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THE BENGAL NATURAL HISTORY SOCIETY

Estd. 1923

The Society under the name Darjeeling Natural History Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition, to promote the study of Natural History and to get together as complete as possible collections of Natural History specimens from a limited area, including "the Civil Districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a quarterly journal has been started. The journal is no longer confined to articles on the Natural History of the above mentioned area, but includes those from anywhere. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

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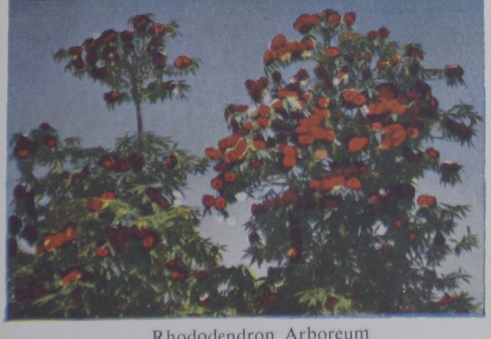

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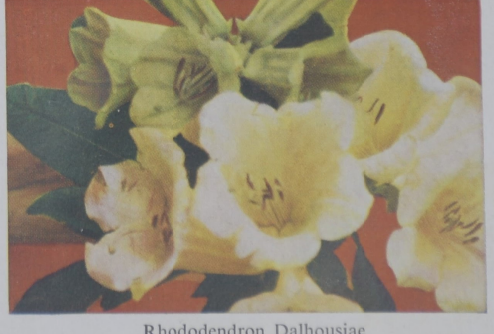

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Plate I

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RHODODENDRONS OF DARJEELING AND SIKKIM HIMALAYAS

BY

M. SAIN

The description of Rhododendrons that will appear in this series of articles is intended as a handy reference for the identification of the various species occurring in the Eastern Himalayas. It is hoped that it will be especially useful to those who undertake treks along the Singalila range or into the interior of Sikkim. It is in these areas that the indigenous Rhododendrons grow luxuriantly on the mountain sides, varying in size from huge trees to small bushes, and all of them magnificently coloured when in Flower. The data used have been collected during the many tours to every accessible area of the Sikkim Himalayas, made during the past 45 years of the Author's residence in Darjeeling.

One or two species are perhaps omitted from this list, but these may be only the rarer species from areas that the author has not been able to visit. It is hoped that readers will bring to the attention of the Editor, the species omitted, as additions to the present list. The leaves are of great importance in the identification of Rhododendrons; their shape, size, colour, and texture should always be very carefully observed. The underside of the leaves are particularly valuable for the identification of the different species.

There are about 40 species of Rhododendrons in the Sikkim Himalayas. The Rhododendrons are widely distributed in this extensive region, hence the localities given under each

species should not be considered as the only areas in which the particular species is found. Climatic conditions in relation to altitude are the main barrier to the distribution of Rhododendrons, as well as that of other plants. An important factor often overlooked by amateur gardeners in transplanting a plant from its natural habitat to their Garden, with perhaps thousands of feet difference in altitude.

At about 5,000 feet altitude the Temperate Zone of the Himalayas begin ; here the Oak, Chestnut, Cherry, Birch, Maple, Laurel, with Aralia, Holboellia, Daphne, Symplocos, Ferns and small Bamboo as undergrowth form a thick Jungle. From 7,000 ft. upwards where the dense Jungle ends is the domain of the Rhododendrons, covering vast areas, thriving in wild abandon and painting the blue landscape with riotous colour in their flowering season. On the majestic mountainsides such a scene leaves an unforgettable impression.

It is just after the winter snow and frost, when the cold earth and the brooding trees awaken to the call of Spring and the first showers bring forth the green grass and herbaceous plants, with the landscape assuming the tender tone of new leaf, that the Rhododendrons begin to flower. The earliest to herald the season being *Rhododendron grande*, as its name implies a 'grand' flower indeed.

RHODODENDRON GRANDE: (*N. KORLINGA*) Plate I.

HABIT: a tall evergeen tree 20-40 ft. high, trunk solitary or more spreading, bark red-brown, peeling off in small scales.

LEAVES: oblong-elliptic or tapering, 6-12 in. long, 3-5 in. broad ; upper-surface deep-green and shiny, midrib and primary veins deeply impressed, under-surface silvery-white coated with hairs, midrib and primary veins 20-24 on each side, prominent, pale green ; leaf stalk $\frac{3}{4}$-$1\frac{1}{2}$ in. long.

INFLORESCENCE: a large rounded cluster of 20-25 flowers, 5 to 8 in across.

Note :—Local names are given in parentheses, N stands for Nepali, L. for Lepcha.

Rhododendron barbatum as they used to be seen in the past, at Tonglu.
Photo—Author

FLOWER :—creamy white.

STALK: 1 to 1½ in. long, glandular or glandular and wooly.

CALYX: short, with 8 wavy lobes.

COROLLA: bell-shaped, 2-2½ in. long, rose-pink in bud, later white or creamy-white, with purple blotches in the nectar pouches at the base ; lobes 8, notched.

STAMENS: 16, unequal, 1½-2 in. long, filaments white, smooth or hairy at the base.

PISTIL: 1¾-2¼ in. long ; ovary oblong, 16 chambered, densely glandular ; style stout, smooth or with few glands at the base ; stigma disc-like.

FLOWERING SEASON :—March-April.

FRUITS: 1-2 in. long, stout and curved. Ready in December-January.

HABITAT: 7000-10,000 ft., Tiger-hill, Tonglu and Sikkim.

RHODODENDRON BARBATUM: (*N. RATO CHIMAL*). Plate II

HABIT: a tree, grows to a height of 30-50 ft. or more ; branched from the base ; bark purple-red, smooth, peeling off in large flakes ; young shoots clad with long stiff hairs.

LEAVES: elliptic-lanceolate (this species is also known as *R. lancifolium* because of its lance shaped leaves), 4-8 in. long, 1½-2¼ in. broad, base blunt, tip sharply pointed, upper-surface smooth, shining, midrib deeply grooved, primary veins 14-16 on each side deeply impressed ; under-surface yellowish-green, smooth, midrib and primary veins prominent ; leaf-stalk short thick and clad with bristles.

INFLORESCENCE:—a compact rounded cluster of 15-20 flowers, 4-5 in. across, the very sticky bud-scales and bracts persist during flowering.

FLOWER :—crimson red.

FLOWER STALK: smooth.

CALYX: short, smooth with 5 irregular lobes and a thick greenish rim at the base.

COROLLA: tubular bell-shaped, about $1\frac{1}{2}$ in. long, with 5 lobes, rounded, rich-crimson or blood-red colour, fleshy, the 5 nectar pouches at the base tinged with blackish-crimson within.

STAMENS: 10, clustered around style, filaments white, smooth; anthers, purple-black.

PISTIL: 1 in. long, ovary cone-shaped, greenish-white, densely clad with glands, style, white, smooth ; stigma, hardly broader than style, pink tinted.

FLOWERING SEASON :—March-April.

FRUITS: about 1 in. long, cylindric, October-November.
HABITAT: Tonglu and Sikkim Himalaya, 9000-11,000 ft.

Its rich crimson coloured flowers seen against the azure sky with the superb Kanchenjungha in the background is a sight not easily forgotten. It is the tallest among the Himalayan Rhododendrons. At Tonglu there were more than 100 of these giant Rhododendrons near the Bungalow a few years ago as will be seen in the accompanying photograph, but to-day not a single tree, of the many that charmed hundreds of visitors who went there particularly to see them, is left. They have all been cut down and used as fuel in the Bungalow chimneys and kitchens. Their rotting stumps still sticking out of the ground tell the tale of their glorious past. The credit for the vandalism goes to the Bungalow chowkidar and the men-in-charge of the Police out-post there. The very few smaller ones that are left are getting reduced in numbers as the felling is still going on unabated. Obviously the preservation of flora is not receiving equal attention as the preservation of fauna.

RHODODENDRON ARBOREUM: (*N. Gurans*) Plate I

This species blooms at the beginning of March along with

its sub-species *cinnamomeum* and *campbelliae*. Its flowering period is the longest among Rhododendrons. The fallen flowers of *R. arboreum* are collected, dried and preserved by the local people to be used as a remedy for dysentry. Its wood is pink-white, hard and close-grained ; used for making "*kukri*" handles and pack saddles.

HABIT: a tree, growing to a height 20-40 ft., often attaining great girth, bark thick, pink-brown, roughish, peeling off in flakes.

LEAVES: oblong, tapered at both ends, 4-7 in. long, $1\frac{1}{4}$-2 in. broad, base wedge shaped, narrowed to a point at the tip ; upper-surface rich green, glossy and smooth, midrib grooved, primary veins deeply impressed ; under-surface coated with whitish fawn, cinnamon or rusty-brown wooly felt, midrib and primary veins 18-22 on each side prominent, greenish and smooth ; leaf stalk short, rounded and glandular below.

INFLORESCENCE: a large compact truss of 18-20 flowers, 4-6 in. across.

FLOWER :—Scarlet.

FLOWER STEM: short, hairy and glandular.

CALYX: small, a green rim at the base with 5 small triangular lobes, glandular or downy, fringed with hairs.

COROLLA: tubular bell-shaped, $1\frac{1}{2}$ to 2 in. long, with 5 lobes notched and waved at the margin, deep scarlet, rarely pink, fleshy, marked with deep coloured dots on the inside, 5 nectar pouches at the base black bloched.

STAMENS: 10, unequal, 2 in. long, filaments white and smooth.

PISTIL: about 2 in. long, ovary cone-shaped, clad with soft white hairs, sometimes glandular ; style slightly curved at the tip, smooth.

FLOWERING SEASON :—March, April, May.

FRUITS: 1 in. long, curved and hairy. October-December.

HABITAT: Darjeeling, Sikkim and practically the whole Himalayan range, 6000-11,000 ft.

R. arboreum Var. cinnamomeum differs in having the underside of its leaves covered vith a dense cinnamon-coloured coating of fine hairs and the flowers relatively small, and pale rose with purple spots in colour.

R. arboreum Var. campbelliae leaves obtuse at the base under-surface coated with rusty-brown wooly hair, flowers purple-rose.

RHODODENDRON CINNABARINUM: (*N. Sanu Chimal*) Plate III.

HABIT: a large shrub 6-14 ft. high, bark reddish-purple.

LEAVES: Oval-elliptic, broadly rounded to a short sharp point at the tip, shortly rounded at the base, up to 3 in. long and $1\frac{3}{4}$ in. broad, upper-surface smooth and shiny, lateral nerves distinct; under-surface densely scaly, greyish blue; leaf-stalk about $\frac{1}{2}$ in. long.

INFLORESCENCE: limited, 3-5 flowered, rarely more.

FLOWER :—Cinnamon Red.

FLOWER STALKS: recurved, about $\frac{1}{4}$ in. long, scaly.

CALYX: unequally lobed, 5 lobes blunt, upper lobes often larger than the lower 3.

COROLLA: tubular, narrowly funnel-shaped, widened towards the top, about $1\frac{1}{2}$-2 in. long, 5 lobes sharply pointed and equal, cinnamon-red, waxy.

STAMENS: 10, slightly hairy towards the base.

OVARY: 5 celled, scaly style little longer than stamens, hairy towards the base.

Plate III

Rhododendron Cinnabarinum.
Photo—Author

FLOWERING SEASON :—April-May.

FRUITS: ½ in. long densely scaly, September—November

HABITAT: Tonglu, Sandakphu & Sikkim Himalaya, 10,000-12,000 ft. alt.

There are two other varieties of *R. cinnabarinum var. blandfordiaeflorum* : flowers coral red outside, yellow or greenish-yellow within, calyx rim-like. Var. *roylei*: flowers deep rosy red, corolla more open, smaller than the others, calyx lobes equal.

All the three varieties can be seen at Sandakphu.

While taking photographs of these flowers at Sandakphu I was, told by my sirdar (the late Nursang Sirdar of Everest fame) that important Lamas and wealthy Tibetans make 'Jam' out of the flowers of *cinnabarinum*, and elaborated about its efficacy as a medicant for various ailments. Jokingly I told him, I had no ailments but would not mind being a Bara Lama possessing the recipe for "Cinnabarinum Jam". Much to my surprise at dinner that night he actually served me a cupful of this jam.

