SOME JUNGLE BIRD ASSOCIATIONS

BY

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(*With a map*)

This paper contains a short comparative account of the birds found by the writer in such of the major forest types in India and Burma as he happened to visit during the years 1942–1945.

During the last 6–7 decades much work has been done in the study of forest classification throughout the world. The most comprehensive survey of the types occurring in India and Burma is that published by Mr. H. G. Champion (1936) who puts forward a tentative classification of the main forest types based on four temperature zones, tropical, sub-tropical, temperate and alpine, each subdivided according to the available amount of moisture as reflected by the relative importance of evergreen, deciduous and thorny trees. Important edaphic variations as well as certain primary and secondary seral types are also listed.

A given square mile of country in any of the major forest types may contain several distinct sub-types as well as edaphic or seral variants and an ideal comparative study of the avifauna would cover concurrently large areas of each main type, including examples of all the major components, for long periods at all seasons of the year. Such a survey would be a very big undertaking requiring the co-operation of many observers, but until it is possible to organise such a survey preliminary information can be collected from smaller surveys of more limited areas. In the present case no properly controlled survey was possible, and the present records were derived from various incomplete samples of varying duration, made at different seasons under very varying conditions. The comparisons, therefore, are by no means complete, but they may perhaps have some value as a pointer for later work.

Certain minor habitat types within the major ones, e.g. tanks, have not been treated separately in this paper, as it was well-nigh impossible to separate them satisfactorily in the circumstances under which the surveys were made, and this accounts for the presence in the lists of such unexpected species as terns, which may perhaps have been seen at an isolated tank surrounded by a considerable area of jungle. Soaring and high flying birds have been included as these obtain much of their food directly or indirectly from the jungle.

The classification of forests here adopted is that contained in Mr. Champion's paper.[1] The writer was not aware of that paper until after he had left India and he has been unable to establish beyond doubt to which sub-type the various areas of jungle under survey belonged.

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[1] CHAMPION, H. G. (1936). 'A Preliminary Survey of the Forest Types of India and Burma'. *Ind. For. Rcds.* (*New Series*), *Sylviculture*, Vol. 1, No. 1, 1–287.

Summary of Surveys made

I. Moist Tropical Forests

A. *Tropical Wet Evergreen Forest*:	1. Myitkyina	(*a*) forest (*b*) scrub.
B. *Tropical Semi-evergreen Forest*:	2. Jessore	(*a*) forest
	3. Dhubalia	(*a*) forest
C. *Tropical Moist Deciduous Forest*:	4. Ramgarh	(*a*) forest
	5. Digri	(*a*) forest (*b*) scrub.

II. Dry Tropical Forests

D. *Tropical Dry Deciduous Forest*:	6. Monywa	(*a*) forest (*b*) scrub
E. *Tropical Thorn Forest*:	7. Ambala	(*a*) forest
	8. Delhi	(*a*) forest (*b*) scrub
	9. Okhla	(*b*) scrub

III. Montane Sub-tropical Forests

F. *Sub-tropical Wet Hill Forest*:	10. Darjeeling	(*a*) forest

I. Moist Tropical Forests

A. *Tropical Wet Evergreen Forest*

1. Myitkyina, North Burma: Position: 25° 30′N × 97° 25′E Altitude: approx. 470′ A.S.L. Period of survey: 24-27 March, 1945; almost continuous observation. Locality: although the forest in much of the surrounding country is of this type, the only subtypes visited here were a small citrus orchard and an area of scrub. The latter was, I think, clearly a seral form of vegetation as it lay to a great extent on the bed of a fairly recently dried-up meander of the Irrawaddy. The vegetation may also have been influenced by the felling of the larger trees to provide a clear air approach to the landing ground. which lay between the bed of the meander and the main river.

(*a*) Tree Forest: Some 5-6 acres of overgrown citrus orchard on the right bank of the Irrawaddy. Some trees cut down to make room for huts and tents. Some rough thin bushes round the edges with a few teak (*Tectona grandis*) and (?) *Bombax* trees.

(*b*) Scrub: A large area of dense scrub, in places consisting of fairly large bushes with a sprinkling of trees of medium size, including a few bamboos and (?) *Bombax*; in other places the vegetation consisted of considerable areas of a leafless woody scrub of medium height,

almost like some sort of crop (not identified). The whole area was intersected by several paths and grassy rides. One long visit of several hours on foot. Major battles had recently been fought in this area and signs of this were still very obvious.

B. *Tropical Semi-evergreen Forest*

2. Jessore, Lower Bengal: Position: 23° 11′N × 89° 10′E. Inland portion of delta area. Altitude: 20′ A.S.L. Period of survey: 14 April, 1943—9 Sept., 1944 (with three breaks of a fortnight each and one in Sept., 1943 of a month). Locality: this probably lies in Champion's C4 category (Chittagong Tropical Evergreen Forest). There were considerable areas of mature forest, though some patches, judging by the absence of large trees, were only of a secondary nature and in many places the forest was very broken. The greater part of the district is devoted to rice growing, with some jute, and the vegetation was always very luxuriant.

(*a*) Tree Forest: The whole of this area of several square miles consists of extensive stretches of paddy and jute fields round a small, well-wooded Indian town, set in a matrix of patchily dense jungle. Dominant trees in many of the jungle patches were mango (*Mangifera indica*), bamboos (? species), with coconut palms (*Cocos nucifera*), date palms (*Phoenix sylvestris*), but many other trees were also well represented, including red silk cotton (*Bombax malabaricum*), banyan (*Ficus bengalensis*), jackfruit (*Artocarpus integrifolia*), and litchi (*Nephelium litchi*). The undergrowth varied from very dense to only a few scattered babool (*Acacia arabica*) bushes at the edge. Some patches of this mixed jungle, I think, probably represented the climatic climax, but more often, judging from the absence of really mature trees, they were only of a secondary seral nature, representing a small residue of the original jungle (the larger figs, mangoes &c) mixed with younger regeneration growth after considerable human interference.

