

## THE SATPURA TREND AS AN ORNITHO GEOGRAPHICAL HIGHWAY.

*By SALIM ALI, Bombay Natural History Society, Bombay.*

(Communicated by Dr. S. L. Hora, F.N.I.)

The significant fact of the occurrence in Ceylon and in the Travancore-Cochin-Malabar area (north to about Goa and Belgaum) of plant and animal forms not found elsewhere in peninsular India, either identical with or possessing close affinities with Indo-Chinese and Indo-Malayan forms, has been commented on by botanists and zoologists ever since systematic investigations were first undertaken in this country. Hooker and Thomson in their 'Introductory Essay to the Flora Indica' published in 1855 were perhaps the first to draw attention to the similarity in vegetation. Since then W. T. Blanford, A. R. Wallace and others have given numerous instances of animal forms exhibiting the same peculiarity.

In a previous paper (Salim Ali, 1935), I had occasion to dwell at some length on the Malayan element in the avifauna of the Travancore-Cochin area. Whistler (1944) brings to date the findings of older workers concerning the island of Ceylon, and recently (Salim Ali, 1948), I have succeeded by systematic collecting from the northernmost extremity of the Sahyadris or Western Ghats south of the Narbada (which dovetails into the western extremity of the Satpuras) to trace some significant extensions of range of a number of the peculiar forms of birds hitherto considered as more or less restricted to the Malabar Zone.

Biologists are generally agreed that the presence today of all these closely allied forms in such far flung discontinuous areas is accountable only on the presumption that these areas were at some past epoch directly connected with one another—not necessarily contemporaneously—and through their uniform physiography afforded continuity of those humid conditions and heavy rainfall which we find essential for the prevalence of these specialized forms. Of the two or three possibilities suggested as to the manner in which the geographical continuity in the distribution of plants and animals may have existed, the one that appeals most strongly from the ornithological point of view is that suggested and so ably developed by Dr. S. L. Hora. This hypothesis postulates that from an original centre of distribution in the Szetschwan-Yunnan area, animals and plants spread to Malaysia over the southern arm of the newly upraised Himalayan trend—the mountain ranges of Assam, Arakan and Tenasserim, continuing into Malaysia—and westward over the Eastern Himalayas across a mountain connection, since lost, over the Garo-Rajmahal hills gap (or alternatively between Darjeeling and Monghyr), then over the Satpura trend of mountains across the peninsula to the Western Ghats and southward along that trend to Cape Comorin and Ceylon. Taking into account the comparative youthfulness of the Himalayas in relation to the mountains of Yunnan that abut on them, and a critical study of the present-day distribution of Indo-Chinese and Indo-Malayan avifauna, it can scarcely be doubted that most East Himalayan and Malaysian forms have been derived from the region of Yunnan.

The plausibility of Dr. Hora's hypothesis is heightened by his own studies of the fish fauna inhabiting torrential streams of the area covered by what has aptly been termed this zoogeographical 'horseshoe' whose eastern terminal is Malaysia and western Ceylon. The physiology of torrential fishes is shown to be so closely adapted to the special conditions under which they live that there seems no way in which they could have attained their present far-flung discontinuous distribution

unless there was at some time or other a direct connection between the hill streams they inhabit.

Details will be found in Dr. Hora's contribution to this symposium, and contributors on other classes of animal life and plants will doubtless furnish what evidence they possess for or against this interesting hypothesis. Without going into detail or discussing any of the alternative suggestions regarding the route by which eastern forms may have reached peninsular India and Ceylon, I would like to put forward such ornithological evidence as we are able to adduce, all of which in my opinion lend significant support to the postulate of the Satpuras having been the highway of their westward spread.