I have had many Sirdars in the course of my treks into the mountains among whom I found Nursang to be quite a naturalist. He was very knowledgeable on the herbs that had medicinal properties, and the qualities of hosts of other plants. He was loathe to remove a plant from its habitat, even refusing to oblige me when I wanted some magnificent sub-tropical orchid taken off a tree branch. "It will only die in Darjeeling.....too cold for it", he would say, "better where it is, it is very happy there".

RHODODENDRON FALCONERI (*N. Korlinga*). Plate IV.

HABIT: a large gregarious shrub or tree reaching 20-40 ft. bark red-brown, peeling off; foliage bud, large, conical, clothed with greenish-fawn hairs; outer scales thick at base tapering to long narrow points.

LEAVES: oblong-oval or broadly-oval, leathery, 8-12 in. long, 3-6 in. broad, tip bluntly rounded, base rounded heart-shaped; upper-surface dark mat-green, primary veins deeply impressed; under-surface coated with a dense rust-coloured wooly felt; midrib and primary veins raised, leaf-stalk $1\frac{1}{2}$-$2\frac{1}{2}$ in. long, clothed with greyish-white soft hairs.

INFLORESCENCE: a compact rounded cluster of 20-25 flowers, 5-8 in. across.

FLOWER :—Creamy white.

FLOWER STALK: $1\frac{1}{2}$-2 in. long, dull yellowish or pinkish, glandular or hairy.

CALYX: small, with 8 small teeth, wooly or glandular.

COROLLA: oblique, bell-shaped with a swelling on the lower side, $1\frac{1}{4}$-2 in. long, creamy-white, or yellowish with dark purple blotches at the base within; lobes 8, rarely more.

STAMENS: 12-16, $\frac{3}{4}$-$1\frac{3}{4}$ in. long, filaments smooth or hairy at the base.

PISTIL: $1\frac{1}{4}$-2 in. long, ovary cone-shaped, clad with glands and hairs, 16-18 chambered, style stout and smooth, at the base glandular or hairy, widened towards the broad disc-like stigma.

FLOWERING SEASON :—May-June.

FRUITS: $\frac{3}{4}$, $1\frac{1}{4}$-2 in. long, warted, October-December.

HABITAT: Tonglu, Kalapokhri and Sikkim Himalaya 9000-11,000 ft. altitude.

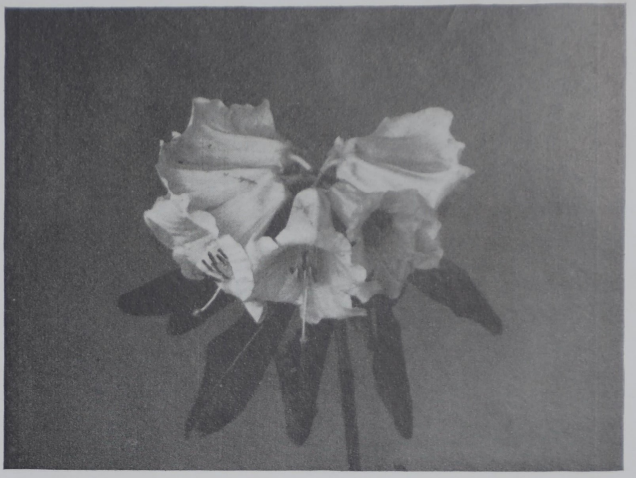
RHODODENDRON HODGSONII: (*N. Korlinga*) Plate IV.

HABIT: a large shrub or small tree 12-20 ft. high, branching from the base; dark greenish; young shoots stout, coated with greyish felted hairs; foliage buds conical, outer scales broad and oval, tapering to pointed tips.

Rhododendron falconeri

Rhododendron hodgsonii

Photos—Author



Rhododendron lindleyi

Rhododendron griffithianum.

Photos—Author.

LEAVES: Oblong elliptic to broadly oblong, tapered, 7-12 in. long, 3-5 in. broad, tip blunt or rounded or depressed, base blunt or rounded, upper-surface dark mat green and slightly wrinkled, midrib and primary veins impressed; under-surface coated with smooth grey or buff wooly felt, midrib and primary veins prominent, greenish and smooth, leaf-stalk about 2 in. long, grey-green with a thin coat of fine hairs.

INFLORESCENCE: a compact rounded cluster of 15-20 flowers, 5-7 in. across.

FLOWER :—Purple Red.

FLOWER STALKS: about $1\frac{1}{4}$ in. long and densely clad with hairy film.

CALYX: a short fleshy cup with 7 triangular teeth.

COROLLA: tubular, bell-shaped and fleshy; $1\frac{1}{2}$ in. long, dark magenta-purple in buds, fading with expansion of corolla to a paler and duller tint of purple-red, with darker blotches at the base within; lobes 7-8 rarely more.

STAMENS: 16, rarely more or less, about 1-$1\frac{1}{4}$ in. long, filaments smooth.

PISTIL: about $1\frac{1}{4}$ in. long, ovary oblong cone-shaped, $2\frac{1}{2}$ in. long, covered with hairs, ovary 9-12 chambered, style smooth.

FLOWERING SEASON :—April-May.

FRUITS: about 2 in. long coated with dull-yellow wooly hairs; November-January.

HABITAT: Sandakphu, Phalut and Sikkim Himalaya, 10,000-12,000 ft. altitude.

RHODODENDRON TRIFLORUM :

A slender shrub 4-8 ft. high; branchlets covered with small black glands.

LEAVES: oblong and tapered, sharply pointed at the tip, base blunt or rounded, $1\frac{1}{2}$-$2\frac{1}{2}$ in. long, $\frac{3}{4}$-$1\frac{1}{2}$ in. broad, smooth above, densely scaly-glandular below, leaf-stalk $\frac{1}{4}$ in. long, scaly.

INFLORESCENCE: 3 flowered, loosely set; leaf buds open along with the flowers.

FLOWER :—Yellowish or greenish white.

FLOWER STALKS: up to and about $\frac{1}{2}$ in. long, densely scaly.

COROLLA: widely funnel-shapped with 5 lobes, about $1\frac{1}{2}$ in. long, densely scaly outside, yellowish white or greenish-white, spotted with green dots, fragrant.

CALYX: small 5 lobed, lobes densely scaly and fringed with short hairs.

STAMENS: 10, extended, clad with soft hair above the base.

OVARY: 5 celled, densely scaly; style smooth.

FLOWERING SEASON :—April-May.

FRUITS: $\frac{1}{2}$ in. long covered with small scales, November.

HABITAT: Tonglu, Sandakphu and Sikkim Himalayas, 9000-12,000 ft. altitude.

RHODODENDRON DALHOUSIAE: (*N. Lahare Chimal, L. Etukop*) Plate I.

HABIT: a slender shrub, epiphyte, often growing on rocks, 5-8 ft. high, branches scaly, dark red-brown and smooth.

LEAVES: oval or broadly tapered, bluntly rounded at tip, wedge-shaped at the base, 3-6 in. long, 1-$2\frac{1}{4}$ in. broad, upper-surface green and smooth, lower-surface greyish blue, densely scaly, midrib and 10 primary veins on each side prominent leaf-stalk about $\frac{1}{2}$ in. long.

INFLORESCENCE: loosely set, about 5 flowered, rarely more, flower-stalk about $\frac{1}{2}$ in. long, clad with soft hairs and densely scaly.

FLOWER :—White.

CALYX: 5 lobed, oblong about $\frac{1}{3}$ in. long, not hairy.

COROLLA: broadly funnel-shaped about $3\frac{1}{2}$ in. long, tube smooth, with 5 broad lobes, white, fragrant, tinged with rose when fading, buds greenish-yellow.

STAMENS: 10, filaments hairy, anthers large, about $\frac{1}{2}$ in. long.

OVARY: 5 chambered, densely scaly, style scaly near the base.

FLOWERING SEASON :—May-June.

FRUITS: $1\frac{3}{4}$ in. long, October-November.

HABITAT: Darjeeling, Tonglu and Sikkim Himalaya 6000-10,000 ft.

RHODODENDRON LINDLEYI: (*N. Lahare Chimal, L. Etukep*) Plate V.

HABIT: Epiphyte on trees, often growing on rocky slopes 5-10 ft. high ; bark reddish-brown, smooth.

LEAVES: elliptic, rounded at both ends, 3—6 in. long, 1—$2\frac{1}{4}$ in. broad, upper-surface green and smooth, the nerves formed like a net-work, lower-surface smooth and scaly, scales small and unequal, about 2-3 times own diameter apart, primary veins 10—12 on each side prominent, wavy and looped near the margin, leaf-stalk $\frac{1}{2}$—$\frac{3}{4}$ in long.

INFLORESCENCE : loosely set, 4—6 flowered, rarely more, flower-stalk about $\frac{1}{2}$—$\frac{3}{4}$ in. long, densely clothed with rusty scales.

FLOWER :—Pale Yellow.

CALYX : 5 lobed near the base, $\frac{2}{3}$ in. long and broadly oblong, smooth with few scales at the base, densely fringed with soft white hairs.

COROLLA : widely funnel-shaped about 3 in. long, scaly near the base, lobes 5, rounded and notched, pale yellow, scented buds greenish yellow.

STAMENS : 10, filaments densely hairy, anthers $\frac{1}{3}$ in. long.

OVARY : 5 chambered, densely scaly, style scaly at the base.

FLOWERING SEASON :—May-June.

FRUITS : December-January, 2 in. long and scaly.

HABITAT : Darjeeling, Tonglu and Sikkim Himalaya, 6000-10,000 ft.

RHODODENDRON GRIFFITHIANUM : (*N. Seto Chimal*) Plate V.

HABIT : A tall slender shrub 8-15 ft. high, grows frequently under shade of big trees, young shoots pale green and smooth.

LEAVES : Leathery, oblong, ellipitic or broadly oval, 4-9 in. long, 2-4 in. broad, tip pointed, base rounded or pointed ; upper-surface smooth, midrib, and primary veins 16-25 on each side, distinct ; under surface yellowish-green or greyish-blue, smooth, midrib and primary veins raised, leaf-stalk 1-1$\frac{1}{2}$ in. long, rounded, pale green and smooth.

INFLORESCENCE : A lax cluster of 3-5 flowers, rarely more.

FLOWER :—White tinged with Pink.

FLOWER STALKS : 3-5 cm. long, smooth.

CALYX : saucer shaped, 2-3.5 cm. in diameter, greenish or pink tinted, outside glosy and smooth.

COROLLA : Widely funnel-shaped, about 2$\frac{1}{2}$ in. long, as much as 3-3$\frac{1}{2}$ in. across, white-tinged pink, rarely pure

white or yellowish, lobes 5, rounded and frilled, scented, young buds pink.

STAMENS: 12-118, about 1¼ in. long, filaments smooth.

PISTIL: 1½-2 in. long ovary egg-shaped, 10 chambered, greyish-green and glandular; style glandular throughout and slightly curved near the tip; stigma large, greenish yellow.

FLOWERING SEASON :—May-June.

FRUITS: 1½ in. long. purplish-brown, 10 chambered, October-November.

HABITAT: Bakhim, N. W. Sikkim, Sedonchen, and Lachung valley, N. E. Sikkim, 7000-10,000 ft. altitude.

RHODODENDRON AUCKLANDI (*Seto Chimal*)

Some authors have described *R. griffithianum* and *R. aucklandi* as the same, with pinkish white flowers. Cowan describes *griffithianum* flowers as pure white and scented, *aucklandii* as white with pink spots.

I have seen both species many times, the shrubs are similar in character except that the former is much taller, growing up to 12-15 ft. and has white flowers tinged yellow at the throat, pinkish only when in bud; while the latter growing 5-8 ft. branches always pendant bearing pure white flowers, exactly in shape and size like the former but with bright red uneven spots in the corolla, not more than 5-7, also its leaves though similar in character to the former, are much smaller in size; Seen on the road between Sandakphu and Phalut, also above Bakhim in north Sikkim at altitudes between 8000 and 10,000 ft.

RHODODENDRON EDGEWORTHII (*N. Lahare Chimal*)

HABIT: a small shrub 4-6 ft. high, often epiphytic, usually near the tops of large trees, branchlets slender, densely clothed with fine rusty hair.

LEAVES: elliptic or broadly-elliptic, tip sharply pointed, base wedge shaped, 3-4 in. long. $1\frac{1}{4}$-2 in broad, upper-surface deep green and wrinkled; lower-surface densely coated with wooly hairs, leaf-stalks $\frac{1}{2}$-$\frac{3}{4}$ in. long, wooly.

