VII. *The Distribution of Vertebrate Animals in India, Ceylon, and Burma.*

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[Plate 44.]

Contents

1. Introductory.

Thirty years ago I published a note* on the geographical distribution of the Indian fauna, and proposed the division of the Indian Peninsula into certain provinces and sub-provinces distinguished by their zoological characters. Six years later, on the appearance of Wallace's 'Geographical Distribution of Animals,' I republished the scheme of geographical classification† with a small sketch map. Both papers were merely statements of conclusions, without full details of the facts on which those conclusions were founded. The completion of the Vertebrata in the 'Fauna of British India' affords an opportunity of reconsidering the whole question, and of reviewing

* 'Journ. Asiatic Soc. Bengal,' 1870, vol. 39, p. 336.

† "The African Element in the Fauna of India," 'Ann. Mag. Nat. Hist.,' 1876 (4), vol. 18, p. 277.

generally the distribution of terrestrial vertebrate animals throughout the British possessions in India, Ceylon, and Burma.

For the study of zoological distribution there are few, if any, regions on the earth's surface that exceed British India and its dependencies in interest. The area is large, nearly 1,800,000 square miles, and although the vertebrate fauna is by no means thoroughly explored, it is well known throughout the greater part of the area, and fairly well throughout the whole; better probably than in any other tropical and sub-tropical tract of approximately equal extent. The variety of elevation and of climate is remarkable; the country is bounded on the north by the highest of known mountain ranges, and by the loftiest plateau on the earth's surface, and it includes within its limits both the almost rainless area of the Sind Desert, and the locality in the Khási Hills distinguished by the heaviest rainfall known. Another element of interest is the fact that the Peninsula of India is a land of great geological antiquity, there being no evidence to show that it has ever been submerged, although the greater part of the Himalayas and Burma have at times been beneath the sea.

The object of the present contribution to zoological geography is to determine the divisions into which the Indian Empire can be classed by our present knowledge of the vertebrata, and especially to ascertain the zoological relations between the Indian Peninsula and the neighbouring countries. After some consideration I have come to the conclusion that the object in view can be best carried out by a review of the distribution of genera; families and sub-families alone being too few in number and ranging in general over wider tracts than genera do, so that it is difficult to determine subregional divisions by means of them, whilst species are too numerous and too unequal in importance.

2. Area included and Terms used.

It is as well to define briefly the area to which the following pages refer, and to explain the sense in which a few terms, widely used in writings on zoological distribution, are employed.

The limits adopted for the 'Fauna of British India,' as stated in the Introduction to the Mammalia, are those of the dependencies of India with the addition of Ceylon, which, although British, is not under the Indian Government. "Within the limits thus defined are comprised all India proper and the Himalayas, the Punjab, Sind, Baluchistan, all the Kashmir territories with Gilgit, Ladák, &c., Nepal, Sikhim, Bhutan, and other Cis-Himalayan States, Assam, the countries between Assam and Burma, such as the Gáro, Khási, and Nága Hills, and Manipur, the whole of Burma, with Karenni, and of course Tenasserim and the Mergui Archipelago, and lastly the Andaman and Nicobar Islands. Afghanistan, Kash-

garia, Tibet, Yunnan, Siam, and the Malay Peninsula south of Tenasserim are excluded."

The name India may with advantage be restricted to the country of the Hindus, to which it properly belongs; that is, to the area lying west of the Bay of Bengal and of longitude about 90° E., and south of the Himalayas. The best western boundary of India to the north of the Arabian Sea is to be found in the Afghan and Baluch Hill ranges, forming the western limit of the great Indo-Gangetic Plain. Burma comprises Arakan, Upper Burma, the Shan States, Pegu, Karenni, and Tenasserim.

The terms applied to the great zoological subdivisions of the earth's surface are those used by LYDEKKER in 'A Geographical History of Mammals,' pp. 27, &c., and are somewhat altered from those employed by myself in 1890.* The names Arctogæa, Notogæa (Australia, &c.), and Neogæa (South America) are applied to the primary zoological divisions of the world or zoological realms, and the Arctogæan realm comprises five regions—the Sonoran, Holarctic, Ethiopian, Malagasy, and Oriental.† The greater part of India and its dependencies are included in the last named, but the higher Himalayas are within Holarctic limits, and, as will be shown, the fauna of North-western India contain too large a proportion of Holarctic, or, as they are generally called, Palæarctic, types for it to be included in the Oriental or Indo-Malay region.