The roads were nearly all bordered with trees and in some places bushes and patches of jungle. Here the dominant trees were, in most places, peepal (*Ficus religiosa*), in one place I think tamarind (*Tamarindus indicus*), with a smaller proportion of babool, banyan, mango and coconut and palmyra palms (*Borassus flabelliformis*). Small groves of palms were scattered all over the paddy fields, usually with no undergrowth and the paddy growing beneath them.

The whole of the urban area is liberally sprinkled with tanks, but it was not practicable to treat these as a separate habitat; their avifauna, if indeed they really have a distinct one, is usually submerged in that of the major habitat in which they are situated.

3. Dhubalia, Lower Bengal: Position: 23° 30′N × 88° 27′E. Lower Gangetic Plain. Altitude: about 45′ A.S.L. Period of survey: 11 Sept.,—11 Dec., 1944 (except 10-31 Oct.). Locality lies 60-70 miles W.N.W. of Jessore and much nearer to the Tropical Moist Deciduous Forest region. I think it is rather drier than Jessore, though temperature and rainfall data (q.v.)

were not available for the whole year, and the vegetation rather less luxuriant, with the forest more patchy and broken.

(*a*) Tree Forest: The whole countryside is broken up by rough, untidy 'hedges' and small patches of mixed jungle consisting of large straggling bushes growing in a dense tangle, with trees of various kinds. Some of the 'hedges' were swollen into considerable belts of bushes. Undergrowth varied from place to place. Dominant trees difficult to determine, but tamarind (*Tamarindus indicus*), Mango and various palms, including palmyras, probably predominated. My bungalow stood under the dense canopy of a large mango grove (1½–2 acres) with only a little undergrowth at the extreme edges. I think that none of the jungle seen here represented the climatic climax, and that it consisted of a secondary seral type interspersed in a few places with the sub-type called by Champion 'Gangetic Saline Scrub'.

I have already dealt more fully with the birds seen at Jessore and Dhubalia in 'Some Bird Associations of Bengal' (*J. Bomb. N. H. S.* Vol. 49 (4), April, 1951).

C. *Tropical Moist Deciduous Forests*

4. Ramgarh, Bihar: Position: 23° 38′N × 85° 34′E. Altitude: approx. 2,000′ A.S.L. Period of survey: 25 May—3 June, 1942; almost continuous observation. Locality: The jungle here was richer, higher, denser and more varied than at Digri, and I suspect that it represented the climatic climax, but I was not qualified to identify any of the trees with certainty.

(*a*) Tree Forest: A large camp carved out of rather light, deciduous woodland with bushes (? *Laureaceae*) and many trees of varying size (including some *Ficus* and a very few palms). The whole terrain was rough and irregular with many nullahs. The value of the survey here was greatly limited owing to my unfamiliarity with the species seen, as I had only just arrived in India.

5. Digri, S. W. Bengal: Position: approx. 22° 47′N × 87° 23′E. Altitude: about 200′ A.S.L. Period of survey: 8 March—8 April, 1943. Locality: this was in an area of Sal (*Shorea robusta*) forest (probably Champion's 'Wet Sal'), with small patches of larger mixed trees.

(*a*) Tree Forest: Some 50 acres of light woodland with many bamboos (? species) some 20-30′ high, and a good sprinkling of larger deciduous trees of various kinds (including some large *Ficus*). A fair number of thatched busti huts under the trees, and some Mess kitchens whose refuse was a great attraction to the ubiquitous Pariah Kites. Also considerable patches of sal, 25-30′ high, which were under only occasional observation from near the edge and so not worth treating separately.

(*b*) Scrub: About 1 square mile of fairly level, rough, broken ground, about 40% of which was covered with low, thorny scrub; bushes nowhere more than 2-3′ high. Sparse, patchy grass and weeds in the

open ground between the scrub. Daily observation, usually from an open truck or motor cycle, but sometimes on foot.

II. Dry Tropical Forests

D. *Tropical Dry Deciduous Forest*

6. Monywa, Lower Chindwin, Burma: Position: 22°00′N × 95° 05′E. Altitude: approx. 300′ A.S.L. Period of survey: 3-6 March, 1945 and 30 March–2 April, 1945. Fairly continuous observation. Locality: lies near northern end of the dry zone of Burma and not far to the south of the Tropical Moist Deciduous Forest region. None of the area I visited appeared to have any climatic climax forest.

(*a*) Tree Forest: An extensive area composed of a mixture of more or less derelict compounds about the edge of the town, all well-wooded, mostly with light-leaved trees of the *Acacia* type (though other species were quite well represented); of roadside trees of various kinds, and clumps and whole areas of bushes and scrub. Also a stretch of road out to the aerodrome some 2-3 miles long, bordered on each side by a continuous line of trees, predominantly neem (*Melia*), and here and there a tamarind (*Tamarindus indicus*), an occasional babool (*Acacia arabica*) and a few other species; there was also a light thorn hedge bordering much of the road. Frequent visits, usually in an open truck.

(*b*) Scrub: About 10 acres of rough grass, with a patchy growth of low scrub and a sprinkling of larger thorn bushes (not identified). Daily visits on foot.

E. *Tropical Thorn Forest*

7. Ambala, Punjab: Position: 30° 25′N × 76°50′E. Altitude: about 900′ A.S.L. Period of survey: 7 July–5 Aug., 1942. Several visits. Locality: lies very near the Tropical Dry Deciduous Forest region.

