna Lake—Mahajan, 13018; Tiger Path—Mahajan, 24796; Bombay Point—Mahajan, 24647.

245. *Litsea stocksii* Hook. f.: Cooke's Flora, Vol. II, p. 539. A large tree in the dense evergreen forest, frequent. Moist, reddish, brown, coarse clay.

Chinaman's Falls—Puri, 247, 252; Arther's Seat—Puri, 334; Near Polo ground—Mahajan, 24788.

246. *L. wightiana* Benth.: Cooke's Flora, Vol. II, p. 540. A large tree, young parts covered with rusty tomentum.

Below Bombay Point—H. M. Birdwood.

247. *L. zeylanica* Nees.: Cooke's Flora, Vol. II, p. 540. A middle storey tree in the evergreen forest, generally occurs over slopes, rare over Mahabaleshwar plateaux.

Arther's Seat, Puri, 322, 333, 16725.

248. *L. tomentosa* Heyne.: Cooke's Flora, Vol. II, p. 539. A small tree on the edge of the evergreen forest over the steep slope, occasional. Dry, red, gravelly soil, exposed to wind. Yellowish flowers: Oct.

Bombay Point—Mahajan, 24673.

- 248A. *Grevillea robusta* Cunn. Not recorded in Cooke's Flora. A tall handsome tree often planted in gardens and in the compounds of the Bungalows.

Mahabaleshwar—Mahajan.

THYMELIACEAE

249. *Lasiosiphon eriocephalus* Decne.: Cooke's Flora, Vol. II, p. 542. A large stout shrub having pale yellow flowers, very common all over the evergreen forest and in the open patches. Moist, red, gravelly soil. Flowers: Dec.-May.

Hirda Bungalow—Puri, 143; Venna Lake—Mahajan, 13026; Bombay Point Road—Mahajan; Lodwick Point Road—Mahajan, 24734; Dhobi Point Road—Mahajan, 24731; Near Polo ground—Mahajan, 24788.

ELAEAGNACEAE

250. *Elaeagnus conferta* Roxb.

Syn. *Elaeagnus latifolia* L.: Cooke's Flora, Vol. II, p. 543. A large shrub or small tree, the branches usually climbing over trees in the evergreen forests, frequently met with in the evergreen forest and scrub.

Venna Lake—Mahajan, 13056; Bombay Point—Mahajan.

LORANTHACEAE

251. *Loranthus capitellatus* Wight: Cooke's Flora, Vol. II, p. 550. A shrub parasitic on trees, in the evergreen forest.

Mahabaleshwar—Cooke, Woodrow.

253. *L. elasticus* Desv.: Cooke's Flora, Vol. II, p. 547. A large much-branched shrub parasitic on *Eugenia jambolana* Lam. On the edge of the evergreen forest. The flowers are sessile, the petals being whitish and stamens, stigma and style red. Occasional. Flowers: Oct.

Bombay Point Road—Mahajan, 24642.

254. *Viscum angulatum* Heyne.: Cooke's Flora, Vol. II, p. 553. Parasitic on *Osyris arborea*, rare.

Lingmala—Puri, 218.

SANTALACEAE

255. *Osyris arborea* Wall.: Cooke's Flora, Vol. II, p. 555. A large shrub on the edge of the evergreen forest, frequent.

Lingmala—Puri, 211.

EUPHORBIACEAE

256. *Euphorbia acaulis* Roxb.: Cooke's Flora, Vol. II, p. 562. A herb with radical leaves, frequent along roads on the edge of the evergreen forest.

Mahabaleshwar.

257. *E. rothiana* Spreng.: Cooke's Flora, Vol. II, p. 564. A tall erect herb (about 1 meter high) on the edge of the evergreen forest, and in open patches. Small, greenish flowers. Very common. Flowers, Fruit: Oct. Moist, red, gravelly soil.

Hirda Bungalow—Puri, 157; Wilson Point Road—Puri, 9202; Bombay Point Road—Mahajan, 27125, 24640; Dhobiman's falls—Mahajan, 24738.