INFLORESCENCE: loosely set 2-3 flower; flower-stalks $\frac{3}{4}$ in. long, stout and densely wooly.

FLOWER :—White tinged with Pink.

CALYX: 5 large lobes, $\frac{1}{2}$-$\frac{3}{4}$ in. long, densely clad with hairs.

COROLLA: Broadly tubular with 5 lobes, slightly scaly outside, about 3-4 in. long, white tinged with pink, scented, buds deep pink.

STAMENS: 10, extended, clad with soft hair in the lower half.

OVARY: 5-6 celled, densely hairy, style longer than the stamens wooly near the base.

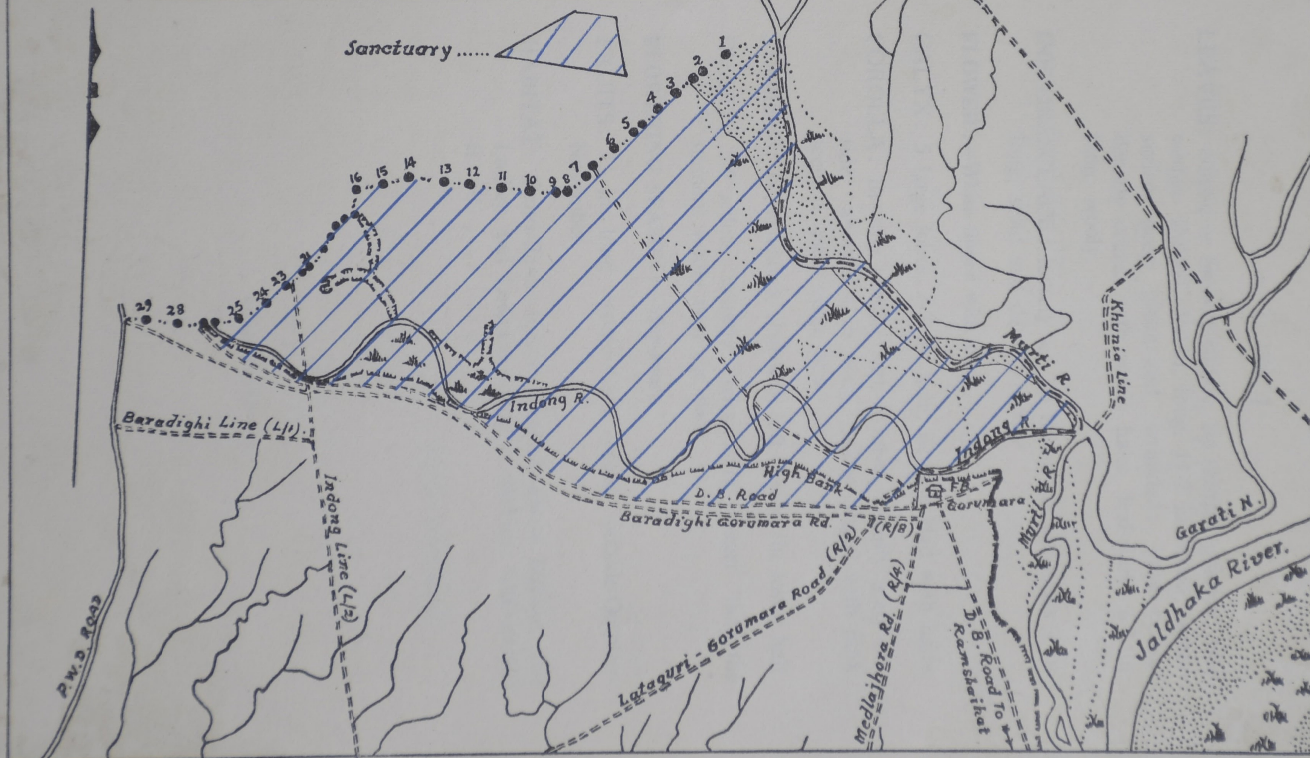
FLOWERING SEASON :—May-June.

FRUITS: $1\frac{1}{4}$ in. long wooly and scaly outside-October-November.

HABITAT: Gahri-Bans (below Tonglu), above Bakhim and Lachen and Lachung valley in Sikkim, 7000-10,000 ft. alt.

(to be continued).

MAP OF GORUMARA GAME SANCTUARY



GORUMARA GAME SANCTUARY

By

A. C. Gupta

Formerly of the Indian Forest Service.

The Gorumara Game Sanctuary stretching across 3 rivers in the Lower Tondu Forest of Jalpaiguri district, occupies an area of 3,326 sq. miles. It falls within the administrative jurisdiction of the Jalpaiguri Forest Division, and the sphere of influence of the Tista-Toorsa Game Association. The sanctuary takes its name from Gorumara a small clearing within the forest reserve on the right bank of the Indong, the smallest of the 3 rivers draining the submontane area. The clearing, which is on the western edge of the sanctuary, holds two rest-houses together with their outhouses, and is protected on 3 sides against elephants with a 4 feet deep trench. The buildings are all wooden with c. i. sheet roof. The larger 2 storeyed rest-house provides accommodation to forest officers of gazetted rank, while the smaller rest-house on stilts is meant for the non-gazetted staff. The nearest station on the Assam rail link is Chalsa with which Gorumara is connected by a first class motor road of which 6 miles are tar-macadam, and 2 miles shingled.

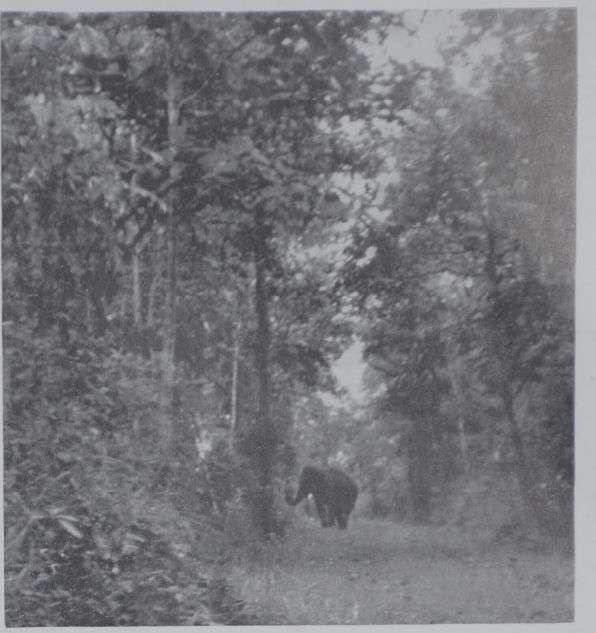
By virtue of its position on the high bank bordering a fairly extensive riverain type of forest in the combined flood-plains of the rivers, Indong, Murti, Jaldhaka and Daina, Gorumara commands from its elevated position, a pleasent view of the riverain forests stretching away to the north-east, and of the Bhutan hills beyond. The feeling of being shut within a small clearing in a fairly dense Sal Forest never oppresses a visitor to Gorumara. The high bank would be about 30 feet above the small Indong river immediately below. Gorumara is ideally situated for making observations of what goes on in the forest below, and by way of taking full advantage of this circumstance an overhanging observation platform supported by Sal log cantilever has been provided at a vantage point on the edge of the high bank. To aid observation 2 strips radiating from the Indong river immediately below are cleared of scrub

and tall grass at the end of the rains each year, and these extend upto the next river, which is the Murti. One can spend hours on this platform without feeling bored, and as many years record in the visitors' book would testify, many a visitor to Gorumara has seen, from the security of this platform, quite a number of wild animals in daylight. The one person who has seen the most is, of course, the chaukidar of the rest-house, who is always there. I remember several occasions when I had an exciting time in this sanctuary. About November, 1951, a cow-rhino with a very small calf was frequently seen. A tiger was after this calf, and one afternoon in early December when I happened to be at Gorumara with some friends, the tiger went for the calf. The cow at once charged the tiger, and a fearful battle ensued about 300 yards from the platform. There was a lot of movement, and the tall grass often obscured the view, but the little that could be seen kept the small crowd at Gorumara spellbound for 30 minutes or so. All was quite thereafter, but the battle was inconclusive. About 3 weeks later I saw the Cow-rhino and her small calf again. The calf looked normal, but the cow was emaciated, bore deep claw marks, on both flanks, and seemed to walk slowly with some difficulty. In the third week of January, 1952, the second and the concluding round of battle was fought during the night, and the poor, much weakened rhinoceros was killed together with her calf. I was not at Gorumara at the time, and the news reached me the following evening. I reached Gorumara on the 3rd day, and I found the remains of the two animals on the right bank of the Indong, a little upstream of Gorumara. This time there were two tigers, and the calf had been completely eaten together with about a third of the cow. There were no vultures, and from the signs imprinted on the soft earth no carrion eaters such as bears, wild pigs, and civet cat had visited the kill. That proved that the killers were constantly there until my arrival.

Two lone bull elephants, who were never seen together, were a feature of this sanctuary some years ago. One was a *Mukna* (a tuskless bull) while the other was a tusker with the long right tusk intact, but carrying the stump of a broken tusk

Observation Platform at Gorumara
overlooking riverain Forest.

Rhino tunnel through tall Grass
Photos—Author.



A lone *Muckna* elephant in the sanctuary

Rhinoceros (*Rhinoceras unicornis*) in wallow

Photos—Author.

on the left. While going about alone in the jungle I inadvertently came very close to both the animals on numerous occasions, but they were quite harmless, and never did anything more than making a little noise. In October, 1951, a lone tusker unknown in the country-side, appeared in the Kumani forest in the Kalimpong foothills, not very far from Gorumara, and started doing a great deal of damage to both human life and property. In November the Deputy Commissioner of Darjeeling proclaimed the animal for destruction. The animal however, continued at large, and at the close of the year he shifted his haunt to the Gorumara forest, which was in the adjoining district of Jalpaiguri. He was a stranger to the locality, and when he first arrived nobody suspected him to be the rogue from Kumani. For a week or 10 days he went about taking stock of his new surroundings, and then suddenly one day he engaged the one-tusked bull to a fight. At the end of the fight, which lasted only about two hours, the one-tusked bull was killed outright, but even then the killer was not connected with the Kumani rogue. A few days later he seized a man on the forest road, and almost reduced him to pulp. It was then that we started regarding him seriously, and we got evidence that he was the rogue of Kumani fame. Poaching in the Gorumara sanctuary became rife from November, 1951, and all efforts made by the small protective staff proved unavailing. The killing of a man had however, a very salutary effect, and as soon as the identity of the rogue was established all poachers' guns became silent. Soon after this the elephant was once again proclaimed as a rogue, but this time by the Deputy Commissioner of Jalpaiguri. One afternoon when I was at Gorumara, someone brought the news that the rogue had just been seen close by. I quickly decided that I should take him on my movie before he was destroyed. Followed by an orderly carrying a rifle I went about looking for the animal, and after a while we found him in the thick *Sal* jungle. He stood still and stared at us for a minute or two as if in amazement at someone, who did not run away from him. Then he started manoeuvring for a position from where to launch, a charge at two defiant men. I had to keep moving with him for considerations of both defence and favourable light. When I had exposed a few feet of my film the

animal grew impatient, and without further ado made a savage charge at us from a distance of about 50 yards. At first we ran for a position of vantage behind a close group of *Sal* trees, and once there, I exchanged my movie camera for the rifle, and gave the animal a shot on the head when he had come dangerously close. It was a soft nose bullet, and it found its mark rather high on the head. The massive animal was dazed all the same. Without turning he immediately put himself on the reverse gear as it were, and swayed his huge head from side to side as blood oozed out of the bullet hole. The rogue was never seen again alive or dead in any part of the North Bengal forests, and presumably he went up the Jaldhaka valley and disappeared into Bhutan.