It must be made clear, however, that our knowledge of the ornithology of the Satpura and Vindhya mountains, as well as that of the Aravallis, is as yet very incomplete and defective. Throughout the length of the Satpura trend there are no doubt many 'pockets' or 'islands' lying at elevations over 3,500 ft.—similar to Pachmarhi or Parasnath Hill—with the requisite rainfall and humidity for producing the biotopes essential for the survival of the specialized forms that concern the present enquiry. A systematic investigation of such isolated patches of evergreen or moist deciduous forest would provide evidence of the greatest value: it is a subject that deserves high priority on the field programme of the Zoological Survey of India.

Numerous genera and species of birds can be cited occurring in Ceylon and the Malabar zone of south-western India whose nearest relatives are to be found only in the Indo-Chinese countries, the Eastern Himalayas and southward to Malaysia. The following are some of the more outstanding examples and will suffice for our present purpose. I feel confident that a closer investigation of suitable isolated biotopes along the Satpura trend will reveal further 'milestones' in the distributional journey of some of these forms, and much other evidence bearing on the question.

#### Genus *Garrulax* Lesson.

(Laughing Thrushes.)

(Forest-frequenting birds of evergreen biotope found from the level of the plains up to about 9,000 ft. elevation, but usually to 4,500 feet, varying with locality and species.)

Represented along the Himalayan trend (i.e. including Pakistan and Burma) by 6 species in at least 12 geographic races, from the Hazara country in the west to North Chin and Kachin Hills on the east; Assam, Cachar, Shan States, Central Burma, Pegu and Tenasserim. Extralimital, the genus occurs in Yunnan, Hainan, Thailand, Annam, Cambodia, Malaysia.

One isolated species, *Garrulax delesserti* (Jerdon), is confined to the Malabar zone (Wynaad to South Travancore) while Ceylon possesses another, *G. cinereifrons* Blyth. The distance separating *G. delesserti* from its nearest northern congener is 1,000 miles, and across the Bay of Bengal 1,500 miles.

#### Genus *Trochalopteron* Blyth.

(Laughing Thrushes.)

(Forest-frequenting birds of evergreen biotope found at elevations of over about 4,000 ft.)

Represented along the Himalayan trend by about 11 species in some 27 races, from the Afghan frontier in the west to the Mishmi Hills in the east, and beyond into Yunnan, etc., eastward the genus extends to Eastern China; southward to Malaysia. (See map.)

Two isolated species occur in the Malabar zone of South India, viz. *Trochalopteron cachinnans* (Jerdon) and *T. jerdoni* (Blyth), the latter in 2 races. Their range is almost exactly coincident with that of the Nilgiri Tahr. The genus is absent in Ceylon.

Genus *Oreocincla* Gould.

(Mountain Thrushes.)

(Inhabits hill forests and sholas usually between 2,000 and 4,000 ft. elevation. Often considerably higher in the Himalayas.)

Represented along the Himalayan trend by 3 species in 5 races from the Afghan frontier in the west to the Mishmi Hills in the east. Extra-limital, it is found in Yunnan and farther east; Annam, Thailand, Malaysia, etc.

A race of the Himalayan species *dauma* (*neilgherriensis*) Blyth is found in the Malabar zone of S. India. A second race *imbricata* (Layard) is peculiar to Ceylon, while that island also possesses an endemic species *O. spiloptera* Blyth.

Genus *Irena* Horsfield.

(The Fairy Bluebird.)

(One species *Irena puella* (Latham) is an inhabitant of evergreen biotope from almost plains level to about 4,000 ft. elevation.)

Distribution: Eastern Himalayas from Sikkim and Bhutan to the Mishmi Hills. East to Yunnan, Annam, Cochin-China; south through Burma, Thailand and Tenasserim to Malaysia; Andamans and Nicobars. Also the Malabar zone of S. India and Chitteri Hills (possibly also the Shevaroyes), separated by a break of at least 1,200 miles from the East-Himalayan population. It is rare (straggler?) in Ceylon.

The Fauna of British India series on birds (Vol. iii, p. 2) gives its breeding range as from Travancore to Kanara and Khandesh. The basis for the inclusion of Khandesh is unknown since the claim is unsupported by reliable evidence. The most northerly authentic record so far is from Savantvadi near Goa. Nevertheless, I feel that a careful investigation of how far north in the Ghats this species extends, and whether along the Satpuras or to the Chota Nagpur-Rajmahal Hills area needs to be undertaken.