258. *E. pycnostegia* Boiss.: Cooke's Flora, Vol. II, p. 565. A slender herb in the moist localities, rare.

Mahabaleshwar—Birdwood.

259. *Bridelia retusa* Spreng.: Cooke's Flora, Vol. II, p. 572. A moderate-sized tree having greenish white flowers, on the edges of the evergreen forest, frequent.

Mahad Road—Puri, 294; Gureghar (Panchgani Road)—Mahajan, 6888; Lingmala falls—Mahajan, 13086.

260. *Glochidion hohenackeri* Bedd.: Cooke's Flora, Vol. II, p. 579. A moderate-sized tree in the dense evergreen forest, fairly common. Fruit: Oct. Moist, brown clayey soil.

Hirda Bungalow, Puri, 147; Mahajan, 13044; Gureghar (Panchgani Road), Mahajan, 6905; Near Venna Lake—Mahajan, 13019.

261. *Embllica officinalis* Gaertn.: Not recorded in Cooke's Flora. Syn. *Phyllanthus emblica* Linn.: A second storey tree in the evergreen forest.

Gureghar (Panchgani Road)—Mahajan, 6890.

262. *Phyllanthus lanceolarius* Muell.

Syn. *Glochidion lanceolarium* Dalz.: Not recorded in Cooke's Flora. A second-storey tree in the evergreen forest.

Birdwood—Mahabaleshwar.

263. *Mallotus philippinensis* Muell.: Cooke's Flora, Vol. II, p. 615. A tree in the dense evergreen forest, occasional. Small white flowers and dark red fruits. Moist, red, gravelly soil.

Mahad Road—Puri, 297; Arther's Seat—Puri, 342; Bombay Point—Mahajan, 24658.

264. *Homonoia riparia* Lour.: Cooke's Flora, Vol. II, p. 620. A stout shrub in the bed of nalas, abundant in the valleys. Fruit: Apr.

Mahad Road—Puri, 316.

265. *Ricinus communis* L.: Not recorded in Cooke's Flora. A large shrub, probably planted.

Kshetra Mahabaleshwar, near temple—Mahajan, 13212.

266. *Tragia involucrata* L.: Cooke's Flora, Vol. II, p. 621. A climber on the shrubs on the edge of the evergreen forest, small, yellowish flowers, stinging hairs which are irritating to the skin. Moist, red, gravelly soil.

Arther's Seat—Puri, 323; Holiday Camp—Mahajan, 27151; Babington Point Road—Mahajan, 24717.

URTICACEAE

267. *Girardinia zeylanica* Decne.: Cooke's Flora, Vol. II, p. 633. A tall perennial herb (1-2 m. high) armed with stiff glassy stinging hairs occasional along roads and on the edges of the evergreen forest. Yellowish Flowers: Oct.

Venna Lake—Mahajan, 13016; Bombay Point Road—Mahajan, 24635.

268. *Debregeasia velutina* Gaud.: Cooke's Flora, Vol. II, p. 646. A tall shrub in the evergreen forests, rare.

Mahabaleshwar—Law, Cooke.

269. *Ficus bengalensis* L.: Not recorded in Cooke's Flora. A large tree, occasionally met with along the roads, and on the edges of the evergreen forest.

Mahabaleshwar.

270. *F. rumphii* Blume: Cooke's Flora, Vol. II, p. 640. A tree in the evergreen forest, rare.
Mahabaleshwar, Cooke, Birdwood.
271. *F. carica* L.: Not recorded in Cooke's Flora. Small tree along the road near the market, cultivated for its fruits.
Market Road—Mahajan, 13096.
272. *F. glomerata* Roxb.: Not recorded in Cooke's Flora. A large tree along roads, occasional. Several large trees along the bazaar street conspicuously attract the attention.
Bombay Point Road—Mahajan, 24625.
273. *Morus alba* L.: Not recorded in Cooke's Flora. A large shrub cultivated.
Rust Research Station—Mahajan.