(*a*) Tree Forest: A small plain about ½ mile × ½ mile, covered with babool trees, a few of which were in flower. Ground covered with grass on which cattle, goats, etc., were grazed. No undergrowth. A few other species of trees growing round the edges.

8. New Delhi: Position: 28° 45′N × 77° 20′E. Altitude: 718′ A.S.L. Period of survey: 15 August—29 December 1942. Frequent observation. Locality lies near the junction of this type with the Tropical Dry Deciduous Forest region and area (1) below is probably more representative of that kind.

(*a*) Tree Forest: (1) Rough deciduous woodland with mixed trees and a few palms. Many *Acacia arabica*. Fairly dense low undergrowth.

(2) Part of the golf course, including: (i) a patch of light deciduous woodland with a fair amount of undergrowth, in places low and thin, in others tall and dense and including a fair number of climbers. (ii) Another patch of open deciduous woodland with no undergrowth except rough grass and weeds and a few small bushes at the edge (5 acres), and a patch of some 5 acres of much denser light deciduous woodland (chiefly *Acacia arabica*) with a good deal of undergrowth, and about 10 acres of rough grassland with isolated trees and bushes varying from semi-scrub, a foot or so high, to thorn and bramble bushes 12–15′ high. Part of this area was subject to disturbance from September onwards when a large tented camp was erected on it. (iii) The golf course proper, consisting of fairly rough grass bordered by a thick growth of deciduous trees and dense patches of bushes in which stood small scattered ruins. It was not practicable to treat the grass as an entirely separate habitat from the surrounding jungle.

(3) A large patch of fairly dense deciduous woodland (almost entirely an *Acacia* known locally as Kabul Babool, whose species I never discovered), standing 15–20′ high, with a scattering of other trees. The canopy was so dense in most places that nothing would grow under it except a little sparse, weak grass, though most of the branches were high enough for a man to be able to walk upright under them. A certain amount of interlacing rough open ground running through the wood, with rough grass and a few bushes, and many tiny interlacing ponds only a yard or two across with here and there a larger one. Most of these ponds were empty though damp and covered with moss and herbage; no doubt during the rainy season this area becomes a bog.

(*b*) Scrub: A patch some 300 × 400 yds. of thorn bushes of the drooping or 'weeping' kind (? a kind of *Acacia*), of average height 8–10 ft. and quite impenetrable except along cart tracks. Here and there an *Acacia arabica* and a fair sprinkling of a low-growing tamarisk (? *T. gallica*) in the more open parts. Probably Champion's 'Dry Deciduous Scrub Forest'. Observation was confined to the limits of vision from the cart tracks.

9. Okhla, near Delhi: Position: some 7–8 miles S.E. of New Delhi. Altitude: about 700′ A.S.L. Period of survey: a single visit of several hours devoted to observation on 1st November 1942. Locality: as for New Delhi.

(*b*) Scrub; a dense belt of scrub and bushes (not identified), 50–100 yards wide along the top of the river bank. In most places impenetrable. Some tamarisk and a few tamarind trees.

III. Montane Sub-Tropical Forests

F. *Sub-tropical Wet Hill Forest*

10. Darjeeling, North Bengal: Position: 27° 03′N × 88° 18′ E. Altitude of areas surveyed: 1,800–6,500′ A.S.L., though preponderance of observation was 3,000–6,000′. Periods of survey: I paid 7 visits to 3 tea gardens near Darjeeling, lasting 2–4 weeks each in the months of January,

February, March, April, May, June and October, and almost the whole of this time was spent in bird watching. Locality: although Darjeeling itself lies in the Montane Temperate Forest Region, the tea gardens on which most of my observation was done lay well below it and should, I think, be included in this category under Champion's 'Upper Bengal Sub-tropical Hill Forest' type.

(*a*) Tree Forest: All these three tea estates were basically similar in that they consisted of patches of tea bushes [*Camellia thea* (Link)] of varying extent, set in a matrix of mixed jungle on the steep hillsides. They differed in the proportions of tea to jungle, total acreage, aspect, in the use of shade trees and leguminous plants interplanted among the tea, in the intensiveness of the forestry methods practised, and such minor points as the turfing or walling of the terraces on which the tea was planted. The hillsides were frequently broken with small jungle-clad ravines with small streams.

The jungle was for the most part a widely varied mixture of deciduous trees and it was difficult to say just what species predominated. Utis (*Betula alnoides*) and toon (*Cedrela toona*) were usually well represented, and here and there were small patches of bamboos (? species). In some places were *Cryptomerias* growing in groves or clumps or as isolated trees. Undergrowth varied from barely any to a dense covering of bushes and brambles, with here and there a tree fern. Luxuriant herbage sprang up during the rainy season.

I have included the tea in this type as the tea plantations and the jungle were so intermixed as to be almost inseparable as distinct habitats with any degree of accuracy, and most of the birds to be found in the one could also be seen, at any rate at times, in the other. The chief shade trees interplanted among the tea were Sau or Black Siris (*Albizzia stipulata*) and Koroi or White Siris (*A. procera*). The principal leguminosae interplanted were Indigofera (*I. dosua*), Boga Medeloa (*Tephrosia candida*) and in some places *Crotellaria*.

I have not thought it worth while to give comparative lists for these three gardens, and a single composite list for the Darjeeling area has therefore been included in the main comparative Table.