Genus *Arachnothera* Temm. and Laug.

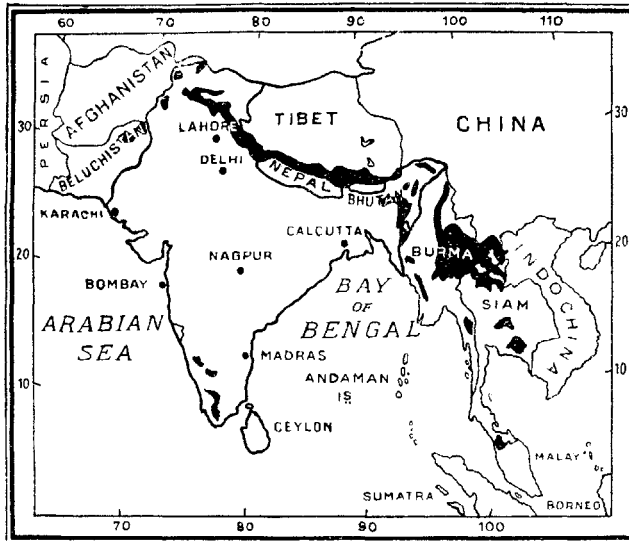
(Spider Hunters.)

(Birds of tropical and sub-tropical rain forest.)

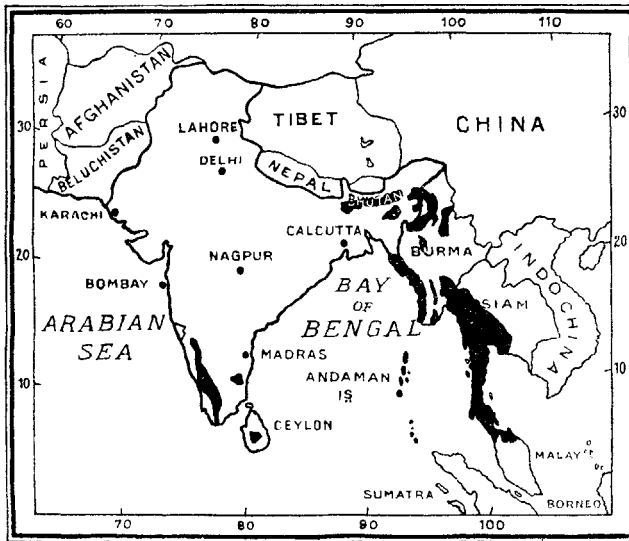
Represented along the Himalayan trend by 4 species in 5 races from Sutlej Valley to the Mishmi Hills. Extra-limital in Yunnan, Thailand, Annam, Cochin-China, etc., and south to Malaysia.

The distribution of one species and race, *A. longirostris longirostris* (Latham) is remarkable. It occurs in eastern and southern Assam, E. Bengal (Tipperah), Chittagong, the hill tracts from Manipur to the Chin Hills; Burma, Shan States, Thailand, Annam, Cochin-China and Malaysia.

After a break of over 1,000 miles from its nearest inhabited area, the same species and race reappears in the Malabar zone of S.W. India. It does not occur in Ceylon.



a.



b.

FIG. 1a. The distribution of the genus *Trochalopteron* (Laughing Thrushes) in India, Pakistan and Burma.

FIG. 1b. The distribution of the Fairy Bluebird (*Irena puella*) in Ceylon, India and Burma.

**Genus *Hemicircus* Swainson.**

*Hemicircus canente* (Lesson): The Heart-spotted Woodpecker.

(Inhabitant of moist deciduous or semi-evergreen biotope.)

The typical race *canente* (Lesson) occurs in Assam, Burma, Thailand, Annam, Cochin-China and Malaysia.