A long tongue of forest running south from the Bhutan border on the west of the Jaldakha river is known as the Tondu Reserve and it is in the southern half of Tondu (Lower Tondu) that Gorumara is situated. At its north-western extremity it touches the Kumani forest in the Kalimpong foothills. The Kumani forest, which holds a salt-lick in Rongo compartment No. 1 on the left bank of the Nuxal Khola, has been generations past, a rendezvous for scores of herbivorous animals from the adjoining Bhutan, the foot hills forests of Kalimpong and the farthest end of the Tondu forest. There is no other salt lick to serve the animals of those forests. Upto the outbreak of World War II the sanctity of the salt lick was respected, and many well-troden game paths converged to the salt-lick from several directions through dense forest. There was a large concourse of wild animals, elephants, gaur, sambhur, cheetal, muntjac and others, to be seen in the precincts of the salt lick and as an Assistant Conservator serving in those parts some 30 years ago, I remember I used to be afraid even to approach the salt-lick. The war proved to be the undoing of many things, and the preservation of wild life was one among these. Throwing the basic principle of management of forests and of wild life to the winds, most accessible parts of forests were heavily exploited, and large clearings were made all over for labour force establishments. This fever of unbalanced action lasted for several years after the termination of the war in 1945, and a very great deal of damage was done. In the context of our

present subject, the importance of the salt-licks at Nuxal Khola to the wild life many miles around was completely overlooked, extensive clear-fellings were made in Kumani Block along the game paths, a large clearing was made fairly close to the salt lick and a forest village established therein, and finally the Rongo Block in which the salt-lick occurs was transferred to the Directorate of Commerce and Industries for the cultivation of medicinal plants. It seems strange that in the Working Plan for the management of Kalimpong forests, which was drawn up during the years, 1946 and 1947, and which prescribed the clear-fellings in Kumani Block, no provision was even made for the exclusion of forested strips along the permanent game paths leading to the salt-lick to serve as corridors. While dealing with nature human actions are often of far-reaching consequence, and the damage once done may prove difficult to repair. The facts enumerated above should prove that the actions taken over a period of years were based neither on a sound local knowledge nor on knowledge of the laws of nature.

The principal circumstance that led to the Gorumara forest being notified as a sanctuary in November, 1940, was its content of about a dozen heads of the Great One Horned Indian Rhinoceros. An area of 1129 acres was notified in that year. Later on in August, 1949, another area of 1000 acres on the east was added on. For many years the number of these massive pachyderms has remained more or less constant, the reason being that the increase resulting from normal multiplication is offset by casualties amongst cows and calves inflicted by tigers, and amongst both cows and bulls inflicted by cultivators' shots in the neighbouring paddy fields. Other than the Balapara forest on the right bank of Sankos, and the forests bordering the Torsa, the Tondu happens to be the only forest in North Bengal that still has a few rhinos. The sanctuary as it is constituted with about half of its area under thick tree forest, and the other half in the riverain area with tall grass, provides an ideal habitat to the rhinoceros. The sanctuary is small being only a little over 3 square miles in extent, and it cannot be expected to hold large animals on a permanent basis. The rhinos roam throughout the Tondu forest far beyond the boundaries of the sanctuary,

and elephants travel even farther. A few Gaur (*Bos gaurus*) come from the north each year, and spend the winter in this sanctuary. They are often seen from the observation platform at Gorumara. The Himalayan Black Bear is also a winter visitor. The tree forest is too thick to hold Cheetal deer, but there is a fair number of Sambhur and Muntjac. I have never seen a Hog-deer in this area, and perhaps there is none. Pigs constitute the staple food of the tiger. The sanctuary holds a small number of leopards, which usually live near the forest villages. There are several species of wild cats and civet cats. One interesting thing about the sanctuary is the occasional occurrence of feral buffaloes. I once saw a fairly young animal, very well built and streamlined, that had been knocked down by a heavy lorry during the night. It still bore unmistakable mark of yoke on its neck. Game birds include Pea-fowl, Kalij Pheasant, and the Red Jungle Fowl. Pythons are common in the damp areas bordering the rivers. Of vermins there are a few, the prominent being the wild dog, the otter, and the cormorant. Porcupines have burrows along the high bank on the western flank of the Indong.

Although this area was constituted a sanctuary nearly 20 years ago, nothing was ever done either here or in the other sanctuary (Chapramari) in the Tondu forest lying to its north, towards carrying out what is currently understood as Wild Life management. All that has been done is to exclude the area from shooting rights, and the provision of a small protective staff of men in lower ranks having no specialized knowledge nor training. The shooting right of the poacher however, remains unimpaired, and a game sanctuary offers him much greater attraction than a forest outside it. The portion of the sanctuary in close proximity of Gorumara, which often has visitors in the rest-houses, is disturbed a great deal by human noise, but strange as it would seem, it is here that animals are mostly seen. They have learnt from years of experience that the human beings occurring at Gorumara are friendly, and very unlike the inhuman human beings they have known in other parts of the forest. It is remarkable how quickly the wild denizens of the jungle can feel a kindly atmosphere, and how eager they are to grasp a friendly hand. This has been amply exemplified by the results achieved in the National Parks of the U.S.A. and Canada.

When the Murti river is not in flood, its bed is used as a regular pedestrian highway by people inhabiting the Ramshai and Bamandanga areas. This is highly undesirable in a game sanctuary, and unless the practice is rigorously put down now the position may become difficult later. Domesticated cattle trespassing into forest reserves carry a great many disease against which wild animals have no immunity, and it is particularly for this reason that cattle trespass into game sanctuaries has to be prevented by all possible means. In May 1931, in the Jaldapara Reserve, which has since been constituted a sanctuary, I remember having witnessed whole herds of bisons afflicted with rinderpest and dozens of fine animals either dead or in death throes. We have deaths even among wild elephants from similar causes, yet cattle trespass goes on, and thanks to the unenlightened public opinion, and the unfriendly attitude of many of the local leaders, conscientious forest officers trying to do their duty often burn their fingers. So far as the Gorumara Sanctuary is concerned, cattle trespass is common on all sides except on the west, and the number of cattle involved is often quite considerable. It would be an act of wisdom if our administrators made a determined effort to stop this before instituting any measures for wild life management on modern lines.

OBSERVATIONS ON THE INDIAN ELEPHANT.

The Indian Elephant is the largest of all the big game animals of India. It is one of the two survivors of a race of animals which were more widely distributed and had numerous species in ancient days.

In Assam, where I have done most of my observation and hunting, at one time there were thousands of elephants. They were especially numerous in the great Namba Forest, in the Langting Forest and in the Garo Hills. In the Naga Hills, there was a forest encircled all round by steep mountains. This place was strictly preserved by the Forest Department and was full of elephants.

There are three kinds of male elephants and all have distinct names. There is the "Dental" or Tusker with two tusks, which may be equal or one shorter than the other, The "Mukna" which has a pair of very short tusks directed downwards very like that of the female. Muknas are very large, of a lighter colour than Tuskers, heavily built, generally very fat, and with very deep inter-frontal fossa. The spoor of a "Mukna" is almost a circle, that of the Tusker is oval. A fight between a Mukna and a Tusker usually ends in favour of the Tusker, who has the advantage of his tusks. The "Mukna" can only get his tusks into his adversary by standing on his hind legs like a goat and then bringing these down on the tuskers head. Rogue elephants are generally "Muknas" and in captivity they often go "*Musth*" and run amok, when the small glands on each side of the elephant's head, begin to secrete, an evil smelling secretion. In Malaya, if an elephant eats the seed of the Nenering tree, he gets fighting drunk. This tree has large black beans with a whitish lining and are about two feet long. It is used in Assam for stupyfying fish. When an elephant turns tail after a fight, the conqueror tries his best to tear or bite off the bristly tuft at the end of the others tail, and of the many "Muknas" that I have examined, hardly one had a tuft.

The third variety is known as a "Ganesh", such an elephant has one tusk only, the other one not developing or getting broken during a fight. This tusk in a Ganesh is generally very long, but not thick. In old tuskers the tusks get discoloured, affected with caries and in some, take deep yellowish orange colour. Elephants must suffer from the pangs of toothache, judging from the large conical mass of sensitive pulp that fills the cavity of the tusk at its prosimal end. This caries often makes them illtempered and savage. In Assam I have never seen a white or Albino elephant. The so-called white elephants are simply those that have squirted water, containing clay, over themselves. This dried clay on the body leads to the conclusion that the beast is white. I once shot a "Mukna" which had squirted water containing yellow clay over itself and looked exactly like an anthill. The cow Elephant sometimes has small tusks. The tusk of an Elephant is composed of enamel and dentine, they are very brittle and easily snap. Just before

I left India there was an account of a dead elephant being found with a broken-off tusk, of his adversary in his brain. Whilst I was in Assam a train on the Assam Bengal Railway came across a wild elephant on the line, in a deep long cutting. The elephant, in trying to avoid the train, drove his tusk into the clay bank where it broke off. The train Driver got a very welcome piece of Ivory, gratis. It is an awful business getting the tusks out of an Elephant and one must be prepared for a long weary task of hacking and cutting. In the process, one gets covered with blood, pieces of flesh and bone. This must be done at once, as, if you leave them on the dead Elephant even for a night the tusks may be stolen. Two-thirds of the tusk are outside and one-third imbedded in the bony socket, this is just the opposite to a boar's tusk, one-third being outside and the remainder embedded in the jaw. The hollow cavity at the end is filled with a conical purplish pulp, which looks exactly like the unopened flower of the plantain tree. I have been told that Aix folitda smeared round the entrance of the tusk into the cavity will loosen it in no time, but I have never tried this. Sometimes a rope hitched round the tusk and getting an Elephant to pull will hasten matters. At some salt licks, I have seen holes bored into the clay by the tusks, made when the beast is trying to eat the saline stuff. One may see impressions of the tusks on the ground where the animal has sat down, giving valuable indications of their massiveness and size. The ends of the tusks may terminate in a sharp point, but in one elephant I shot they were flattened like the blade of a sabre The tusks are useful to the animal to rest his trunk on. One often sees a tusker resting his trunk on the curve of the tusks, taking the weight off, and relaxing the muscles. In tame elephants, the ends are generally sawn off and an iron ring put round to prevent splitting. An elephant rarely uses his tusks to kill a wounded tiger. He trusts more to pressure by his head or foot, and if he can get the animal between his legs, he simply tosses it backwards and forwards until almost every bore is broken. A human being is either stamped on, torn limb from limb, or caught in his trunk and flung some distance. Mr. Cabe D. C. of the Garo Hills was thus treated whilst he was fishing. The rogue coming up

behind him. In knocking down trees, the elephant places his forehead and forefoot against it and then brings his whole weight to bear. It is marvellous what huge trees can be felled in this way, this gives one an idea of the strength of the beast. The animal that the elephant most fears is a Rhino, and I think any small dog comes next. They are very afraid of snakes, and once my elephant stampeded when a Hamadryad passed close to him. Fire, of course, alarms them but rogues who raid paddy fields soon get accustomed to flames of torches and go on with their work of destruction in spite of these. A young Elephant is a jolly little chap. He is born with hair which is shed afterwards. The trunk is short and not at all proportionate to the body. The young suck milk from the mother with their mouths, not with their trunks as is sometimes thought. If the trunk was longer, it would interfere in this operation. The mammae of the female are situated well forward between the forelegs and not behind, like in most animals. They are exactly in the position of the human breast. A young Elephant is the pet of the herd, and not an Elephant harms it. When lying down, they are very careful not to tread on it. Elephants are excellent swimmers, the trunk being kept above the surface of the water. Elephants need an enormous quantity of food, and owing to the comparatively short intestine, digestion is very rapid. The Elephant feeds on bamboos, ringall, all kinds of grass, reeds and null. They like the leaves and bark of the Peepul (*Ficus religiosa*) wild fig, Acacia, wild cardamom, banyan, wild and cultivated plantains. The elephant apple *Octunga* is also eaten. In captivity the elephant is given Flour cakes "*Chupatties*," paddy in husk, Gur, and salt. To consume all this amount of food, the elephant feeds almost 20 hours out of the 24, and it is said that it sleeps only two hours, and two hours are spent during the heat of the day resting under some large shady tree or bathing in a pool or river. At night they come on to the sand banks of rivers and throw sand all over their bodies, especially over the head and back. They allow liquid mud to cake on their bodies to ward off the attacks of insects. Once I saw an elephant emerging from a wallow covered with black slime, his body glistening in the sun. He walked quitely up a slope, had a look at us and then disappeared. The elephant, when going to sleep lies

straight out, the trunk is coiled and rests on one foot. I believe they also sleep standing, but not for long. Elephants have a great dread of quagmires and quicksand. A friend of mine once saw an elephant bogged and disappear in a quagmire. Branches were thrown to it, which it tried to drag under it, of course, no one dared go near it. At last only the tip of the trunk appeared above the surface and then it too disappeared. When going over a bridge or ground that it is not certain of, the elephant will test its strength by first placing a foot on it, or feeling with its trunk. A good shikar elephant will raise its trunk in the air, if any game is near. Hitting the trunk against the ground is done when there is danger. When an Elephant kicks up the soil with its fore feet and cocks his ears it is a sure sign that he is angry and will charge. Trumpeting generally gives the alarm of danger. A faint rumbling sound denotes pleasure. When in pain or when they are fighting a tremendous noise is produced being a mixture of a trumpet and bellow. A faint squeaking noise is generally one of pleasure. The Indian elephant charges with the trunk coiled and head held high. Elephants will ascend very high up in hilly areas, and it is astonishing how such huge beasts manage to get up the steep inclines. I have seen tracks at an elevation of 8000 feet and apparently the animals had been feeding as they moved up, as all along the upward route there were uprooted ringalls and small trees. In going up a steep bank, a tusker may kneel in which case his tusks leave great holes in the soil if its clayey. The stiff brush at the end of an elephant's tail is often used to clear away any fibrous undigested vegetable matter that may accumulate near the root of the tail on the under side. One will often see an elephant coil the tail and then drag the brush from one side to the other, the trunk cannot reach that part.