CASUARINACEAE

274. *Casuarina equisetifolia* Forst.: Not recorded in Cooke's Flora. A tall handsome tree planted by the forest deptt. along Panchgani road and at Lingmala.
Near Venna Lake—Puri, 345.

SALICACEAE

275. *Salix tetrasperma* Roxb.: Cooke's Flora, Vol. II, p. 661. A middle-sized tree near Venna Lake, few trees growing even in the lake water. Yellowish flowers in spikes (Oct.). Occasional along the edge of the evergreen forest. Moist, red, gravelly soil.
Venna lake—Mahajan, 24703.

HYDROCHARITACEAE

276. *Blyxa echinosperma* Hook. f.: Cooke's Flora, Vol. II, p. 671. An annual aquatic herb growing in pools and tanks.
Mahabaleshwar.

BURMANNIACEAE

277. *Burmanna caelestis* var. *pusilla* Trin.: Cooke's Flora, Vol. II, p. 672. A small annual herb with blue flowers, on the edge of the evergreen forest, frequent.
Mahabaleshwar.

ORCHIDACEAE

278. *Oberonia recurva* Lindl.: Cooke's Flora, Vol. II, p. 676. A small herb epiphytic on the branches of trees in the evergreen forest. Flowers reddish: Feb.-Apr.
279. *Microstylis versicolor* Lindl.
Syn. *Microstylis rheedii* Wight.: Cooke's Flora, Vol. II, p. 678. A small terrestrial herb having purplish fragrant flowers.
Mahabaleshwar.

280. *Dendrobium microbolbon* A. Rich.: Cooke's Flora, Vol. II, p. 681. A small epiphytic herb on the branches of trees and shrubs in the evergreen forest.
Mahabaleshwar.
281. *D. ovatum* (Willd.) Kurz
Syn. *Dendrobium chlorops* Lindl.: Cooke's Flora, Vol. II, p. 682. An epiphytic herb with slender stems and pale yellow flowers.
Mahabaleshwar.
282. *D. harbatulum* Lindl.: Cooke's Flora, Vol. II, p. 682. An epiphytic with pinkish flowers, common on the branches of trees in the evergreen forest.
Mahabaleshwar.
283. *D. herbaceum* Lindl.: Cooke's Flora, Vol. II, p. 682. A large much branched herb epiphytic on the trees in the evergreen forest, yellow flowers.
Mahabaleshwar.
284. *D. crepidatum* Lindl.: Cooke's Flora, Vol. II, p. 683. An epiphytic herb, stems thick and fleshy, flowers white with yellow disc, frequent. Flowers: Mar.-Apr.
Mahabaleshwar.
285. *Cirrhopetalum fimbriatum* Lindl.: Cooke's Flora, Vol. II, p. 686. A herb epiphytic on the trees in the evergreen forest, pseudo-bulbs clustered. Flowers reddish: Apr.-May.
Mahabaleshwar.
286. *Eria reticosa* Wight: Cooke's Flora, Vol. II, p. 690. An epiphytic orchid with pseudo-bulbus and flowers, frequent.
Mahabaleshwar.
287. *E. microchilos* Lindl.: Cooke's Flora, Vol. II, p. 691. An epiphytic herb with pseudo-bulbs, common.
Mahabaleshwar.
288. *Thunia venosa* Rolfe.: Cooke's Flora, Vol. II, p. 692. One of the most beautiful orchids. Flowers snow-white: July-Aug.
Mahabaleshwar.
289. *Sarcophilus viridiflorus* T. Cooke: Cooke's Flora, Vol. II, p. 697. A small herb having long roots, epiphytic on trees.
Mahabaleshwar.
290. *Eulophia pratensis* Lindl.: Not recorded in Cooke's Flora. A terrestrial herb with fleshy tubers, rather rare in the occurrence. Yellow Flowers: Nov.-Feb. in slender racemes.
Birdwood, Mahabaleshwar.
291. *Aerides crispum* Lindl.: Cooke's Flora, Vol. II, p. 700. A stout herb with thick leaves, common on trees, especially on *Memecylon* and *Eugenia*, on the edges of the evergreen forest. Abundant near Venna Lake along Panchgani Road and Satara Road. Flowers pinkish white and fragrant.
Panchgani Road—Puri, 344.