Climate

Myitkyina:

Temp. °F...	J.	F.	M.	A.	M.	J.	Jy.	A.	S.	O.	N.	D.	Year.
Mean max. ...	74	78	85	89	92	88	87	87	90	86	80	75	...
Mean min. ...	50	54	61	67	73	75	76	76	76	71	61	52	...
Rainfall ...	0·4	0·9	0·9	2·0	6·0	15·1	19·2	16·4	9·7	6·8	1·2	0·4	79·0″

Months with less than 2″ of rain—5.

Jessore: April 1943 to September 1944.

Temp. °F.	—	—	—	91	95	—	84	89	90	91	86	80	—
Mean max. ...	73	79	84	92	98	91	89	88	—	—	—	—	—
Mean min. ...	—	—	—	71	77	—	77	77	78	73	60	56	—
	53	57	64	73	79	78	79	78	—	—	—	—	—
Rainfall ...	—	—	—	5·2	2·3	—	16·2	13·6	4·9	6·4	0·0	0·0	—
	5·8	1·1	3·5	4·5	3·0	4·6	13·5	13·3	—	—	—	—	77·0″

Months with less than 2″ of rain: 3.

Dhubalia : September—November 1944 only. No other records available.

Temp. °F.	J.	F.	M.	A.	M.	J.	Jy.	A.	S.	O.	N.	D.	Year.
Mean max. ...	—	—	—	—	—	—	—	—	90	88	84	—	—
Mean min. ...	—	—	—	—	—	—	—	—	78	72	56	—	—
Rainfall ...	—	—	—	—	—	—	—	—	2·6	1·0	0·0	—	—

Monywa : Nearest available station—Mandalay (250 ft. A.S.L.)

Temp. °F.													
Mean max. ...	84	90	98	102	101	94	93	92	90	92	94	94	106
Mean min. ...	59	60	69	81	82	79	79	78	78	75	68	62	53
Rainfall ...	0·1	0·1	0·2	1·1	5·9	5·5	5·3	4·6	5·7	4·7	1·6	0·4	33·2″

Months with less than 2″ of rain : 6. Mean annual humidity 64.

Ambala : No information available to me.

Delhi :

Temp. °F.													
Mean max. ...	71	75	88	99	104	105	95	94	94	92	83	74	116
Mean min. ...	48	52	62	72	78	84	81	80	77	68	56	49	·40
Rainfall ...	1·0	0·5	0·7	0·4	0·7	3·4	8·5	6·9	4·5	0·5	0·1	0·4	27·6″

Months with less than 2″ of rain : 8. Mean annual humidity 51.

Ramgarh : no information available to me.

Digri : do. do. do.

Darjeeling (at 6,912 ft) :

Temp. °F.													
Mean max. ...	50	53	61	67	68	69	70	70	69	66	60	54	78
Mean min. ...	35	37	44	50	53	58	59	59	57	51	43	37	30

Rainfall—no record.

Only fragmentary records are available to me from the three tea gardens at which I stayed.

Comparative Table

showing the occurrence of species in Tree and Scrub Jungle in the various places surveyed.

The following symbols have been used :

✱ = definite, beyond any doubt.

† = probable, but not definite, identification.

⊙ = possible identification.

△ = reported by someone else, but not actually seen by me.

The scientific names are in the main those given in the 2nd edition of *The Fauna of British India Birds*. The columns should be read in conjunction with the Summary of Surveys Made on pp. 574–580.

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Jungle Crow (*Corvus macrorhynchos*) ...	*		*	*	*	*				*				*
House Crow (*Corvus splendens*) ...	*		*	*	*	*	*	*		*	*		*	*
Red-billed Blue Magpie (*Urocissa erythrorhyncha*) ...	*	*												
Yellow-billed Blue Magpie (*Urocissa flavirostris*) ...														*
Green Magpie (*Cissa chinensis*) ...														*
Tree Pie (*Dendrocitta vagabunda*) ...			*	*	*			*			*			
Himalayan Tree Pie (*Dendrocitta formosae*) ...														*
Indian Grey Tit (*Note* 1) (*Parus major*) ...			*	*	*									†
Green-backed Tit (*Parus monticolus*) ...														*
Yellow-cheeked Tit (*Machlolophus xanthogenys*) ...					⊙									†
Red-headed Tit (*Aegithaliscus concinnens*) ...														*
Sultan Tit (*Melanochlora sultanea*) ...														*
Cinnamon-bellied Nuthatch (*Sitta castanea*) ...														*
Velvet-fronted Nuthatch (*Sitta frontalis*) ...														*
Rufous-necked Laughing Thrush (*Dryonastes ruficollis*) ...														*
Grey-sided Laughing Thrush (*Dryonastes caerulatus*) ...														†
Black-gorgetted Laughing Thrush (*Garrulax pectoralis*) ...														†
Necklaced Laughing Thrush (*Garrulax moniliger*) ...														†
White-throated Laughing Thrush (*Garrulax albogularis*) ...														*
Rufous-chinned Laughing Thrush (*Ianthocincla rufogularis*) ...														†
Red-headed Laughing Thrush (*Trochalopteron erythrocephalum*) ...														*
Crimson-winged Laughing Thrush (*Trochalopteron phoeniceum*) ...														†
Striated Laughing Thrush (*Grammatoptila striata*) ...														†
Jungle Babbler (*Turdoides terricolor*) ...			*	*	*					*	*	*	*	