It must be understood that the regions named are founded on the distribution of Mammalia, and are not either necessarily, or, in fact, identical with those which correspond with the distribution of other classes of Vertebrata or of any Invertebrates. The class of Birds, taken as a whole, appears to coincide better with the Mammals in distribution than other classes do. As a guide to the demarcation of regions and subregions in the present paper, terrestrial mammalia are regarded as of primary importance.

3. HISTORY OF THE ZOOLOGICAL SUBDIVISIONS OF THE ORIENTAL REGION.

It is unnecessary to go into much detail in recapitulating the various proposals that have been made for the zoological subdivision of the Indian area. Excellent remarks on the subject may be found in the Introduction to JERDON'S 'Birds of India,' p. xxxix. (1862), and in that to GÜNTHER'S 'Reptiles of British India,' p. vii. (1864), but in both cases the areas specified are geographically arranged and not distinguished on zoological data.

* 'Proc. Geol. Soc.,' 1890, p. 76, footnote. The origin of the names and the various systems of SCLATER, HUXLEY, WALLACE, HEILPRIN, ALLEN, and others need not be recapitulated here. Full details are given in WALLACE'S 'Geographical Distribution of Animals,' vol. i., p. 58, and LYDEKKER'S 'Geographical History of Mammals,' p. 25.

† The name "Oriental," substituted for "Indian" by WALLACE, has unfortunately long been used by botanists for South-western Asia and Persia. The best name for the "Eastern Palæotropical Region," as it is called by some writers, is probably that employed by ELWES—"Indo-Malay."

The scheme which I proposed in 1870* was restricted to "Peninsular India with Ceylon, from Baluchistan to a line drawn to the north from the head of the Bay of Bengal, and including all south of the Himalayas, but excluding the mountains themselves." This area was thus divided:—

"1. *The Punjab Province*; including, besides the Punjab itself, Sind, the desert country east of the Indus, Cutch, and probably Western Rajputana. The fauna, with a few exceptions, is of the desert type.

"2. *The Indian Province proper.*—This includes all India, east of Delhi and Kathiawar, as far as the Rajmahal Hills, and the whole Peninsula south of the Ganges with the exception of the western coast and probably a few scattered hills in Southern India. It also includes Northern Ceylon.

"3. *The Eastern Bengal Province.*—This perhaps should be classed with the Indo-Chinese countries; Malay forms prevail. Calcutta is just on the edge of it, and may rather be placed inside it than outside; Assam and Cachar beyond our limits belong to it.

"4. *The Malabar Province with Southern Ceylon.*—This, although far from thoroughly explored, has the richest and most interesting fauna of all. It comprises the western coast about as far north as Bombay, and the range of hills which runs parallel to that coast from Cape Comorin, probably as far as the River Tapti."

The Indian Province proper was divided into four subprovinces—(*a*) Hindustan, from the Himalayas to the Nerbudda; (*b*) Deccan, from the Nerbudda to the Krishna (Kistna), and bounded on the east by a north and south line a little east of Nagpur; (*c*) Bengal, east of the latter, extending south to the Godávari, and, (*d*) Madras, south of the Kistna, with Northern Ceylon.

The details of this subdivision, it should be stated, were to a great extent founded on a study of the distribution of land mollusca; but after many more years' study of the whole subject, I believe the main lines were for the most part correctly laid down and only require slight modifications.

In a paper on the distribution of Asiatic Birds published in 1873,† ELWES divided the Indo-Malay (SCLATER'S Indian, and WALLACE'S Oriental) region into three subregions—

1. Himalayan or Himalo-Chinese.
2. Indian.
3. Malay.

ELWES'S classification has been adopted by several subsequent writers, and, as will be seen, is accepted with a few modifications as to limits in the present contribution to the subject. In the map attached to the memoir the higher tracts of South-western India and Ceylon, and also the main ranges in the Malay Pensinula and in Burma, are coloured as belonging to the Himalo-Chinese subregion, and a paler

* 'J. A. S. B.,' 1870, vol. 39, pt. 2, p. 336.