292. *Aerides radicosum* A. Rich.: Cooke's Flora, Vol. II, p. 700. An epiphytic with rose-colored flowers, frequent on the branches of trees along roads.
Mahabaleshwar.
293. *Vanda parviflora* Lindl.: Cooke's Flora, Vol. II, p. 703. A stout epiphytic herb with yellow flowers, rare.
Mahabaleshwar.
294. *Platanthera susannae* Lindl.: Cooke's Flora, Vol. II, p. 713. A tall terrestrial herb (about 1 meter high). 'Only one plant of this splendid orchid has been found by Dr. Cooke.'—H. M. Birdwood.
295. *Habenaria digitata* Lindl.: Not recorded in Cooke's Flora. A herb about 1/3—2/3 m. high, greenish white flowers, on the edge of the evergreen forest, occasional.
Lingmala—Puri, 25609.
296. *H. grandiflora* Lindl.: Cooke's Flora, Vol. II, p. 716. A small terrestrial herb, flowers white in few-flowered racemes, frequent in the moist localities.
Mahabaleshwar.
297. *H. longicalcarata* A. Rich.: Not recorded in Cooke's Flora. A herb (about ½ m. high) with white flowers, having long spurs, frequent on the edges of the evergreen forest.
Lingmala—Puri, 25625.
298. *H. plantaginea* Lindl.: Not recorded in Cooke's Flora. A small terrestrial herb on the edge of the evergreen forest, white flowers, rare. Moist, deep, brown, gravelly soil. Flowers: Oct.
Tiger Path—Mahajan, 24800.
299. *H. crassifolia* A. Rich.: Not recorded in Cooke's Flora. A small herb (20 to 40 cms. high), having only 2-3 radical leaves frequently occurring on the edges of the evergreen forest. Moist, red, clayey soil, mixed with gravel and humus.
Lingmala—Puri, 25616.

SCITAMINACEAE

300. *Hitchenia caulina* Baker: Cooke's Flora, Vol. II, p. 728. A herb with tuberous rhizomes, flowers yellow or yellowish white, abundant in open scrub and *Pteris aquilina* communities at Lingmala, Bhakawali and Arther's Seat. Flowers: July-Oct. It is commonly known in Mahabaleshwar as Arrowroot Plant.
Lingmala—Mahajan.
301. *Hedychium coronarium* Koenig: Cooke's Flora, Vol. II, p. 728. An erect herb with white fragrant flowers, frequent in evergreen scrub and fern communities near Lingmala, Bhakawali and Arther's seat.
302. *Zingiber macrostachyum* Dalz.: Cooke's Flora, Vol. II, p. 735. A beautiful herb with whitish flowers, on the edge of the evergreen forest, rare at Mahabaleshwar.

AMARYLLIDACEAE

303. *Hypoxis aurea* Lour.: Cooke's Flora, Vol. II, p. 747. A herb with yellow flowers.
Mahabaleshwar.
304. *Crinum brachynema* Herbert.: Cooke's Flora, Vol. II, p. 751. Herb with white flowers, abundant in the open scrub.
Mahabaleshwar.
306. *Pancratium triflorum* Roxb.: Cooke's Flora, Vol. II, p. 752. Herb in the evergreen forest, rare.
Mahabaleshwar.

DIOSCORACEAE

307. *Dioscorea pentaphylla* L.: Cooke's Flora, Vol. II, p. 757. A climber in the evergreen scrub and in the open patches in high evergreen forest.
Gureghar (Panchgani Road) Mahajan, 6901.