A second race *cordatus* Jerdon—somewhat smaller in size with a smaller bill—was hitherto believed to be confined to the Malabar zone of S.W. India. Seventy years ago Jerdon had recorded it from the 'Chanda forest' in the Central Provinces, but since then it had apparently been lost sight of there. Within the last 10 years, however, it was authentically recorded for the first time in the wooded hills of the Tulsi Lake catchment area in Greater Bombay. The recent Gujarat ornithological survey extended its range still further north to the northern extremity of the W. Ghats, having procured specimens in its typical biotope in the Songadh forests of Navsari Prant, south of the Tapti River. The possibility of its occurrence along the Satpuras and in the Chota-Nagpur-Rajmahal Hills area needs to be investigated.

#### Genus *Dryocopus* Wied.

*Dryocopus javensis* (Horsf.): The Great Black Woodpecker.

(Inhabitant of moist deciduous or semi-evergreen biotope.)

The typical race of this woodpecker *D.j. javensis* (Horsf.) and two others are found in Malaysia. A fourth race *D.j. feddeni* (Blyth.) occurs in Burma, north to the Chin Hills so far as is known at present. A fifth race *D.j. hodgsoni* (Jerdon) was until recently considered as restricted to the Malabar zone, the northernmost record according to Stuart Baker (*Fauna*, iv, 90) being from Belgaum. The Gujarat Ornithological Survey recently extended its limit northward along the Ghats to the Tapti River, to the intermingling zone of forested foothills of the Western Ghats and the Satpuras. It is confidently expected that careful investigation will bring to light its presence in the appropriate biotope along the Satpuras and also in the Chota Nagpur-Rajmahals area, thus providing evidence of the route by which it travelled westward.

#### Genus *Vivia* Hodgson.

*Vivia innominatus* (Burton): The Speckled Piculet.

(Inhabitant of evergreen and most deciduous biotope.)

This tiny woodpecker in two races occurs along the Himalayan trend from Dharmasala in the west to Assam (Mishmi Hills?) and south to Tenasserim. Extra-limital it is found in Thailand, Annam, etc., and Malaysia.

A third race *V.i. avunculorum* Hartert inhabits the Malabar zone of S.W. India, as far north as the Sirsi taluka of North Kanara according to present knowledge.

#### Genus *Alcemerops* Geoff.

*Alcemerops athertoni* (Jardine and Selby): The Blue-bearded Bee-eater.

(Inhabitant of evergreen and moist deciduous biotope up to about 5,000 ft. elevation.)

Occurs in the Himalayas from about Dehra Dun in the west to East and Southern Assam, East Bengal, Chittagong, Vizagapatam Ghats. Extra-limital, in Thailand.

In peninsular India according to Stuart Baker (*Fauna*, iv, 242) it is confined to the west coast from Travancore to Belgaum, and also recorded as occurring in Sambalpur. On the western side, the recent Gujarat ornithological survey extended the northern limit of its distribution to the Tapti River, and I have an undoubted aural record of it from Rajpipla territory just south of the Narbada. Its discovery in the area of the Gujarat Satpuras is of interest because within the last few years it has also been recorded at and around Pachmarhi a more easterly station along the same trend, thus providing an additional milestone to Sambalpur on the postulated highway of East-Himalayan forms to the Malabar zone. This bee-eater does not occur in Ceylon.

Genus *Dichoceros* Gloger.

*Dichoceros bicornis* (Linn.): The Great Indian Hornbill.

(Inhabitant of tropical and sub-tropical rain forests of South-East Asia.)

Distributed along the Himalayan trend from Kumaon in the west to Mishmi Hills on the east; south to Tenasserim. Extra-limital in Thailand and Malaysia.

Also occurs in the Malabar zone of S.W. India separated from the rest of its range by at least 1,000 miles of intervening country. It is absent in Ceylon.

Genus *Lyncornis* Gould.

*Lyncornis cerviniceps* Gould: The Great Eared Nightjar.

(Birds of evergreen biotope; lower hill forest, usually under 3,000 ft. elevation.)