Where there are elephants, Gaur will generally be found and *vice versa*. Elephants have a natural dread of man, except rogues and among these the worst one is an Elephant that has escaped from captivity. It is extraordinary what little noise a herd or an Elephant will make, when going quietly, or grazing in a forest. The cracking of a bamboo or the swish of a branch generally gives them away. Once when

shooting green pigeon, I was leaning against a tree, waiting for the birds, when I heard a faint rustling sound, and looking in the direction, saw about 50 yards away a herd of about 40 elephants. They had not scented or seen us, and I must have watched them for ten minutes, from behind my tree. All of a sudden, a young one trumpeted and the herd retreated almost noiselessly.

Years ago vast herds of elephants roamed the jungles of Assam, especially in the Namba, Langting and Garo Hill forests. They were also numerous in the Khasia hills and in the forests lying at the foot of the Bhootan and Dafla ranges. "Keddah" operations on an extensive scale have reduced their numbers, but there are still plenty more and if Kheddah operations are suspended for a time, I see no reason why they should not increase. A rogue elephant is a solitary tusker grown old with age or a "Mukna". He is kept away from the females by the younger bulls, and when in "*Musth*" destroys everything he can, telegraph poles, bridges, roofs of houses, milestones and any human being unlucky enough to get in his way.

All the milestones in the Langting forest of the Assam Bengal Railway had to be spiked. But this did not prevent the rogues from tearing them up, and I have seen heaps of them lying beside the Railway track. These rogues come down to the plains in winter when the crops are ripe and do tremendous damage, sometimes ruining in a single night a whole year's crop. They fear nothing. Complaints are made to the Magistrate of the district who proclaims the rogue to be destroyed. Description of the elephant is put in the provincial papers of the district. A reward for his destruction is given varying from Rs. 50 to Rs. 500 according to the damage wrought. I think the Khasia and Garo hills held most rogues. In the former district in one year no less than five were proclaimed.

An elephant, at least the Indian one, cannot stand heat. The animal is constantly cooling itself by flapping his ears and squirting saliva or water over his body. Flies etc. are blown away by a blast of air through the trunk. The elephants

skin is not very thick, and mosquitoes, flies and gad flies worry the animal terribly. I have seen my elephant streaming with blood from the bites of gad flies.

The age of an elephant can be roughly guessed by observing 1. The overlapping of the upper portion of the ear. In a young elephant, or one in its prime, there is no turning over of the top of the ear. As age advances, this turning down becomes more marked. 2. Hollowness of the temples and greater prominence of the frontal bones on the top of the head are signs of age. 3. Condition of the skin, which gets wrinkled and loose in old age. Twice the circumference of an elephant's foot will give approximately the height at the shoulder of an elephant.

Anonymous.

(*To be Continued*)

(This article is we believe written by Col. H. S. Wood, as the one on the Buffalo, published earlier. The period would be the last years of the 19th century and the first decade of the present century. —Editor).

SAP DRINKING BUTTERFLIES

By

A. S. Bhaduri

Every year in winter the Date Palms, *Phoenix sylestris* (Roxb.), in our locality of Assam are tapped for toddy. Earthern jars are fixed to the palms and the filled jars are emptied and replaced in the morning. The palms are left to drip the sap all day. This sap which exudes a smell, is a powerful attraction for a great many species of butterflies which pass almost the whole day sipping the smelly sap and flying round the trees.

My observations on sap drinking butterflies was conducted on a palm about 20 ft. high standing by the side of a small pond with a few bushes near it. The palm was peeled near the top by the toddy tapper and the sap oozed out to drip along the trunk and pervade the whole area with the sickly sweet smell of toddy. I found the butterflies wherever the sap fell, both along the trunk and on the ground. Majority of the butterflies consisted of Pansies—Grey (*Precis atlites*), Peacock (*Precis almana*), Lemon (*Precis lemonias*), and Yellow (*Precis hierta*) predominating in that order. Other species seen were Barons (*Euthalia* sp.), Sergeant (*Pantoporia* sp.), Sailors (*Neptis* sp.), Evening Browns (*Melanitis* sp.), Bamboo Tree Brown (*Lethe europa*), Palmflies (*Elymnias* sp.), etc.* Curiously enough though I found a couple of Lime Butterflies (*Papilio demoleus*), a common Mormon (*Papilio polytes*), and a few Grass Yellows (*Terias* sp.), flying within a few yards of the tree, none of them showed the least interest in the toddy.

The top of the palm from where the sap was oozing out was exclusively occupied by a species of black wasp with its abdomen conspicuously banded with orange and by a species of large bee. Often I found a wasp dropping down to the bush below with a bee struggling in its grasp, which was more often killed than allowed to escape by the wasp. The butterflies let this part of the palm alone, but occasionally one or two would fly up and knock and tumble around for a seat, however I never found the wasps aggressive towards them.

The Butterflies were found in diverse groups or singly on the flow of sap along the trunk. One group of six which I observed sitting very close together with wings spread flat and touching consisted of three Grey Pansies (*Precis atlites*), one Common Sailor (*Neptis hylas*), and one Baron (*Euthalia garuda*). A little below this group were two Barons, a pair as evident from the colour. The butterflies were slow drinkers. I found a common Palmfly female (*Elymnias hypermnestra*) alighting on the trunk to sip at 10-4 A.M. and leaving for the bush below at 10-13 A.M. having spent nine minutes on the

*A full list of the Butterflies observed is given at the end of the article.

palm. The Baron very often took much longer time. I found some of them on the trunk for more than half an hour the only movement being the shifting of their pale green proboscis. On the wing the Barons were remarkably swift fliers. I could often here the faint flurry of their wings as they sped past me, and when sitting on the tree their drab light or dark brown colour afforded a wonderful example of cryptic colouration, as then they can be hardly distinguished from the trunk. The same is true in the case of the Grey Pansies.

Sap drinking species do not seem to occur in all the butterfly families. I have found only the butterflies of the Nymphalid and Satyrid Families on the palm. However not all the species of these families are attracted. Among the Nymphalids, I found the Lacewings (*Cethosia* sp.) and the Cruisers (*Cynthia erota*) to be unattracted though they were to be seen in the neighbourhood visiting the flowers of the Cosmos. Among the Satyrids, the Rings (*Ypthima* sp.) which I saw among the grass and weeds near the palm never showed any desire for the sap. The Emigrants (*Catopsilia* sp.), which were exceedingly plentiful, and the Great Orange Tip (*Hebomoia glaucippe*), and Jezebels (*Delias* sp.) among the Pierids, Great Mormons (*Papilio memnon*) and Yellow Helens (*Papilio helenus*) among the Papilionids, Common Crows (*Euploe core*), Plain Tigers (*Danais chrysippus*), and Tawny Tigers (*Danais plexippus*) among the Danaids, all of which were common in the area did not show any interest in the sap.

The habit of the Butterflies which made watching them interesting and a pleasure was what I would term the 'Chase'. Herein a Pansy or a Baron which had been flying sedately along would suddenly dart after another butterfly of the same species or a different species, their flight would undergo a complete transformation and it is a revelation to watch their complete mastery of the air, as they swooped and swerved and twisted and turned after each other with uncanny precision. The chased one would be worried and jostled about in the air till it escaped or took shelter in a bush, where it would spread its wings or slowly move them till the attacker left it. This spreading of the wings seems to have special significance, perhaps

it helps recognition by showing the markings on the wings. I once saw a female Common Emigrant (*Catopsilia crocale*) after being chased and jostled a lot in the air by a male, settle on a leaf where it spread its wings and raised the abdomen stiffly up. This had an immediate effect on the male which stopped fussing her and fluttered round in the vicinity, but as soon as the female began flying the male resumed the chase.

My notes on a day's observation in November, of the species of butterflies and other insects which came to the palm is given below.

6 A.M. : No butterflies on the palm, only wasps and bees.

8 A.M. : The following species were seen, Common Serjeant (*Pantoporia perius*), Colour Serjeant (*Pantoporia nefte*), Common Sailor (*Neptis hylas*), Grey Pansy (*Precis atlites*), Lemon Pansy (*Precis lemonias*), Baron (*Euthalia garuda*), Common Palmfly (*Elymnias hypermnestra*), Blue spotted Palmfly (*Elymnias malelas*), Gaudy Baron (*Euthalia lubentina*), Bamboo Tree Brown (*Lethe europa*), Common Evening Brown (*Melanitis leda*), and Peacock Pansy (*Precis almana*).

A Common Serjeant intimidated a Common Sailor in an interesting manner. It settled near the Sailor which was drinking the sap and after some desultory groping with its proboscis, began to move towards the Sailor in short, purposeful spurts. When quite near the Sailor, it drew itself up with wings spread flat, head end held high and Antennae rigidly apart. The pose seemed to frighten the Sailor, which flew off and settled on another part of the trunk.

There were about 24 butterflies on the palm when I left at 8-45 A.M.

9-30 A.M. : Species seen, Grey Pansy 5, Peacock Pansy 5, Lemon Pansy 2, Common Serjeant 3, Colour Serjeant 2 (♂♀), Baron 6 (4 ♂,2♀), Common Sailor 2, Commander (*Lemenitis procris*).

A Leopard Lacewing was seen in the vicinity. At about 11 A.M. a very frayed Clipper (*Parthenos sylvia*), which in spite of its torn wings showed a magnificent turn of speed settled high up on the trunk.

The Colour Serjeant male was the most active among this company of butterflies with the Grey Pansy running a close second. It was always alert and spiritedly gave chase to a number of butterflies of different species often in the company of the Grey Pansy. The behaviour mentioned in the case of the Common Emigrant appeared to be true in the case of the Colour Serjeant also. A female Colour Serjeant chased by a male reacted in the same way, resting on a branch with spread wings which were swayed gently, the male leaving it alone during this action but resuming the chase as soon as it flew.

1 P.M. : Species seen, Clipper, Colour Serjeant, Blue spotted Palmflies 4, Grey Count (*Euthalia lepida*), Knight (*Lebedea martha*), Common Evening Brown, Nigger (*Orsotroiena medus*), Commander and a Tawny Rajah (*Charaxes polyxena*) which took sips flying at a tremendous speed up and down the palm, the whirr of its wings being quite audible. The Clipper adopted the same intimidating pose for driving away a Serjeant as the Serjeant had done for driving away a Sailor earlier in the day.

3-30 P.M. : The Palm looked almost deserted except for the wasps and bees.

There were only a Common Palmfly and a Common Evening Brown.

5 P.M. : Only the Evening Browns were to be seen skipping on and about the palm, silent and ghost like in the failing light.

The following list is of Sap drinking butterflies observed by me. Sex differenciation was by sight.