LILIACEAE

308. *Asparagus racemosus* Willd.: Cooke's Flora, Vol. II, p. 762. A spiny undershrub with climbing branches, common as undergrowth in the evergreen forest as well as in open scrub areas. White flowers: June.-Sept.
Lingmala—Mahajan, 27189.
309. *Smilax macrophylla* Roxb.: Cooke's Flora, Vol. II, p. 763. A large climber in the evergreen forest, common almost everywhere in Mahabaleshwar.
Gureghar (Panchgani Road)—Mahajan, 6898; Wilson Point Road—Mahajan, 9204; Holiday Camp—Mahajan, 27144; Bombay Point—Mahajan, 24675.
310. *Iphigenia indica* A. Gray: Cooke's Flora, Vol. II, p. 766. A small herb with purplish flowers, frequently occurs in open patches.
311. *Scilla indica* Baker.: Cooke's Flora, Vol. II, p. 767. Herb with an underground bulb, flowers greenish purple in slender racemes, common at Mahabaleshwar especially in open patches. Flowers: May-July.

COMMELINACEAE

312. *Aneilema spiratum* R. Br.: Cooke's Flora, Vol. II, p. 787. A small herb in moist localities, blue flowers, frequent. Flowers: Oct.
Mahabaleshwar.
313. *A. pauciflorum* Dalz.: Cooke's Flora, Vol. II, p. 788. A small herb with slender branches, yellowish flowers.
Mahabaleshwar.
314. *A. sinicum* Lindl.: Cooke's Flora, Vol. II, p. 789. A herb with tuberous roots, blue flowers.
Mahabaleshwar.

315. *A. giganteum* R. Br.: Cooke's Flora, Vol. II, p. 789. A tall herb at times growing upto 1 m. high. Flowers purple.
Mahabaleshwar.
316. *A. lanuginosum* Wall.: Cooke's Flora, Vol. II, p. 790. A small herb with bluish flowers.
Mahabaleshwar.
317. *Cyanotis cristata* Schult.: Cooke's Flora, Vol. II, p. 794. A spreading herb with slender stems and blue flowers, abundant in small patches on wet rocks along nalas etc. Flowers: Oct.
Dhobi's falls—Mahajan, 24759.
318. *C. wightii* Clarke: Cooke's Flora, Vol. II, p. 794. A tall herb (about 1 m. high) on the edges of the evergreen forest. Blue flowers: Aug.-Sept.
Mahabaleshwar.

PALMEAE

319. *Caryota urens* L.: Not recorded in Cooke's Flora. A tall handsome tree, planted in the Garden opposite S. T. stand at Mahabaleshwar.
Mahajan.

ARACEAE

320. *Arisaema murrayi* Hook.: Cooke's Flora, Vol. II, p. 821. A tuberous herb common on the edges of the evergreen forest at the beginning of rainy season. Flowers: May-July.
Mahabaleshwar.

ERIOCAULACEAE

321. *Eriocaulon stellatum* Koern.: Not recorded in Cooke's Flora. A small herb abundant on wet rocks near nalas.
Dhobi's falls, Mahajan, 24763.

CYPERACEAE

322. *Cyperus globosus* All.: Cooke's Flora, Vol. II, p. 857. A much variable herb in moist localities.
Mahabaleshwar, Mahajan.
323. *C. latespicatus* Boeck.: Not recorded in Cooke's Flora. A herb on moist, red, gravelly soil, frequent on the edge of the evergreen forest.
Bombay Point Road—Mahajan, 24626.
324. *Carex condensata* Nees.: Cooke's Flora, Vol. II, p. 905. A tall herb on the edges of evergreen forest and along nalas, frequent.
Mahabaleshwar.
325. *C. mercarensis* Hochst. var. Major.: Cooke's Flora, Vol. II, p. 906. A tall herb fairly common on the edges of evergreen forest, and along nalas. Moist, red, gravelly soil.
Bombay Point Road—Mahajan, 24644 ;
Lodwick Point Road—Mahajan, 27163.