Represented by the typical race *L.c. cerviniceps* Gould in Eastern Bengal and Assam, Burma, Thailand and Malaysia. Various geographical races of this as well as of an allied species are found right up to New Guinea.

One race of *L. cerviniceps*, viz. *bourdilloni* Hume is confined to Travancore, the northernmost point at which it has so far been found being Thattakad ca 10° 7'N. latitude.

Genus *Batrachostomus* Gould.

(Frogmouths.)

(Birds of evergreen biotope, belonging to the family Podargidae found over the greater part of the Australasian Region.)

Represented by two species in the Eastern Himalayas from Sikkim to the Mishmi Hills; Assam, Burma, Thailand, Malaysia, etc.

A third species, *B. moniliger* Blyth, occurs in Ceylon and the Malabar zone of S.W. India.

Genus *Tephrodornis* Swainson.

*Tephrodornis gularis* (Raffles): The Large Wood-Shrike.

(Inhabitant of evergreen or moist deciduous biotope.)

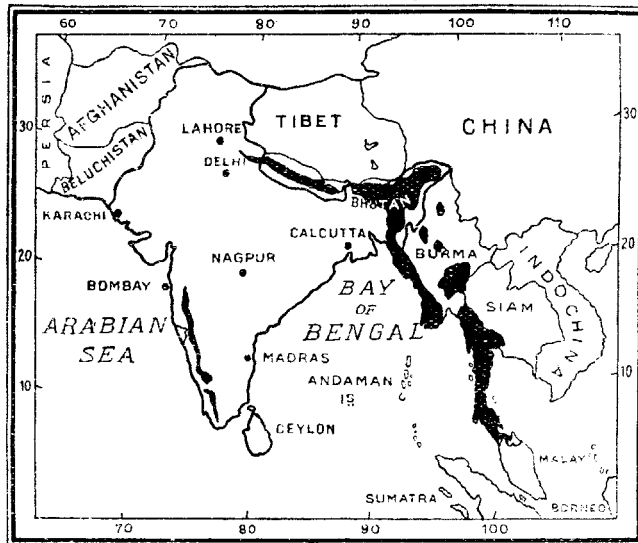
The race *pelvica* (Hodgs.) according to the *Fauna* (ii, 310) occurs in the Himalayas from Nepal to Eastern Assam; practically all Burma; the northern parts of the Malay Peninsula; Shan States, Yunnan, Thailand and Cochin-China. Other races occur in Malaysia.

Represented in Western India by the race *sylvicola* (Jerdon) whose distribution the *Fauna* gives as follows: 'The West Coast of India from the extreme south almost to Bombay City; Nilgiris and adjoining hills, Nelliampathy Hills, etc., up to nearly 6,000 ft.'

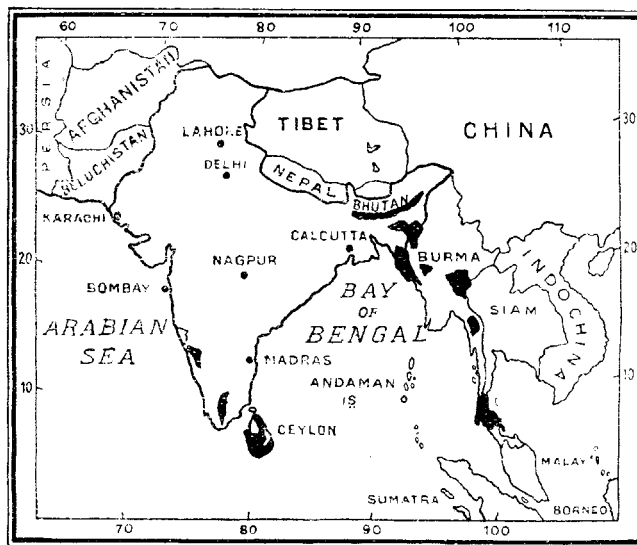
The limit of *sylvicola* has been extended considerably farther north by the recent Gujarat Ornithological Survey which collected a specimen at Waghai in the Surat Dangs. Although it was said to be found 'almost to Bombay City' the most northerly authentic record that could hitherto be traced had only been Belgaum.