Tawny Rajah (*Charaxes polyxena*) ♀

Clipper (*Parthenos sylvia*)
Knight (*Lebedea martha*)
Commander (*Limenitis procris*)

Painted Courtesan (*Euripus consimilis*) ♂

Colour Serjeant (*Pantoporia nefte*) ♂ ♀
Common Serjeant (*Pantoporia perius*)
Common Sailor (*Neptis hylas*)
Grey Count (*Euthalia lepida*) ♀

Gaudy Baron (*Euthalia lubentina*) ♀
Baron (*Euthalia garuda*) ♂ ♀
Peacock Pansy (*Precis almana*)
Yellow Pansy (*Precis hierta*)
Lemon Pansy (*Precis lemonias*)
Grey Pansy (*Precis atlites*)
Bush Brown (*Mycalesis* sp.)
Bamboo Treebrown (*Lethe europa*)
Nigger (*Orsotroiena medus*)
Common Evening Brown (*Melanitis leda*)
Blue spotted Palmfly (*Elymnias malelas*) ♀
Common Palmfly (*Elymnias hypermnestra*) ♂ ♀

BIRDS OF THE DUARS

By

(Late) C. M. Inglis, M.B.O.U., F.Z.S.

(*Continued from Page 94 of Vol. 29, No. 3, December, 1957*)

193. The Yellow-bellied, or Tickell's Willow-Warbler

Phylloscopus affinis (Tickell)

Fauna B. I. 2nd Ed. No. 852.

Description :— Length 4½ inches. Sexes alike. Upper plumage olive-green, a distinct yellow eyebrow with a brown line beneath it through the eye ; lower plumage and under the wings, yellow suffused with olive on the flanks.

Bill dark horny above, pale yellowish-horny below; iris dark brown ; legs yellowish-brown or dark brown.

There is no trace of wing-bar.

Distribution and habits :— This easily recognized species, of a very difficult genus, is a winter visitor from August up to the end of March. It frequents scrub-jungle, old cultivation and not so often, forest. It is seen either singly or in parties and according to Davison, in the Nilgiris, it frequents gardens where it hunts in the flowers, and vegetables, and destroys a great number of insects. He found parties of 20 or 30 of them feeding on the ground and apparently it obtains much of its food there. Its note is a feeble *tsip tsip* repeated frequently.

194. The Siberian, or Brown Chiff-Chaff

Phylloscopus collybita tristis Blyth.

Fauna B. I. 2nd Ed. No. 854.

Description :— Length 5 inches; Sexes alike; Upper plumage brown, sometimes tinged with green, a buff eyebrow, with a brown line beneath it through the eye, lower plumage buff, palest on the chin, throat and abdomen, feathers under the wing primrose-yellow.

Bill blackish-brown; base of lower mandible paler; iris dark brown; legs black to dark brown.

A dull coloured bird. There is no trace of a wing bar.

Distribution and habits :— A very common little bird in the winter, coming into gardens and hunting assiduously for insects, on shrubs, in trees and in hedges. It is constantly on the move and is seen singly or in parties, sometimes it captures insects on the wing. In Bihar it was one of the commonest winter visitors, numbers frequented a *Poincettia* avenue near the bungalow.

195. The Smoky Willow-Warbler

Phylloscopus fulginiventer (Hodgson)

Fauna B. I. 2nd Ed. No. 859.

Description :— Length 4½ inches; Sexes alike Upper plumage dark brown tinged with olive, a narrow dusky-yellow eye-brow with a dark brown line below it, passing through the eye, sides of the head buff olive-brown, lower plumage dusky yellow with dark olive-brown on the breast and flanks. Feathers under the wing deep olive tinged with yellowish.

Bill black, lower mandible horny brown; iris brown; legs greenish brown.

It cannot be mistaken for any other species as it is a very dark coloured bird. There is no wing-bar.

Distribution and habits :— A common cold weather visitor remaining, at any rate, upto the end of March. In the Duars it is decidedly aquatic keeping largely to bushes, and dense vegetation, near streams, generally seen in pairs keeping low down, or even on the ground.

196. The Indian Dusky Willow Warbler

Phylloscopus fuscatus fuscatus (Blyth).

Fauna B. I. 2nd Ed. No. 860.

Description :— Length 5 inches ; Sexes alike ; Upper plumage brown, a distinct buff eyebrow with a dark brown streak below it, running through the eye, sides of head buff and brown, chin and throat whitish, lower plumage buffy-yellow, more fulvous on flanks and sometimes the centre of abdomen is washed with cream, feathers under the wing fulvous.

Bill above horny-brown, lower mandible yellowish with the tip dusky; iris dark brown; legs dusky flesh.

There are no wing-bars.

Distribution and habits :— A common winter visitor remaining, at any rate, well into March, probably later. It

frequents scrub jungle heavy grass, tea-bushes, garden hedges and reeds near water, where it keeps low down and also descends to the ground where it finds part of its insect food. It is a great skulker. I have often put them up while walking through the tea.

197. Weigold's Willow-Warbler

Phylloscopus fuscatus weigoldi, Stresemann.

Fauna B. I. 2nd Ed. No. 861 part.

Description :— Closely resembles the last species in size and colouration but the upper plumage is much darker. "Its abelline colours in plumage is reduced so that the supercilium (eye-brow), throat, cheeks, breast, flanks and under wing are more greyish-white and have only a slight isabelline wash. The centre of the belly has a slight creamy tinge" (Ticehurst).

Bill nearly black except base of lower mandible; iris brown; legs almost black.

Distribution and habits :— I obtained two specimens of this Willow-Warbler on the 4th. March, 1928 and the 14th February, 1929. They were identified by C. B. Ticehurst the leading authority on the genus. It ascends to a high altitude. Ludlow found it at 12,500 feet in S. E. Tibet. It frequents the same sort of situations as the smoky Willow-Warbler but is, also, found in long grass.

198. Eastern Ashy-throated Willow-Warbler

Phylloscopus maculipennis maculipennis (Blyth).

Fauna B. I. 2nd Ed. No. 863.

Description :— Length 4 inches ; Sexes alike ; Head brownish-grey with a broken central coronal-band and very distinct whitish eyebrow from base of bill to nape, and a brown streak below it, through the eye, rest of upper plumage, except the yellow rump, yellowish green, wing, brown with two yellowish-white wing-bars, that of the greater wing-coverts very distinct, chin to upper breast, pale grey, rest of lower plumage

yellow, tail dark brown with the inner webs of three outermost feathers white, feathers below the wing yellowish.

Bill black; iris dark brown; legs yellowish-brown. Easily recognized by its small size, yellow rump and the white on the tail.

Distribution and habits :— The only place where I have found this diminutive and pretty Willow-Warbler is Baksa Duar. It is said to come down to 1,000 feet elevation in the winter but is, usually found above 2,500 feet. It is a forest loving bird, generally keeping high up in the trees. Its note is a constantly repeated *zip*.

199. The Nepal Orange-barred Willow-Warbler

Phylloscopus pulcher pulcher Blyth.

Fauna B. I. 2nd Ed. No. 864.

Description :— Length about $4\frac{1}{4}$ inches. Sexes alike. The crown and a line below the pale greenish buff eyebrow, dark olive, down the centre of the crown there is an indication of a very faint yellowish streak, upper plumage olive-green, rump pale yellow, wings brown with an indistinct yellowish olive bar and another conspicuous orange one, the three outermost pairs of tail-feathers largely white ; lower plumage greyish yellow, yellowest on the abdomen and below the tail, feathers under the wing pale yellow.

Bill black, base of lower mandible yellowish; iris brown; legs dusky greenish.

Easily recognized by the orange wing-bar.

Distribution and habits :— The only specimen I obtained of this small Willow-Warbler was at Baksa Duar on the 2nd. March, 1918. It is a forest bird and does not usually come down lower than 3,500 feet but occurs as high as 11,000 feet, according to Stuart Baker as high as 13,000 ft. Ticehurst says "The call note is a thrush-like "*Zip*" loud for so small a bird" and that its song ends with a trill.

200. The Nepal Yellow-rumped Willow-Warbler

Phylloscopus proregulus chloronotus (G. R. Gray).

Fauna B. I. 2nd Ed. No. 866.

Description :- Length about $3\frac{1}{2}$ inches. Sexes alike. Top of head and nape dark olive-brown, a broad eyebrow, and streak down centre of the crown, dull dirty yellow, upper plumage ochraceous-olive, rump lemon-yellow, wings brown with two conspicuous yellowish-white wing bars, lower plumage dirty greyish yellow, feathers under the wing pale yellow.

Bill above and terminal half of lower mandible, black, rest of lower mandible orange-yellow; legs dingy greenish-brown.

Recognizable by its lemon-yellow rump, from the Ashy-throated Willow-Warbler, and from the last species by having no white on the outer tail-feathers. The yellow rump is very conspicuous in the field.

Distribution and habits :— This is a bird of high elevations (up to 13,000 feet) in summer and the foothills during the winter. It does, however, occasionally wander well into the plains as I secured a specimen in the Moraghat forest (350 feet) on the 28th December, 1950. It is, of course, only a winter visitor, my specimens were collected from December to the middle of February. Stevens obtained it at Bhutan ghat in January. It is a sociable bird during the winter, joining hunting parties of other small birds and has a preference for light jungle and scrub especially in riverbeds. Its song is said to be rich and modulated.

201. The Yellow-browed Willow-Warbler

Phylloscopus inornatus inornatus (Blyth).

Fauna B. I. 2nd Ed. No. 871.

Description :— Length 4 inches ; Sexes alike ; Upper plumage olive-green, a faint greyish green streak down the centre of the crown, a broad yellowish eyebrow, extending to the nape,

infront of the eye, and a line below the eyebrow behind the eye, dark olive-green, wings and tail dark brown edged with olive-green, the former with two conspicuous yellowish-white wing-bars, lower plumage white more or less washed with yellowish, feathers under the wings yellowish white.

Bill brownish-horny above, lower mandible yellowish fleshy, tipped with brown ; iris dark brown ; legs ochraceous-brown.

Recognizable by its small size, two conspicuous wing-bars and by having no yellow on the rump.

Distribution and habits :— A common winter visitor. My specimens were collected from December to the third week in March. It is partial to open forest, groves, gardens etc. generally keeping high up in trees, it also joins hunting parties of small birds. Its rather plaintive notes are often heard while hunting for its insect food and prior to its leaving its winter habitat, they are described as *te-we-cet* or *tis-yip*.

202. The Greenish Willow-Warbler

Phylloscopus trochiloides viridanus (Blyth).

Fauna B. I. 2nd. Ed. No. 875.

Description :— Length about 4¼ inches ; Sexes alike ; Upper plumage dull olive-green, wings and tail brown, the former with a single wing-bar, a well defined yellowish-white eyebrow with a dark olive line below it, sides of the head dull yellowish-white, mottled with olive, lower plumage pale greyish-yellow, feathers under the wing yellowish-white.

Bili horny brown above lower mandible horny yellow ; iris dark brown ; legs olive-grey.

With regard to distinguishing features between it and some others Ticehurst writes "*occipitalis* has a double wing bar and a pale mesial coronal streak, *magnirostris*, which also may show only a single wing bar, has very distinct call note and song, and is larger" (*Systematic Review of the Genus Phylloscopus*).

Distribution and habits :- A Willow-Warbler obtained by O'Donel at Rajabhatkhawa, on the 17th January, 1926 was identified by Whistler as this species. It is, of course, only a winter visitor. I have never come across it. It is a solitary bird not joining other small birds in their hunting-parties. It frequents both trees and undergrowth and has, what Ticehurst calls a penetrating "*chiwee*" call note.

203. The Dull Green Willow Warbler

Phylloscopus torchiloides torchiloides (Sundevall)

Fauna B. I. 2nd Ed. No. 880.

Description :— Length 5 inches ; Sexes alike ; Upper plumage dark olive-green, a yellowish white eyebrow, infront of the eyes and a streak behind them, dark olive-brown, wings and tail dark brown, the former with a single yellowish wing-bar, sometimes an upper wing-bar is indicated, lower plumage yellowish-white suffused with grey, especially on the sides of the breast and flanks, feathers under the wings pale yellow.

Bill horny brown above, lower mandible yellow; iris dark brown ; legs fleshy-horn and horny-brown.

The differences between this and the Large-billed Willow-Warbler are given under that species.

Distribution and habits :— This is, perhaps, the commonest Willow-Warbler which visits us during the winter. I have collected many specimens from all over the district from October to the middle of March. It is found in forest, both open and dense, also in undergrowth. Weigold described its note as follows "*sittja sittja sittja-zwiwitt zwiwitt zwiwitt-zittitt zittitt zittitt*". I hope my readers can follow this I am afraid it is beyond one. Ludlow only heard a few musical chirps. Its call-note is given as *dschiewist* and its warning note as *errk*. In the breeding season it is found as high as 14,500 feet.