GRAMINEAE

326. *Setaria glauca* Beauv.: Cooke's Flora, Vol. II, p. 920. A tall herb, (1 to 2 m. high) on the edge of the evergreen forest over slope, occasional. Abundant in patches in a fenced grassland. Moist brown clayey soil mixed with gravel and humus.
Lingmala, 27195 ; Holiday Camp, 27153.
327. *Isachne lisboe* Hook. f.: Cooke's Flora, Vol. II, p. 922. A small herb about 15 cms. high in moist situations, occasional.
328. *I. australis* R. Br.: Cooke's Flora, Vol. II, p. 923. Herb in wet reddish sandy soil along a nala, occasional. Trap basalt exposed at places.
Dhobiman's falls—Mahajan, 24748.
329. *Tricholaena wightii* Nees: Cooke's Flora, Vol. II, p. 925.
330. *Paspalum compactum* Roth.: Cooke's Flora, Vol. II, p. 943. A herb abundant in roadside gutters, and also in marshy areas, forming communities with *Cyperus*. Wet reddish coarse clay.
Venna Lake—Mahajan, 24691 ; Lodwick Point Road—Mahajan, 27161.
331. *Dimeria ornithopoda* Trin.: Cooke's Flora, Vol. II, p. 945. An annual herb with slender stems.
332. *Spodiopogon albidus* Benth.: Cooke's Flora, Vol. II, p. 947. A weak, spreading herb.
333. *Peltophorus divergens* Hack.
Syn. *Rottboellia divergens* Hack.: Cooke's Flora, Vol. II, p. 952. A small herb in the crevices of stones along roads and in the crevices of dry trap rock on the edge of the evergreen forest, abundant. Often grows together with other grasses. It is described as 10.23 cms. high in Bombay Grasses (Blatter & McCann). The specimens collected by us are much smaller, i.e., 5-10 cms. high only.
Dhobi's falls—Mahajan, 24758 ; Venna Lake—Mahajan, 24695.
334. *Ischaemum diplopogon* Hook. f.: Cooke's Flora, Vol. II, p. 960. A small herb (about 20 cms. high) along nalas and also in the crevices of rocks, abundant.
Dhobi's falls—Mahajan, 24745, 24555.
335. *I. impressum* Hack.: Not recorded in Cooke's Flora. A small herb (about 10.20 cms. high) abundantly growing in the crevices of stones along roads, in open patches in the evergreen forest and also in fenced grasslands. Moist reddish clayey soil mixed with gravel and humus.
Bombay Point Road—Mahajan, 24629 ; Venna Lake in the crevices of stones—Mahajan, 24695 ; (grows along with *Peltophorus divergens* Hack.) ; Holiday Camp, in a fenced grassland, Mahajan, 27156.
336. *Arthraxon inermis* Hook. f.: Cooke's Flora, Vol. II, p. 968. A small herb with slender stems, frequently occurs on the walls along the roads.
Mahabaleshwar.