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Common Babbler (*Argya caudata*) ...				*							*			
Large Grey Babbler (*Argya malcolmi*) ...										*	*		*	
Rusty-cheeked Scimitar Babbler (*Pomatorhinus erythrogenys*) ...														*
Red-capped Babbler (*Timalia pileata*) ...		*		*				*						
Yellow-eyed Babbler (*Chrysomma sinensis*) ...		†						†			†			
Spotted Babbler (*Pellorneum ruficeps*) ...		†												†
Abbott's Babbler (*Malacocincla sepiaria abbotti*) ...			†											
Black-throated Babbler (*Stachyris nigriceps*) ...														*
Red-headed Babbler (*Stachyridopsis ruficeps*) ...														*
Hume's Babbler (*Stachyridopsis rufifrons*) ...	†													
Yellow-breasted Babbler (*Mixornis gularis*) ...														†
White-eyed Quaker Babbler (*Alcippe nepalensis*) ...														*
Black-headed Sibia (*Leioptila capistrata*) ...														*
Stripe-throated Yuhina (*Yuhina gularis*) ...														*
Yellow-naped Ixulus (*Ixulus flavicollis*) ...														*
Red-billed Leiothrix (*Leiothrix lutea*) ...														*
Nepal Cutia (*Cutia nipalensis*) ...														†
Red-winged Shrike-Babbler (*Pteruthius erythropterus*) ...														*
Common Iora (*Aegithina tiphia*) ...			*	*	*									
Marshall's Iora (*Aegithina nigrolutea*) ...											†			
Orange-bellied Chloropsis (*Chloropsis hardwickii*) ...														*
Jerdon's Chloropsis (*Choloropsis jerdoni*) ...				*		†								
Silver-eared Mesia (*Mesia argentauris*) ...														†
Red-tailed Minla (*Minla ignotincta*) ...														*

Species	I							II						III
	A		B		C			D						F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeelin
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Himalayan Black Bulbul (*Microscelis psaroides*) ...														
Himalayan Brown-eared Bulbul (*Ixos flavala*) ...														
Himalayan Rufous-bellied Bulbul (*Ixos macclellandi*) ...														†
Striated Green Bulbul (*Alcurus striatus*) ...														*
Red-vented Bulbul (*Molpastes cafer*) ...	*	*	*	*	*	*				*	*		*	*
White-cheeked Bulbul (*Molpastes leucogenys*) ...											*			*
Red-whiskered Bulbul (*Otocompsa jocosus*) ...		*	*	*				*						
White-browed Bulbul (*Pycnonotus luteolus*) ...											*			
Scaly-breasted Wren (*Pnoepyga albiventris*) ...														†
Indian Brown Dipper (*Cinclus pallasii*) ...														*
Indian Blue Chat (*Larvivora brunnea*) ...														†
White-browed Shortwing (*Heteroxenicus cruralis*) ...														†
Burmese Stonechat (*Saxicola caprata*) ...		*						*	*					
Indian Bush Chat (*Saxicola torquata*) ...														*
Dark Grey Bush Chat (*Rhodophila ferrea*) ...														*
Spotted Forktail (*Enicurus maculatus*) ...														*
Little Forktail (*Microcichla scouleri*) ...														*
Blue-fronted Redstart (*Phoenicurus frontalis*) ...														*
Black Redstart (*Phoenicurus ochrurus*) ...		*									*			*
White-capped Redstart (*Chaimarrornis leucocephala*) ...														*
Plumbeous Redstart (*Rhyacornis fuliginosa*) ...														*
Red-spotted Bluethroat (*Cyanosylvia suecica*) ...											*			
Red-flanked Bush Robin (*Ianthia cyanura*) ...														†
White-tailed Blue Robin (*Muscisylvia leucura*) ...														*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Brown-backed Indian Robin (*Saxicoloides fulicata*) ...					*					*	*			
Magpie Robin (*Copsychus saularis*) ...	*		*	*		*		*		*	*			*
Black-capped Blackbird (*Turdus merula*) ...					⊙									
White-collared Blackbird (*Turdus merula albocinctus*) ...														†
Grey-winged Blackbird (*Turdus boulboul*) ...														*
Red-throated Thrush (*Turdus ruficollis*) ...														⊙
Black-throated Thrush (*Turdus atrogularis*) ...														*
Orange-headed Ground Thrush (*Geokichla citrina*) ...			*	*										
Plain-backed Mountain Thrush (*Oreocincla mollissima*) ...														†
Lesser Brown Thrush (*Zoöthera marginata*) ...														†
Chestnut-bellied Rock Thrush (*Monticola rufiventris*) ...														*
Blue-headed Rock Thrush (*Monticola cinclorhyncha*) ...														*
Blue Rock Thrush (*Monticola solitaria*) ...														*
Himalayan Whistling Thrush (*Myophonus caeruleus*) ...														*
Maroon-backed Accentor (*Prunella immaculata*) ...														⊙
Sooty Flycatcher (*Hemichelidon sibirica*) ...														†
Ferruginous Flycatcher (*Hemichelidon ferruginea*) ...														†
Red-breasted Flycatcher (*Siphia parva*) ...			*	*										*
Indian Little Pied Flycatcher (*Muscicapula melanoleuca*) ...														*
Tickell's Blue Flycatcher (*Cyornis tickelliae*) ...														*
Verditer Flycatcher (*Eumyias thalassina*) ...			*											*
Grey-headed Flycatcher (*Culicicapa ceylonensis*) ...														*
Large Sikkim Niltava (*Niltava grandis*) ...														†
Rufous-bellied Niltava (*Niltava sundara*) ...														*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*		*a*	*b*	*b*	*a*
Small Niltava (*Niltava macgrigoriae*) ...														*
Paradise Flycatcher (*Tchitrea paradisi*) ...			*	*	*									
Black-naped Flycatcher (*Hypothymis azurea*) ...			*	*										⊙
Yellow-bellied Flycatcher (*Chelidorhynx hypoxanthum*) ...														*
White-browed Fantail Flycatcher (*Leucocirca aureola*) ...			*	*							*			
White-throated Fantail Flycatcher (*Leucocirca albicollis*) ...														*
Indian Grey Shrike (*Lanius excubitor*) ...											*	*		
Bay-backed Shrike (*Lanius vittatus*) ...			*								*			
Burmese Shrike (*Lanius collurioides*) ...		*						*	*					
Black-headed Shrike (*Lanius nigriceps*) ...			*											*
Rufous-backed Shrike (*Lanius schach erythronotus*) ...			*								*			
Grey-backed Shrike (*Lanius schach tephronotus*) ...	*													*
Brown Shrike (*Lanius cristatus*) ...		*		*										
Brown-backed Pied Shrike (*Hemipus picatus capitalis*) ...														*
Nepal Wood Shrike (*Tephrodornis gularis*) ...														*
Indian Common Wood Shrike (*Tephrodornis pondiceriana*) ...			*	*										
Scarlet Minivet (*Pericrocotus flammeus*) ...														*
Short-billed Minivet (*Pericrocotus brevirostris*) ...														*
Small Minivet (*Pericrocotus peregrinus*) ...			*	*	⊙						*			
Dark Grey Cuckoo Shrike (*Lalage melaschista*) ...														*
Ashy Swallow Shrike (*Artamus fuscus*) ...			*	*										*
Black Drongo (*Dicrurus macrocercus*) ...	*	*	*	*	*	*	*	*		*	*		*	*
Grey Drongo (*Dicrurus leucophaeus*) ...											*			*
White-bellied Drongo (*Dicrurus coerulescens*) ...			†											