204. The Large-billed Willow-Warbler

Phylloscopus magnirostris Blyth.

Fauna B. I. 2nd Ed. No. 878.

Description :— Length nearly 5½ inches ; Sexes alike ; Upper plumage dark olive-green, a conspicuous yellowish-white eyebrow from the base of the bill, with a dusky olive line below it in front of and behind the eyes, wings brown with a single, yellowish-white wing-bar, the median wing-bar being scarcely indicated, sides of head mottled olive and yellowish, lower plumage yellowish-white, suffused with olive-grey on the breast and flanks, feathers under the wing greyish-yellow.

Bill above dark horny, lower mandible plumbeous or brown, pale flesh at base ; iris dark brown ; legs dark blueish-slate or greyish-brown.

It very closely resembles the common Dull Green Willow-Warbler. Ticehurst writes as follows. "These two species are very alike and can easily be confused, poor specimens, unsexed or wrongly sexed, may be impossible to differentiate". He says the upper parts in this are a little greener and in the Dull Green Willow-Warbler a little browner also in the latter the whole of the lower mandible is yellow.

Distribution and habits :— O'Donel obtained one specimen at Haldibari on the 21st August, 1929. Ticehurst says the best differentiation of this bird in life is the distinct call note" well expressed by "*dirtee*" the second syllable half an octave higher than the first" that of the Dull Green Willow-Warbler sounding like "*dschiewist*". It is a solitary bird and frequents ever-green forest and shady trees during the winter preferring those in which there are open spaces, it keeps more to the boughs than the leaves.

205. The Himalayan Large Crowned Willow-Warbler

Phylloscopus occipitalis (Blyth).

Fauna B. I. 2nd Ed. No. 881.

Description :— Length 5 inches. Sexes alike. Upper plum-age olive-green, the head is darker and browner an indistinct

yellowish-grey streak down the centre of the crown and a broad, dusky-olive one on each side of the head above the eye, a well defined yellow eyebrow extending to the nape with a dark olive line beneath it and infront of the eye, wings brown with two indistinct yellowish-white wing-bars that on the median wing-coverts often absent, lower plumage dull white tinged with pale grey on breast and flanks, feathers under the wing primrose-yellow. Bill brown above lower mandible orange-yellow ; iris brown ; legs greyish-brown or brownish-slate.

In its winter habitat it is the only Willow-Warbler with coronal streaks except the Crowned Willow Warbler in which according to Ticehurst "the mesiel coronal streak and upper parts are yellower, some yellow on underparts, bill smaller, wing bands broader".

Distribution and habits :— O'Donel secured a single specimen at Rajabhatkhawa on the 2nd December, 1925 and I, another at Hasimara, on the 8th March, 1926, the latter was identified by Whistler. It is a bird of open forest, spending its time hunting for insects both in the trees and bushes. It moves about continually, flipping one wing and its call-note is *chip-chip* often repeated, its song is a loud monotonous *cha-chi*.

206. The Himalayan or Blyths-Crowned Willow-Warbler

Phylloscopus reguloides reguloides (Blyth).

Fauna B. I 2nd Ed. No. 883.

Description :— Length 4½ inches. Sexes alike. Very similar to the last but is smaller, the upper plumage is a brighter green and the central streak down the centre of the crown yellower, the wing bars are broader. The tail is dark brown with the inner web of the two outer feathers narrowly edged with white. It is distinguished from the Ashy-throated Willow-Warbler and the Orange-barred Willow-Warbler by the absence of the yellow rump.

Bill dark brown above, lower mandible yellow ; iris brown ; legs yellowish plumbeous.

Distribution and habits :— I have obtained specimens of this Willow-Wren at Hasimara, Binaguri and in the Moraghat forest from the beginning of December to the middle of March. Stevens secured seven specimens at Bhutanghat in January. This Willow-Wren has the same habits as the former species.

207. The Khasia Crowned Willow-Wren

Phylloscopus reguloides assamensis Hartert

Fauna B. I. 2nd Ed. No. 884.

Description :— Resembles the last but is darker and brighter, the yellow bars on the wing broader and yellow and usually there is more white on the inner webs of the outer tail-feathers, sometimes the whole inner web of the outermost one is, more or less, white mottled with dusky-grey. Ticehurst says it is "a poor race and single birds cannot be identified for certain. The size is the same as in *reguloides*, not smaller as has been stated".

Distribution and habits :— It seems to be slightly commoner than the last. Nearly all the specimens I secured were from the Moraghat forest from January to the end of March. It frequents wet evergreen forest and apparently, during the breeding season, descends to the ground as Stuart Baker found it nesting in holes in moss-covered banks and among the roots of trees, in Assam. Its habits are like those of the Willow-Wrens already described.

(to be continued)

A CATALOGUE OF PLANTS OF THE SIKKIM HIMALAYAS.

By

B. N. Ghose.

(*Continued from Page 106, Vol. 29, No. 3, December, 1957.*)

Discifloral : Sepals free or adnate to the ovary, Disc usually conspicuous as a ring or cushion or spread over the base of the calyx tube. Stamens variously inserted on the disc, Leaves pinnate or digitate.

Family Sapindaceae : (derivation, Latin: Soap and Indian, alluding to the use of the fruit as soap in India) Fruit not samaroid. Trees or shrubs with palmately compound leaves. Fruit of many forms.

Genus Erioglossum Blume: Flowers irregular, ovule solitary ; fruit deeply divided ; leaf pinnate ; stamens 8 more or less turned to one side. Trees or Shrubs.

Erioglossum edule Blume: A large timber tree with pubescent shoots and inflorescence. Leaflets 8-12 in number. Flowers in clusters arranged in panicles, sweet scented, flowering season April ; Wood chocolate coloured strong and useful commercially; Distribution, Sundari Jhora, 2,000 ft. Eastward to Burma and Andamans.

Genus Allophylus Linn.: Flowers very small, irregular, white or yellow, Stamens 8 inserted on the receptacle inside the disc ; fruit deeply divided ; Leaves 1-3, foliolate.

Allophylus zeylanicus Linn.: A small tree with terete branches. Leaves unifoliate, petioled. Flowers in June, small ; Fruit globose, red ; Distribution. Sikkim at 1-3,000 ft. in Lat forest upto 4,600 ft.

Var. *grandifolia*, Shrub; Leaves ovate or widely repend, denticulate and membranous ; Fruit, red, in February ; Distribution, Sikkim at 3,000 ft.

Local names : Nep stands for Nepali, Beng. for Bengali and Lep for Lepcha.

Genus Aesculus Linn.: Large Shrubs ; Leaves digitate, deciduous ; Flower large, irregular, only two together, stamens irregular, 5 to 8; Panicles terminal or thersoid.

Aesculus punduana Wall: A deciduous ornamental tree with glabrous terete branches ; Leaves 6-7, irregular, the terminal one, 8 to 15″ by $2\frac{1}{4}$ to 5″ in size ; Flowers in February and March, Panicle narrowly lanceolate rarely equalling the leaves ; Tropical Sikkim in wet areas, also at Rajabhatkawa in Eastern Duars, distribution extends eastward to Assam and Burma.

Genus Sapindus : Soap berry Tree ; Leaves alternate without stipules, coriaceous, generally entire, aril wanting; Flowers regular, stamens 8-10 inserted within the disc, disc angular ; Fruit smooth and fleshy.

Sapindus aftenuatus Wall: A tree of moderate size; Leaves pinnate ; Flower, small, red, bud greenish ; Fruit red or dark purple, eaten in some places.

Sapindus mukorossi Gaertn: A handsome tree, shoots tomentose ; Leaves pinnate 10-15, shortly petioled ; Flower ciliated, white or purple, ovary glabrous ; Fruit fleshy, subglobose, yellow. Distribution, Mansang, Singtam Bazar, 2,000 ft. It is cultivated throughout India and is well known as *Ritha* in all Indian Languages.

Sapindus deturgens Wall: A handsome deciduous form of *mukorossi* having obtuse or accuminate leaflets ; Leaves cut for fodder ; Fruit has an alkaline principle like saponin useful for cleaning purposes ; Wood is not particularly useful ; Largely planted in Avenues or cultivated in Villages ; Sikkim at 2,000 to 4,000 ft.

Genus Nephelium Linn.: Flowers usually regular, panicled.

Nephelium litchi Camb: A handsome evergreen tree with spreading branches. Leaflets 2 to 8, opposite or alternate ; Fruit globose, aril fleshy, edible; Wood, red, hard and heavy; Widely cultivated for its sweet fruit ; Exotic probably introduced from South China ; Common name, *Litchi*.

Nephelium longana Comb: Evergreen Tree with young leaves red in colour ; introduced from Deccan ; Beng. *Asphal*.

Family Aceraceae : Leaves palmately veined ; generally more stamens than petals ; Fruit, a two winged Samara ; Some species contain a sugary sap ; Bark is astringent and yields colouring principles.

Genus Acer Tournef: Maple ; Trees with palmately lobed leaves with terminal racemes ; Leaves opposite, simple or compound ; Stamens inserted, on the disc ; Ovary two celled ; Fruit a nutlet with an elongated wing on one side.

Acer oblongum Wall: A deciduous small tree with moderately hard reddish brown wood ; Leaves 3 nerved at base, glaucus and netted beneath ; Fruit glabrous, diverging, clothed with white hairs inside ; Sikkim, 3,000 to 5,000 ft.

Acer lacvigatum Wall: A large deciduous tree; Leaves netted beneath undivided with three basal nerves, quite entire ; more strongly reticulated than in *oblongum ;* Ovary hairy ; Carpels 1 to $1\frac{1}{2}$ inches long ; Fruit glabrous ; Wood moderately hard, used for planking ; Sikkim 5,000 to 9,000 ft. Darjeeling.

Acer sikkimensis Miq.: A small tree having undivided leaves with 5 basal nerves ; Raceme almost equals the leaves ; Fruit glabrous ; Carpels about $\frac{3}{4}''$ long, wings vinose, diverging ; Sikkim 7,000 to 9,000 ft., at Lachen 8,000 ft. and Darjeeling 7,000 ft. ; Occasionally Epiphytic.

Acer hookeri Miq.: A deciduous tree with undivided leaves having both sides green, base 5 nerved, cordate ; Raceme simple: Flowers in March-April, Fruits in August, fruit glabrous ; Ghoom 7,500 ft., Tonglu 10,000 ft. ; Autumn foliage copper coloured ; Two varieties, *major* and *normalis*.

Acer pectinatum Wall: Flowers in June, August ; Fruits in December ; Sugary juice is extracted from this tree at Lachen in Sikkim ; Phalut, 11,000 ft.

Acer papilio King: It flowers from June to August and fruits in December ; Sugar is extracted from this also ; Found from Phalut to Chiabhanjang and also at Lachen.

Acer campbellii Hook: Large deciduous tree; Leaves 5-7 lobed, nerved, nearly entire but accuminate with tips serrate and of beautiful green colour ; pilose beneath when young ; Petioles reddish ; Cymes 2 to 6 inches ; Petals white, stamens 8 reddish, divericate venose wings ; widened above ; Fruits in October ; Wood used for planking ; Occurs at Rangbul, Darjeeling and in Sikkim from 7,000 to 10,000 ft.

Acer villosum var. *thomasonii*: A large handsome deciduous tree; Leaves narrowly 5 lobed, upper surface glabrous and lower surface villose ; Flowers in June ; Fruit 2 to 3″ long ; Occurs at Ging, 5,000 ft. and Gahiribans 10,000 ft. In Sikkim from 7,000 to 9,000 ft.

Acer osmostoni Gamble: Closely resemble *A. campbellii*. Uncommon, found at Mirik and in some other areas from 5,000 to 8,000 ft.

Acer stachyophyllum Hiern.: Leaf has thick tomentum below, undivided, $2\frac{1}{2}$ to $3\frac{1}{2}$ inches long, upper surface, hoary, velvety, base rounded ; Flowers in May ; Fruits in October ; glabrous ; carpels about two inches somewhat widened upwards and diverging ; Occurs at Lachung Valley in Sikkim, 9,000 to 10,000 ft.

Acer caudatum Wall: A moderate sized deciduous tree with glabrous shoots ; Carpels 1 to $1\frac{1}{2}$ inches long, more or less diverging, wings pink ; Wood moderately hard ; Occurs in Sikkim at Laghep 10,000 to 11,000 ft.