337. *A. meeboldii* Stapf.: Cooke's Flora, Vol. II, p. 969. A herb in a fenced grassland, very rare. Moist, brown soil mixed with gravel and humus. Holiday Camp—Mahajan, 27157.
338. *Andropogon polystachyos* Roxb.: Cooke's Flora, Vol. II, p. 989. A small herb (about 10 cms. high).
339. *Themeda quadravalis* Kuntze.: Not recorded in Cooke's Flora. A tall herb (about 1 m. high) in a fenced grassland. Moist, brown clayey soil mixed with gravel and humus. Holiday Camp—Mahajan, 27155.
340. *Polytoca cookei* Stapf.: Cooke's Flora, Vol. II, p. 998. A tall herb (about 1 m. high).
341. *Arundinella avenacea* Munro.: Cooke's Flora, Vol. II, p. 1000. An annual slender herb (10-30 cms high) in moist sandy soil as well as in the crevices of the trap rock along nalas common. It also grows on dark brown coarse clay in road-side gutters. Lodwick Point Road—Mahajan, 27162; Dhobi's fall—Mahajan, 24750; Venna Lake—Mahajan, 24684, 24797. It is extremely abundant on trap boulders piled along a field near Venna Lake.
342. *Arundinella ciliata* Nees: Not recorded in Cooke's Flora. A herb about 30-40 cms. high abundant on moist, red, gravelly soil on the edge of the evergreen forest and along roads. Bombay Point Road—Mahajan, 24631.
343. *A. tenella* Nees. & Wight: Cooke's Flora, Vol. II, p. 1001. A pretty looking herb extremely abundant in the crevices of trap rock and under the shade of the trees and also in the crevices of the gutter stones along the roads. Moist, shallow, clayey soil. Bombay Point Road—Mahajan, 27135.
344. *A. hispida* Kuntze.: Not recorded in Cooke's Flora. A tall (1 to 1½ m. high) perennial herb with a stout hard rootstock; frequently occurs in the crevices of the trap rock in the bed of streams. Shallow, wet, sandy soil. Dhobiman's fall—Mahajan, 24752.
345. *A. spicata* Dalz.: Cooke's Flora, Vol. II, p. 1004. A small herb (5.14 cms. high) extremely abundant in open patches as well as in *Pteris aquilina* communities. Orange red, moist, shallow, clayey soil, trap rock outcrops at places. Lingmala—Mahajan, 27175.
346. *A. brasiliensis* Raddi: Cooke's Flora, Vol. II, p. 1003. A much branched perennial herb with spreading branches, occasional along streams. Mahabaleshwar—Dalzell & Gibson, Lisbon.
347. *Oxytenanthera monostigma* Bedd.: Cooke's Flora, Vol. II, p. 1048. A moderate-sized bamboo (about 3.4 m. tall) in open patches in the evergreen forest, rare. Mahabaleshwar, Fagan.

CRYPTOGAMS

POLYPODIACEAE

348. *Peranema cyatheoides* Don: Blatter & D'Almeida, Ferns of Bombay, p. 35.
349. *Leucostegia immersa* Presl.: Blatter & D'Almeida, Ferns of Bombay, p. 42. In cool, shady areas at Lingmala, frequent.
350. *Adiantum lunulatum* Burm.: Blatter & D'Almeida, Ferns of Bombay, p. 60. Frequent in cool, shady, moist areas at Lingmala and Dhobiman's fall.
351. *A. capillus veneris* L.: Blatter & D'Almeida, Ferns of Bombay, p. 69. A small fern frequently occurring along nalas in shady places.
352. *Cheilanthes albomarginata* Clarke: Blatter & D'Almeida, Ferns of Bombay, p. 69. Fairly common all over Mahabaleshwar plateaux on the edges of the evergreen forest. Resembles *C. farinosa* but distinguishable by its dwarfish sturdier habit. Gureghar—Mahajan, 6911.
353. *C. farinosa* Kauff. Blatter & D'Almeida, Ferns of Bombay, p. 77. Common all over Mahabaleshwar plateaux in moist shady places. Moist, red gravelly soil. Both the species of *Cheilanthes* are commonly known as 'Silver Fern'. Lingmala falls—Mahajan, 13076; Venna lake, Mahajan, 24698.
354. *C. tenuifolia* Sw.: Blatter & D'Almeida, Ferns of Bombay, p. 80. Very rare at Mahabaleshwar.
355. *Pteris pellucida* Presl.: Blatter & D'Almeida, Ferns of Bombay, p. 86. Occurs rarely in shady places.
356. *P. quadriaurita* Retz.: Blatter & D'Almeida, Ferns of Bombay, p. 88. Both *Forma memorialis* and *Forma biaurita* occur frequently in shady places.
357. *P. quadriaurita* Retz.: Var. *setigera* Bedd. A very distinct looking handsome fern commonly occurring along roads and on the edges of open patches in evergreen forest. Bombay Point Road—Mahajan, 6855, 27128; Mahad Road—Puri, 282; Venna Lake—Mahajan, 346, 13013, 13049; Dhobi's fall, 24773.
358. *P. aquilina* L.: Blatter & D'Almeida, Ferns of Bombay, p. 92. This is the common Brake of Braken fern. Extremely abundant in open patches and evergreen scrub. Bombay Point Road—Mahajan, 24667; Arther's Seat—Mahajan, 13205; Lingmala—Puri, 9216.
359. *Blechnum orientale* L.: Blatter & D'Almeida, Ferns of Bombay p. 91.
360. *Asplenium lunulatum* Sw. var. *trapeziforme* Bedd. Blatter & D'Almeida, Ferns of Bombay, p. 105. A fern generally growing along nalas and moist places.