† 'P. Z. S.,' 1873, p. 645.

tint of the same colour, blue, is used to distinguish the large forest area of Central and South-eastern India, but this arrangement is not that adopted in the paper itself, and is only mentioned incidentally.

WALLACE, in his great work on the 'Geographical Distribution of Animals,' published in 1876, divided each of the six regions as arranged and named by SCLATER into four subregions,* which in the case of the Indian or Oriental region were the following :—

1. *Hindostan or Indian Subregion.*—"The whole Peninsula from the foot of the Himalayas on the north, to somewhere near Seringapatam on the south, the boundary of the Ceylonese region being unsettled." On the map at p. 315, the southern limit of this subregion is represented as terminating on the west at Goa, and on the east a little south of Masulipatam, but as running farther south inland.

2. *Ceylon and South India.*—The island of Ceylon with the southern portion of the Indian Peninsula, the limit between this and the Hindustan subregion being left somewhat indefinite.

3. *Himalayan or Indo-Chinese Subregion.*—This comprises the Himalayas as far west as Kashmir from the base to an elevation of 9000 or 10,000 feet, and the countries east of the Bay of Bengal, Assam, Burma, Southern China, Siam, and Cochin China, except the Malay Pensinula.

4. *Indo-Malaya or Malayan Subregion.*—The Malay Peninsula and Archipelago.

Mr. ALLAN O. HUME, in 1878,† called attention to the influence of rainfall on the distribution of Indian birds. He published a map of India, showing, by a system of shading, the mean annual rainfall in different parts of the country, and he pointed out the connection between the areas of higher or lower rainfall and the zoological subdivisions.

By an ingenious arrangement, proposed by Dr. R. B. SHARPE for Birds, an attempt was made to distinguish the hill areas in his Indian region from the plains. This plan, already suggested, as Dr. SHARPE points out, by Mr. ELWES's map, has much to recommend it, though it is rather complicated, and it does not apply so well to other classes of Vertebrata as to birds. The question will be further considered in a later part of this paper.

The subregions of the Indian region,‡ as proposed by Dr. SHARPE, are—

1. Indian Peninsular subregion.
2. Indo-Malay subregion.
3. Indo-Chinese subregion.
4. Himalo-Malayan subregion.
5. Himalo-Chinese subregion.

* Vol. 1, pp. 81, 82, 321, 326, 329, 334.

† 'Stray Feathers,' vol. 7, pp. 53, 501.

‡ 'Natural Science,' August, 1893, p. 108.

The three first approximately correspond to WALLACE's four, his Hindustan and Ceylonese subregions being united, and the Himalayas differently arranged. The Himalo-Malayan contains the lower Himalayas and the mountains of Southern India, Ceylon, Burma, and the Malay Peninsula. The Himalo-Chinese contains the higher slopes of the Himalayas and of the high mountains of the Indo-Chinese subregion, the crests of the Himalayan range being rightly placed in a subdivision of the Palæarctic region.

In the Introduction to the Mammalia in the 'Fauna of British India,' p. iv. (1888), treating of a larger area than in 1870, I wrote thus :—

"The division of the area into zoological subregions is somewhat difficult, the affinities of the different subdivisions being complicated. The following subregions may be accepted as convenient and as approximately correct—

"I. *Tibetan.*—The upper Indus valley (Gilgit, Ladák, &c.) and the higher Himalaya above 12,000 or 14,000 feet.

"II. *Himalayan.*—The southern slopes of the Himalaya, from the base to about the limit of trees.

"III. *Indian.*—India, from the base of the Himalaya to Cape Comorin, with the exception of the Malabar coast, but with the addition of Northern Ceylon.

"IV. *Malabar or Ceylonese.*—The Malabar coast and neighbouring hills as far north as the Tapti River, together with Southern Ceylon.

"V. *Burmese.*—All Burma, except South Tenasserim, and with the addition of Assam and the intervening countries.

"VI. *South Tenasserim.*—This is the northern extremity of the great Indo-Malayan subregion, comprising the Malay Peninsula and several of the islands."

"It is well to notice that the Tibetan subregion is Palæarctic, whilst the other five subdivisions are included in the Oriental region."