The East-Himalayan race *pelvica* has recently been procured in the Vizagapatam Ghats, but the species is so far unrecorded from anywhere along the Satpura trend or from the Chota Nagpur-Rajmahal Hills area. Careful field work will doubtless reveal its presence in suitable biotope there.

Besides the above, numerous other examples could be cited from almost every endemic bird family which exhibit the same peculiarities of discontinuous distri-



a.



b.

FIG. 2a. The distribution of the Great Hornbill (*Dichoceros bicornis*) in India and Burma.

FIG. 2b. The distribution of the genus *Batrachostomus* (Frogmouths) in Ceylon, India and Burma.

bution in a greater or lesser degree. Some of them are:—*Hemipus picatus* (Sykes), *Pericrocotus flammeus* (Forster), *Aethopyga siparaja* (Raffles), *Eurystomus orientalis* (Linn.), *Hirundapus giganteus* (Temm. and Laug.), *Chrysocolaptes guttacristatus* (Tickell), *Dinopium javanense* (Ljung.), *Alcedo meninting* Horsf., *Ceyx tridactylus* (Pallas), *Harpactes fasciatus* (Pennant), *Huhua nipalensis* Hodgs., *Baza leuphotis* (Dumont), *Baza jerdoni* (Blyth), *Lophotriorchis kieneri* (de Sparre), *Ducula badia* (Raffles) and *Gorsakius melanolophus* (Raffles).

There are two records in the literature which have hitherto been looked upon with suspicion, but which in the light of recent findings need careful re-examination. A specimen of the Southern Tree-Pie (*Dendrocitta leucogastra* Gould was recorded by McMaster from the Gawilgarh Hills near Chikalda, Amraoti District, Berar) about 80 years ago, and also the Black Bulbul (*Microscelis psaroides* (Vigors)). These records have not since been repeated. Stuart Baker (*Fauna*, i, 52) disposes of the former by saying 'apparently a straggler only'. But in the case of so sedentary a species whose known distribution at present is restricted to the Malabar zone (Southern India from South Travancore to the Wynaad) it is not easy to understand why or how it could have straggled so far north-east. Since the Gawilgarh Hills record is authentic and supported by a skin, it does not seem unreasonable to suggest that it may represent a population that is now either extinct, or that the species may still be tucked away in some isolated pockets of the requisite humid evergreen biotope at remote points along the Satpuras, possibly extending eastward into the Bastar, Chota Nagpur and Rajmahal Hills areas. Should this prove to be the case, it will be worth while to examine more closely and determine the true taxonomical relationship between this species and the Brown-browed Tree-Pie (*D. frontalis* Horsfield) of the Eastern Himalayas, Assam, and North Burma hills.

As regards *Microscelis psaroides*, the known range of this bulbul at present is from Ceylon through the South Indian hills northward along the Western Ghats to about Matheran. The only other area whence it has been recorded in the peninsula is the Shevaroy Hills. In the Himalayas this species occurs west to east, to the Mishmi Hills and beyond in Yunnan. It is also found in Burma, Thailand, Tenasserim and Malaysia, in evergreen and moist deciduous biotope, breeding mostly in the hills between 2,000 and 8,000 ft. elevation. That here again the spread to peninsular India has been along the Satpura trend seems more than likely. The point needs to be cleared up by careful collecting.

#### REFERENCES.

- Ali, Salim, (1935). The Ornithology of Travancore and Cochin. *Journ. Bom. Nat. Hist. Soc.*, 37, 818-831.  
 ——— (1948). The Gujarat Satpuras in Indian Ornithography. The Highway of the Malayan forms to the Western Ghats. *Journ. Gujarat Res. Soc., Bombay*, 10, 35-45.  
 Whistler, H. (1944). The Avifaunal Survey of Ceylon, *Spolia zeylonica*, XXIII, 25.