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jossore	Dhubalia	Kamgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Bronzed Drongo (*Chaptia aenea*) ...														*
Hair-crested Drongo (*Chibia hottentotta*) ...	*													*
Blyth's Reed Warbler (*Acrocephalus dumetorum*) ...			*	†							*			
Tailor Bird (*Orthotomus sutorius*) ...			*	*				*			*		*	*
Streaked Fantail Warbler (*Cisticola juncidis*) ...											*			
Franklin's Wren Warbler (*Franklinia gracilis*) ...											†			
Sykes's Tree Warbler (*Hippolais rama*) or Booted Warbler (*Hippolais scita*) ...			†								†	†		
Grey-faced Willow Warbler (*Phylloscopus maculipennis*) ...														†
Yellow-rumped (Pallas' Himalayan) Willow Warbler (*Phylloscopus proregulus*) ...														†
Yellow-browed (Crowned) Willow Warbler (*Phylloscopus humii*) ...				†							†			
Large Crowned Willow Warbler (*Acanthopneuste occipitalis*) ...								†						
Grey-headed Flycatcher Warbler (*Seicercus xanthoschistus*) ...														*
Chestnut-headed Flycatcher Warbler (*Seicercus castaniceps*) ...														*
Strong-footed Bush Warbler (*Homochlamys fortipes*) ...														*
Rufous-capped Bush Warbler (*Horeites brunnifrons*) ...														*
Brown Hill Warbler (*Suya criniger*) ...														*
Black-throated Hill Warbler (*Suya atrogularis*) ...														*
Streaked Wren Warbler (*Prinia gracilis*) ...												†		
Ashy Wren Warbler (*Prinia socialis*) ...				†							†			
Jungle Wren Warbler (*Prinia sylvatica*) ...											*			
Indian Wren Warbler (*Prinia inornata*) ...											*			

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Indian Oriole (*Oriolus o. kundoo*) ...			*		*						*			
Indian Black-headed Oriole (*Oriolus xanthornus*) ...			*	*		*								
Maroon Oriole (*Oriolus traillii*) ...														*
Grey-headed Myna (*Sturnia malabarica*) ...			*	*		*					*			
Black-headed (Brahminy) Myna (*Temenuchus pagodarum*) ...											*		*	
Black-necked Myna (*Gracupica nigricollis*) ...		*												
Jerdon's Myna (*Gracupica burmanica*) ...								*						
Common Myna (*Acridotheres tristis*) ...	*		*	*	*	*	*	*	*	*	*	*	*	*
Bank Myna (*Acridotheres ginginianus*) ...			*								*			
Jungle Myna (*Aethiopsar fuscus*) ...			*			*								
Pied Myna (*Sturnopastor contra*) ...		*	*	*	*	*					*			
Baya Weaver Bird (*Ploceus philippinus*) or Eastern Baya Weaver Bird (*Ploceus atrigula*) ...		*		*				*				*		
Himalayan White-backed (Hodgson's) Munia (*Uroloncha striata*) ...														*
White-throated Munia (*Uroloncha malabarica*) ...				*							*	*		
Spotted Munia (*Uroloncha punctulata*) ...														*
Scarlet Finch (*Haematospiza sipahi*) ...														*
Himalayan Greenfinch (*Hypacanthis spinoides*) ...														*
House Sparrow (*Passer domesticus*) ...	*		*		*			*	*	*	*			
Malay Tree Sparrow (*Passer montanus*) ...														*
Pegu House Sparrow (*Passer flaveolus*) ...									*					
White-capped Bunting (*Emberiza stewarti*) ...											†			
Hodgson's House Martin (*Delichon nipalensis*) ...														†