As will be seen in the sequel, the result of a more thorough study of the whole fauna has led to several modifications in these subregions.

NEWTON* and GADOW,† treating of Birds, and W. L. SCLATER,‡ writing on the distribution of Mammals, unite the Indian and Ceylonese subregions of WALLACE into one. LYDEKKER§ has practically adopted the subdivisions proposed in the 'Fauna of British India' for the western part of the Oriental region. W. L. SCLATER differs from all other writers in uniting the Himalayas west of about 88° E. long. with Peninsular India and Ceylon into one subregion; and in the maps accompanying his paper, a considerable portion of the Tibetan plateau, with the upper

* 'Dictionary of Birds,' p. 356 (1893)

† BRONN'S 'Kl. Ord. d. Thierreichs,' vol. 6, pt. 4; Vögel, p. 296 (1893).

‡ 'Geographical Journal,' 1896, vol. 8, p. 380. The articles originally published in the 'Geographical Journal' have since been republished in book form, with some additions, as 'The Geography of Mammals,' By W. L. and P. L. SCLATER, 1899. The Oriental region and its divisions are described in Chapter V.

§ 'Geographical History of Mammals,' p. 266 (1896).

valleys of the Indus and Brahmaputra, is included in the same subregion as the Peninsula of India. This inclusion of part of Tibet, however, must be, I think, due to some mistake of the map drawer.*

There are several differences between various writers with regard to the eastern part of the Oriental region, but these do not require notice here. The above is not a complete list of contributions to the question, but it comprises, I believe, all the writers who have discussed at any length the question of the divisions to be established in the western part of the Oriental region.

4. Preliminary Remarks.

Before proceeding further, a few remarks are necessary. It is usual to write about boundaries and limits of regions and subregions as if these were really well-marked lines that can be laid down on a map. As a matter of fact, as has been pointed out by other writers, such boundaries are only definite when they coincide with some peculiar physical feature, such as a range of hills, which, lying at right angles to the direction of the rain-bearing winds, causes an abrupt difference in the rainfall and consequently in the vegetation. This is the case along the Sahyádri or Western Ghats, which run parallel with the Malabar coast, and even in this case the difference becomes less marked in the south of India, because rain-bearing winds come from opposite sides of the range at different seasons. Generally, there is no definite limit to a region or subregion; there is a gradual change in the fauna throughout a tract often several hundreds of miles in width. Thus it is very difficult to assign any distinct limits to the Indo-Malay region on the west side of India. A few Indian animals range throughout Baluchistan and even into Arabia and Palestine, though they are greatly exceeded in number by the prevailing desert (Eremian) forms of the North African type. Similarly, in the Himalayas there is a gradual replacement to the westward of tropical or subtropical genera by those of the temperate Holarctic region. Again, in Tenasserim, the Malay types which prevail in the south of the province disappear gradually to the northward, some ranging much farther than others.

One question of primary importance affecting the distribution of animals in all tropical or temperate regions with a fair rainfall is the prevalence of forest, and the extent to which the original forest has been destroyed by man. The clearing of forest for cultivation or for a supply of timber and firewood, if thorough, destroys a large proportion of the animals, vertebrate and invertebrate, and species having but a limited range disappear completely. In some Indian tracts—for instance, throughout the greater part of the Indo-Gangetic Plain—it is uncertain whether forest ever prevailed, the present vegetation consisting of gigantic grasses from 6 to 20 feet high, but the practice of annual burning tends to kill trees and to encourage the growth of grass. Tracts like the Deccan and Carnatic were doubtless formerly

* The paper was published whilst Mr. Sclater was away from Europe.

forest land, and it is probable that the occurrence of species, characteristic of the Malabar forests, on isolated hill-groups in Central and Southern India, is due to migration through the forest lands formerly existing.