Acer caesium Wall.: A large deciduous tree; Leaves undivided or sometimes palmately lobed, thinly pubescent ; Carpels vinose, rose coloured in August ; Cymes nearly equalling the leaves ; Carpels about 2″ long, wings vinose somewhat diverging ; Fruit glabrate ; wood soft inferior.

Genus Dobinia Hamilt.: A curious genus without a disk ; ovary one celled ripening into small broadly winged achene ; In Darjeeling found from 4,000 to 6,000 ft.

Dobinia vulgaris Hamilt.: A branching shrub of 5 to 8 ft. in height ; Flowers rose in colour, apetalus, in panicles upto 2 ft.

in width ; Fruit a small broadly winged achene ; Distribution Central and Eastern Himalayas ; Nep. *Sangli.*

Family Staphyleaceae : (Derivation Greek-Staphele meaning cluster, refers to the inflorescence); Trees or Shrubs; Leaves stipulate opposite ; Carpels usually three ; Fruit inflated and pod like.

Genus Turpinia Vent.: Trees with glabrous shining terete branches ; Flowers regular, stamens inserted outside the disc ; Panicles appear in October, terminal or auxillary ; Fruit, subglobose, 3 celled fleshy or leathery, hard, shining, aril. Fruiting season February.

Turpinia pomifera (D. C. Prod): A large leafy shrub ; Leaves 5 to 20″ long; Fruit purplish, red, yellow, or green; In Darjeeling at Lebong, in Sikkim occurs from 2,000 to 7,000 ft.

Turpinia nepalensis Wall.: In habit similar to *pomifera*, but with distinct ovate leaflets ; branches of the depressed pyramidal panicles less stout ; Flowers shortly ciliate, small, white, in July, ovules 2 to 3, together ; Fruit, small, dry ; Wood of inferior quality, leaves used as cattle fodder.

Family Sabiaceae : Erect or climbing shrubs with petiolate, entire, deciduous leaves ; Flowers dull coloured in axillary clusters, stamens 4 to 5 inserted at the base of the disc, ovary 2 celled each with two ovules ; Fruit reinform drupes.

Genus Sabia Coleb : Climbing plants ; Flowers axillary, solitary or panicled, stamens all equal, inserted at the base of the disc.

Sabia campanulata Wall : Small woody vine ; Leaves oblong, acuminate base acute ; Flowers campanulate greenish purple, peduncle single flowered ; Fruit a drupe, 2½″ long, pale blue, orbicular, compressed ; Flowers, and fruits in May—August.

Sabia leptandra Wall.: Woody vine ; Leaves beautifully reticulated, elliptic, base rounded ; Flowers campanulate, greenish purple ; Fruit a drupe ; Flowers in August and Fruits in December; Occurs at Kalimpong, Rishap, Sittong at eleva-

tions from 5,000 to 7,000 ft ; Nep. *Simali Lahara*, Lep. *Payong rik*.

Sabia parviflora Wall.: A vine with slender branches and long pilose panicles ; Flower with unequal stamens ; Fruit a drupe, stone compressed ; Flowers in March—May, and Fruit in June—September ; Occurs from 3,000 to 6,000 ft. in Sikkim and at Sureil and Teesta in Darjeeling District.

Sabia paniculata Edgew.: Woody vine, bark dark brown ; Leaves elliptic, base rounded with persistent bud scales; Panicles many flowered, pilose, filaments ligulate; Fruit orbicular, usually solitary, compressed Flowers in February—May ; Occurs in Forests upto 3,000 ft.; Nep. *Kalilahara*.

Sabia limoniacea Wall.: Woody vine with oblong leaves 3 to 7″ by 1 to $1\frac{1}{2}$″ in size, base rounded or acute ; Panicle reddish, glabrous, with persistent bud scales ; Flowers minute, yellowish, filaments fleshy, incurved ; Flowers in November and fruits in March ; Himalayas upto 3,000 ft.

Sabia purpurea Hook.: Woody climber ; Leaves oblong 2 to 3″ by 1″, on the flowerless branches, base usually rounded ; Peduncle long and irregularly branched ; Flower small, purplish ; Occurs from 4,000 to 6,000 ft. Found above Sureil.

Genus Meliosma Blume.: (Derivation Greek Meli-Honey and Osma-Odour), alludes to the fragrant flowers borne in axillary or terminal panicles. Erect shrubs or trees.

Meliosma dillenaefolia Wall.: A small tree ; Flowers white ; Fruit Black ; Flowers in July, fruit in October ; Occurs in Sikkim from 5,000 to 12,000 ft., Kalapokri, Thangu and Lachen ; Nep. *Likh* or *Ranigogun*.

Meliosma pungens Wall: A tree with branches and panicles rusty pubescent ; Leaves very coriaceus, narrowed to the petiole ; Racemes often longer than the leaves, spreading, erect and densely fascicled ; Fruits in September ; Temperate Himalayas from 5,000 to 7,000 ft.

Meliosma simplicifolia Roxb.: Tree, young parts puberulous ; Leaves 6″ to 16″ by 4″ to 7″, petiole more than $\frac{1}{2}$ inch

long ; Flowers in November-December ; Fruits in June ; Sikkim 2,000 to 4,000 ft. ; Nep. *Chewri*, Lep. *Hingman Kung*.

Meliosma pinnata Roxb: Small tree, branches smooth; Leaves 6 to 18, petiole cylindric, odd, pinnate, 6 to 12 pairs; Panicle as long as the leaves ; Flower white, terminal, disc three angled ; Fruits in August Tropical Sikkim.

Meliosma wallichii Roxb.: A small tree with rusty puberulous branchlets and panicles ; Leaves odd, pinnate ; Flower very shortly pedicelled; Tropical Sikkim, Pedonchen; Nep. *Bara dabdabi*.

Meliosma thomsoni King.: Tree ; Flowers in October and fruits in July ; Darjeeling District, Ging and Takdah, Temperate Sikkim; Nep. *Sindure dabdepe*.

(to be continued)

MISCELLANEOUS NOTES

1. MISCELLANEOUS OBSERVATIONS ON CAPTIVE SPECIMEN OF THE HIMALAYAN MASKED PALM—CIVET.

(*Paguma larvata neglecta*, Pocock.)

In the adult stage the Himalayan Masked Palm-Civet is a taciturn animal, and appears only to be capable of producing a rough, rasping cough as a threat when disturbed or enraged. When young, however, the animal is quite garrulous.

While rearing up a litter of three animals during June 1958, (one male and two females) which were only a few days old, several call-notes were heard. An almost bird-like, squeaky bark is emitted at rapid intervals and kept up for a prolonged length of time, when the young animals were hungry or frustrated. When afraid, or in danger, a continuous wailing-scream could be heard. And when contented the young civets expressed satisfaction by means of a continuous gurgling sound, reminiscent of the purring of a cat. This was particularly noticed when the young animals were snuggling together after a good feed and prior to a comfortable snooze. (This particular call-note, last named, has also been heard by me from the young of the Large Indian Civet, *Viverra zibetha*). The angry cough, typical of adults, has also been heard from the young animals when they were enraged or antagonised.

This civet is extremely dexterous in the use of its limbs and tail and the agility with which they are able to climb wire mesh, or even smooth branches, is most astounding. The legs and tail are capable of a vice-like grip on any object, and the animals can climb head downwards with the same facility as going up.

The tail is flat on the two sides and is an indispensable aid to climbing ; since its length and flattened sides enable the animal to wrap it firmly round the tree trunk or branch. The flattened nature of the tail is particularly noticeable when the animal is moulting in the process of acquiring its summer coat, which has been found to take place in May.

Himalayan Masked Palm Civet
Photo—Author.

Sikkim Yellow-billed Blue Magpie on Nest
Photo—Author.

The Himalayan Palm-Civet is nocturnal in habit. Lying curled up in their sleeping platforms during the daylight hours they emerge to feed and exercise at night. But they are partial to sunshine and like to bask in it at every opportunity. They are, however, most alert and active at night.

They relish milk, boiled rice, eggs and fruit (especially oranges). They take rather sparingly of meat.

In captivity they become very tame and make entertaining pets. One particular specimen of mine developed a great affinity for a young Macaque and would spend hours with the monkey in rough play and mock battles.

They are exceptionally clean in habit and seldom resort to the malodorous practices of the family.

SAMIR SEN, F.Z.S.

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2. NIDIFICATION NOTES ON THE SIKKIM YELLOW-BILLED BLUE MAGPIE

(*Kitta flavirostris flavirostris*).

I had hardly taken up residence in the Forest Rest House at Rangirum (6,400 ft.) on the morning of the 27th June, 1958, when at about 11-30 the peace and stillness of the serene forests immediately to the west of the bungalow was suddenly shattered by the most awful cacophony which continued for some time. My curiosity aroused I hurried to the spot and in a couple of minutes I was witness to a very unusual scene.

A troop of Assamese Macaque monkeys (*Macaca assamensis pelops*) had evidently approached too close to a nest of The Sikkim Yellow-Billed Blue Magpie (*Kitta flavirostris flavirostris*) and had disturbed the birds. But much to their

chagrin, and to my amusement, the adult magpies were chasing them along the treetops pecking and clawing with amazing vehemence at the heads of the intruders. The enraged screams of the birds were equal to the frightened wails of the monkeys, who being overpowered by the formidable onslaught of the enraged birds, soon made off towards safety. The magpies chased them a considerable distance before returning to their nest.

(It may here be stated that several local residents in our hill forests, who are experienced woodsmen and are completely familiar with the habits of the birds and animals in their area, bear testimony to the fact that the Assamese Macaque are prone to raid birds' nests and pilfer the eggs. From my own experience I have found these monkeys to be very catholic in their diet. I have kept several of them in captivity. Apart from fruit, nuts, cereal, vegetable and seeds, which they relish, they will readily take milk but are completely averse to eggs and animal food. But my observation on captive specimens must not necessarily be taken to conclude that in the wild state these monkeys are not given to raiding nests and supplementing their normal diet with eggs.)

During the next two days I was able to leisurely observe the magpies and photograph them in and around the nest.

The nest was placed among the scanty branches of a slender, young sapling, barely twelve feet off the forest floor. The tree itself was located a few feet away from the main motor road to the Rangaroon Tea Estate.

Climbing a large tree a few feet away from the sapling I was able to get a close-up view of the nest and the eggs. The birds did not resent my inquisitive proximity in any way. In fact, sometimes the mother, completely ignoring my presence, would sit cowering in the nest while I photographed her. The male bird stood sentry in the nearby trees, dropping occasionally to the ground to catch insects.

The nest itself was a flimsy affair completely incongruous in size with the magpies, the central feathers of whose tail alone are about eighteen inches in length It was roughly cup-shaped and comprised a few dry sticks held loosely together with coarse roots. Some light foliage above the nest afforded the only shelter ; nor did the birds appear to have concealment uppermost in their minds when selecting its location.

Three eggs were visible. In size they were comparable to the eggs of the smaller village hen. They were clay-coloured, dull, and prominently marked with reddish-brown spots.

SAMIR SEN, F.Z.S.

"Emerald Lodge",
DARJEELING.

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I, J. C. Daniel, hereby declare that the particulars given above are true to the best of my knowledge and belief.

(Sd.) J. C. DANIEL,
Signature of Publisher.

ERRATA

Volume 29, No. 3, December 1957.

A Catalogue of Plants of the Sikkim Himalayas.

Page 97 for Ronb read Roxb.
for Goertu read Goertn.
Page 98 for (Contd.) read Lamk.
for Berchenia read Berchemia.
Page 99 for dahuricns read dahuricus.
for vivgatus Ronb read virgatus Roxb.
for Thumb read Thunb.
Page 100 for Liun read Linn.
for Ronb read Roxb.
for planicanlis read planicaulis.
Page 101 for Ronb read Roxb.
for Vitas read vitis.
for practeolatum read bracteolatum.
for lanccolarium read lancceolarium.
Page 102 for Parthenocimus read Parthenocissus.
for samicordata read semicordata.
for Ampelocissno read Ampelscissus.
Page 103 for Ronb read Roxb.
for Datz read Dalz.
for Lamp read Lamk.
Page 104 for glanca read glauca.
for Ronb read Roxb.
Page 105 for alota Edgen read alata Edgew.
for lerbacca read herbacea.

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