Species	I							II					III
	A		B		C			D	E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa	Ambala	Delhi		Okala	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*		*a*	*a*	*b*	*b*	*a*
Eastern Swallow ... (*Hirundo rustica*)								*					*
Striated Swallow ... (*Hirundo daurica*)								*		*			*
Indian White Wagtail ... (*Motacilla alba dukhunensis*)								*					
White-faced Wagtail ... (*Motacilla leucopsis*)	*												
Eastern Grey Wagtail ... (*Motacilla cinerea*)													*
Indian Blue-headed Wagtail ... (*Motacilla flava beema*)				†									
Grey-headed Wagtail ... (*Motacilla f. thunbergi*)			†										
Yellow-headed Wagtail ... (*Motacilla citreola*)		*	*										
Tree Pipit ... (*Anthus hodgsoni*)	*		*										*
Indian Pipit ... (*Anthus richardi rufulus*)		†		*	†			*	*	*			
Vinous-breasted (Hodgson's) Pipit ... (*Anthus roseatus*)													†
Short-toed Lark ... (*Calandrella brachydactyla*)							⊙						
Burmese Bush Lark ... (*Mirafra assamica microptera*)		*							*				
Red-winged Bush Lark ... (*Mirafra erythroptera*)										*			*
White-eye ... (*Zosterops palebrosa*)			*										*
Black-breasted Sunbird ... (*Aethopyga saturata*)													*
Yellow-backed Sunbird ... (*Aethopyga siparaja*)													*
Purple Sunbird ... (*Cinnyris asiatica*)			*		*			*		*		*	
Purple-rumped Sunbird (*Note* 2) ... (*Cinnyris zeylonica*)			*	*					*				
Indian Streaked Spider Hunter ... (*Arachnothera magna*)													*
Tickell's Flowerpecker ... (*Dicaeum erythrorhynchum*)			*	*	*								
Thick-billed Flowerpecker ... (*Dicaeum agile*)			*										
Indian Pitta ... (*Pitta brachyura*)			*										
Long-tailed Broadbill ... (*Psarisomus dalhousiae*)													*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubali a	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*b*	*a*	*b*	*a*
Little Scaly-breasted Green Woodpecker ... (*Picus vittatus*)			*											
Black naped Green Woodpecker ... (*Picus canus*)														*
Small Yellow-naped Woodpecker ... (*Picus chlorolophus*)														*
Large Yellow-naped Woodpecker ... (*Chrysophlegma flavinucha*)														*
Pale-headed Woodpecker ... (*Gecinulus grantia*)														†
Darjeeling Pied Woodpecker .. (*Dryobates darjellensis*)														*
Himalayan Lesser Pied Woodpecker ... (*Dryobates cathpharius*)														*
Fulvous-breasted Pied Woodpecker ... (*Dryobates macei*)														*
Yellow-fronted Pied (Mahratta) Woodpecker ... (*Dryobates mahrattensis*)			*	*							*			
Darjeeling Pygmy Woodpecker ... (*Dryobates nanus semicoronatus*)														*
Red-eared Bay Woodpecker ... (*Blythipicus pyrrhotis*)														†
Golden-backed Woodpecker ... (*Brachypternus bengalensis*)			*	*										
Tickell's Golden-backed Woodpecker ... (*Chrysocolaptes guttacristatus*)			*											*
Speckled Piculet ... (*Vivia innominatus*)														*
Rufous Piculet ... (*Sasia ochracea*)														*
Wryneck ... (*Jynx torquilla*)			*											
Great Himalayan Barbet ... (*Megalaima virens*)														*
Green Barbet ... (*Megalaima zeylanicus*)			*								*			
Lineated Barbet ... (*Megalaima lineatus*)	*		†											
Blue-throated Barbet ... (*Megalaima asiatica*)	*		*	*										*
Golden-throated Barbet ... (*Megalaima franklinii*)														*
Crimson-breasted Barbet (Coppersmith) ... (*Megalaima haemacephala*)	*		*	*		*		*			*			
Asiatic Cuckoo ... (*Cuculus canorus*)					⊙									*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Himalayan Cuckoo ... (*Cuculus optatus*)														*
Small Cuckoo ... (*Cuculus poliocephalus*)														*
Indian Cuckoo ... (*Cuculus micropterus*)			*											*
Large Hawk Cuckoo ... (*Hierococcyx sparverioides*)			*	*		*								*
Common Hawk Cuckoo ... (*Hierococcyx varius*)			†	*										
Indian Plaintive Cuckoo ... (*Cacomantis merulinus*)														*
Indian Drongo Cuckoo ... (*Surniculus lugubris*)														*
Pied Crested Cuckoo ... (*Clamator jacobinus*)			*	*						*	*			
Red-winged Crested Cuckoo ... (*Clamator coromandus*)														*
Indian Koel ... (*Eudynamis scolopaceus*)	*		*	*	*	*				*	*			
Large Green-billed Malkoha ... (*Rhopodytes tristis*)														†
Crow-Pheasant ... (*Centropus sinensis*)		*	*	*	*								*	
Large Parakeet ... (*Psittacula eupatria*)			†	†		†								
Rose-ringed Parakeet ... (*Psittacula krameri*)					†					*	†			
Blossom-headed Parakeet ... (*Psittacula cyanocephala*)				*										
Roller ... (*Coracias bengalensis*)	*		*	*	*	*		*	*	*	*			
Broad-billed Roller ... (*Eurystomus orientalis*)														*
Common Green Bee-eater ... (*Merops orientalis*)	*	*	*	*	*			*	*	*	*			
Blue-tailed Bee-eater ... (*Merops superciliosus*)										*	*			
Indian Pied Kingfisher ... (*Ceryle rudis*)			*											
Common Indian Kingfisher ... (*Alcedo atthis*)			*											
Brown-headed Stork-billed Kingfisher ... (*Ramphalcyon capensis*)			*	*										
White-breasted Kingfisher ... (*Halcyon smyrnensis*)			*	*										*
Hoopoe ... (*Upupa epops*)		*								*	*			*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh		Digri	Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Red-headed Trogon ... (*Harpactes erythrocephalus*)														†
Common House Swift ... (*Micropus affinis*)			*		*	*	*			*	*			*
Palm Swift ... (*Cypsiurus batassiensis*)			*		*			*	*					
White-throated Spinetail Swift ... (*Hirundapus caudacutus*)														†
Long-tailed (Horsfield's) Nightjar ... (*Caprimulgus macrourus*)			†	†										
Jungle Nightjar ... (*Caprimulgus indicus*)								*						
Common Indian Nightjar ... (*Caprimulgus asiaticus*)					*		*				*			
Mottled Wood Owl ... (*Strix ocellata*)			*											
Brown Fish Owl ... (*Ketupa zeylonensis*)			*											
Indian Great Horned Owl ... (*Bubo bubo bengalensis*)											*			
Collared Scops Owl ... (*Otus bakkamoena*)			†	†										†
Spotted Owlet ... (*Athene brama*)					†	†		*		*	*			
Barred Owlet ... (*Glaucidium cuculoides*)														†
Jungle Owlet ... (*Glaucidium radiatum*)			*	*										
Collared Pygmy Owlet ... (*Glaucidium brodiei*)														*
King Vulture ... (*Sarcogyps calvus*)			*	*	*					*	*			*
Himalayan Griffon Vulture ... (*Gyps himalayensis*)														†
Long-billed Vulture ... (*Gyps indicus*)			*	*										*
Indian White-backed Vulture ... (*Pseudogyps bengalensis*)			*	*	*	*				*	*			*
Large White Scavenger Vulture ... (*Neophron percnopterus*)										*	*			
Lämmergeier ... (*Gypaëtus barbatus*)														†
Lagger Falcon ... (*Falco jugger*)													†	
Hobby ... (*Falco subbuteo*)														†
Kestrel ... (*Cerchneis tinnunculus*)														*