361. *A. falcatum* Lam.: Blatter & D'Almeida, Ferns of Bombay, p. 105. Rare at Mahabaleshwar. Lingmala—Mahajan.
362. *A. laciniatum* Don: Blatter & D'Almeida, Ferns of Bombay, p. 108. Rare at Mahabaleshwar.
363. *Athyrium hohenackerianum* Bedd.: Blatter & D'Almeida, Ferns of Bombay. Not recorded. Frequent in the undergrowth of dense evergreen forest, abundant at one place in Lingmala forest. Moist, red, clayey soil. Lingmala Mahajan, 27184.
364. *A. falcatum* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 113.
365. *A. felix-foemina* Roth.: Blatter & D'Almeida, Ferns of Bombay, p. 115. A small delicate herb along forest path in dense evergreen forest. Moist, cool, shady place. Wet, red, clayey soil. Lingmala—Mahajan, 27182; Dhobiman's falls—Mahajan, 24772.
366. *Anisogonium esculentum* Presl.: Blatter & D'Almeida, Ferns of Bombay, p. 120. A tall herb (about 1-1½ m. high) in moist shady, cool place on the edge of the evergreen forest, over gentle slope, rare. Moist, red, shallow clayey and stonny soil. Lingmala—Mahajan, 24619.
367. *Aspidium polymorphum* Wall.: Blatter & D'Almeida, Ferns of Bombay, p. 130.
368. *A. cicutarium* Sw.: Blatter and D'Almeida, Ferns of Bombay, p. 132. A common fern occurring on the edges as well as in the undergrowth of evergreen forest. Lingmala—Puri, 25635; Venna Lake, Mahajan—13046; Bombay Point Road—Mahajan, 27127.
369. *Lastrea felix-mas* Presl. var. *cochleata* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 143. A herb in moist cool place in the edge of dense evergreen forest, abundant. Only one fertile frond being much smaller than the sterile ones. Moist, red, clayey soil. Lingmala Road—Mahajan, 27185.
370. *L. sparca* Moore: Blatter & D'Almeida, Ferns of Bombay, p. 144.
371. *Nephrolepis cordifolia* Baker: Blatter & D'Almeida, Ferns of Bombay, p. 157.
372. *N. molle* Desv.: Blatter & D'Almeida, Ferns of Bombay, p. 152.
373. *Drynaria quercifolia* Bory.: Blatter & D'Almeida, Ferns of Bombay, p. 157.
374. *Pleopeltis linearis* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 170.
375. *Pleopeltis membranacea* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 172. A herb with creeping rhizome, epiphytic on trees in the evergreen forest, very common. Frequently occurs growing in the crevices of stones in shady places in the evergreen forest. Near Holiday Camp—Mahajan, 27145.
376. *Gymnogramme leptophylla* Desv.: Blatter & D'Almeida, Ferns of Bombay, p. 175.
377. *Gymnopteris variabilis* var. *lanceolata* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 186.
278. *G. subcrenata* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 189.

OSMUNDACEAE

379. *Osmunda regalis* L.: Blatter & D'Almeida, Ferns of Bombay, p. 192. Lingmala falls—Mahajan, 24709.

SCHIZAECEAE

380. *Lygodium flexuosum* Bedd.: Blatter & D'Almeida, Ferns of Bombay, p. 195.

OPHIOGLOSSACEAE

381. *Ophioglossum vulgatum* L.: Not recorded in the Ferns of Bombay.

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