Species	I							II						III
	A		B		C			D		E				F
	Myitkyina		Jessore	Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*b*	*a*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Eastern Steppe Eagle (*Aquila nipalensis*) ...														†
Hodgson's Hawk Eagle (*Limnaëtops nipalensis*) ...														†
Crested Serpent Eagle (*Spilornis cheela*) ...			*	*										*
Pallas's Fishing Eagle (*Haliaëtus leucoryphus*) ...			†											
Large Grey-headed Fishing Eagle (*Ichthyophaga ichthyaëtus*) ...			*											
Brahminy Kite (*Haliastur indus*) ...			*	*	*						*			*
Common Pariah Kite (*Milvus migrans govinda*) ...			*	*	*	*	*	*		*	*		*	*
Black-eared (*or* Large Indian) Kite (*Milvus migrans lineatus*) ...	*													*
Indian Shikra (*Astur badius*) ...											*			*
Indian Sparrow Hawk (*Accipiter nisus*) ...											†			
Bengal Green Pigeon (*Crocopus phoenicopterus*) ...			†											
Pintailed Green Pigeon (*Sphenocercus apicaudus*) ...														△
Green Imperial Pigeon (*Muscadivora aenea*) ...			†											
Indian Blue Rock Pigeon (*Columba livia*) ...			*	*				*			*		*	
Rufous Turtle Dove (*Streptopelia orientalis*) ...			*											
Spotted Dove (*Streptopelia chinensis*) ...	*	*	*	*	*			*	*	*	*			*
Little Brown Dove (*Streptopelia senegalensis*) ...					†						*	*	*	
Indian Ring Dove (*Streptopelia decaocta*) ...			*	*	†	*				*	*	*	*	
Red Turtle Dove (*Œnopopelia tranquebarica*) ...			*	*						*	*			
Bar-tailed Cuckoo Dove (*Macropygia unchall*) ...														†
Common Indian Peafowl (*Pavo cristatus*) ...											*			
Black-backed Kalij Pheasant (*Gennæus melanotus*) ...														*
Black-breasted *or* Rain Quail (*Coturnix coromandelica*) ...											†			
Hill Partridge (*Arborophila torqueola*) ...														*

Species	I							II						III
	A	B			C			D		E				F
	Myitkyina	Jessore		Dhubalia	Ramgarh	Digri		Monywa		Ambala	Delhi		Okhla	Darjeeling
	a	*a*	*b*	*a*	*a*	*a*	*b*	*a*	*b*	*a*	*a*	*b*	*b*	*a*
Grey Partridge (*Francolinus pondicerianus*) ...					⊙						*	*	*	
Common Bustard Quail (*Turnix suscitator*) ...				*										
White-breasted Waterhen (*Amaurornis phoenicurus*) ...		*		*										
Indian River Tern (*Sterna aurantia*) ...				*										
Red-wattled Lapwing (*Lobivanellus indicus*) ...											*			
Green Sandpiper (*Tringa ochropus*) ...		*												
Wood Sandpiper (*Tringa glareola*) ...		*												
Little Egret (*Egretta garzetta*) ...								*						
Cattle Egret (*Bubulcus ibis*) ...		*		*	*									
Indian Pond Heron (*Ardeola grayi*) ...		*		*				*			*			

Note 1. Grey Tit: I am convinced that I saw one member of this species on one of the tea gardens below Darjeeling, but unfortunately I did not make a note of the exact altitude. Until somebody shoots one there, therefore, this record will no doubt not be admitted.

Note 2. Purple-rumped Sunbird: I identified a ♂ and a ♀ beyond all doubt at Ambala on 19th July, 1942, which is some way north of the range given for this species in the *Fauna*.

Lister, M D. 1952. "Some Jungle Bird Associations." *The journal of the Bombay Natural History Society* 50, 573–593.

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