Another remark which is essential is that the evidence as to the zoological relations of geographical areas afforded by different groups of the animal kingdom is by no means the same. For the purpose of defining geographical subdivisions, it is convenient to regard different orders and families as of equivalent importance, and afterwards to consider the bearing of divergent evidence on the history of both the animals and the region. But there are several facts which should not be forgotten. Amongst certain divisions of the animal kingdom the species appear to arrange themselves naturally into genera and families, and no doubt can exist as to the limits of such groups. They are, as a rule, I believe, more ancient types in which differentiation has become well marked. In other divisions, it is extremely difficult to classify either genera or families, the species, which are frequently just as liable to run into each other as are the larger groups, being generally numerous, and without those breaks, caused by the dying out of intermediate forms, which enable the larger groups to be easily recognised. As an instance of the contrast in this respect, no better case can be mentioned than that of Passerines compared with some other orders of birds. Amongst passerine birds, as is well known, owing to the great number of species and the necessity of classifying them, genera are often founded on characters of minor importance, such as small distinctions in the form of the wing feathers, in the shape of the bill, in the disposal of the rictal bristles, or in the position or form of the nostrils. In the nearly affined order or suborder of Eurylæmi, on the contrary, the genera are easily distinguished by both structure and the coloration of the plumage. This may indicate that the Eurylæmi are of greater antiquity than the Passeres. It is clear that in a group like the Eurylæmi the evidence afforded by different genera is more valuable than that afforded by passerine birds. It is especially amongst groups like the Passerines that there is a liability for generic distinctions to be founded on geographical distribution.

But this is not all, for the so-called families of passerine birds are no more clearly distinguished than the genera, and there is great variation in the arrangement adopted by different recent writers. Of course, birds have much greater powers of traversing a distance than reptiles, batrachians, or even mammals (bats excepted) possess, and barriers, such as seas or deserts, which are impassable by other vertebrates, present no obstacle to birds. It is evident, therefore, that for the study of geographical distribution birds are less well suited than other vertebrates, and that Passerines are not so likely to afford clear evidence as other birds. Under these circumstances, it is very remarkable that SCLATER'S scheme of zoological distribution, mainly founded on passerine birds, should have needed so little modification as has been the case. At the same time some alterations are required.

Amongst the different classes of vertebrata, the evidence afforded by mammals

and batrachians appears to me of the highest importance, that furnished by reptiles comes next, that yielded by birds last. The evidence afforded by freshwater fishes varies so much with the presence or absence of suitable habitats, such as lakes and rivers, that it is generally, I think, only applicable to large areas.

5. Subdivisions of Area.

The plan I have adopted in order to test the distribution of the Vertebrata is to divide the whole of India, Ceylon, and Burma into nineteen tracts, distinguished by physical characters; and, as shown in the tables which follow, to mark in each tract the presence of every genus known to inhabit it. In defining these tracts the principal distinguishing features that have been taken into account are rainfall, temperature, the presence or absence of forest, prevalence of hilly ground, and, in some cases, elevation above the sea. I have also been guided by my own knowledge of the country and by observations on the range of particular species. The boundaries of these tracts are more or less arbitrary, and might in some cases be modified with advantage, as will be noticed in describing them. But such modifications often apply to limits of secondary importance.

As was pointed out in the 'Manual of the Geology of India,'* a main feature in the physical geography of the country is the great Indo-Gangetic Plain, which extends from the Arabian Sea to the Bay of Bengal, and isolates the Indian Peninsula from all neighbouring regions. This plain is from 90 to 300 miles in width, and occupies an area of 300,000 square miles, or about one-sixth of the British Indian Empire. To the north-east an arm runs up the Assam Valley, but this is nowhere much more than 50 miles broad.

This great plain forms a geological boundary of the highest importance. It is entirely occupied by deposits of very late geological age (Pleistocene or recent) and of great thickness; and it has on one side the ancient stable land-area of the Indian Peninsula, and on the other the unstable Himalaya, a mass of comparatively late origin. The former appears to have undergone but little change since very early times, for the unfossiliferous Vindhyan strata, sandstones, shales, and limestones—probably of Cambrian or Precambrian age—are found in many places on the surface of the Peninsula unaltered and almost undisturbed, whilst on the other side of the Indo-Gangetic Plain, at the base of the Himalayas, Pliocene beds are upheaved and contorted. As a dividing belt between contrasting areas, the great plain is as important zoologically as it is geologically.

The idea has naturally occurred to many observers that this extensive plain must be the bed of a former sea now filled up, but geological data are opposed to the hypothesis.† There is no evidence that marine conditions ever prevailed in the great

* Original edition, 1879, introduction, p. ii.; second edition, p. 1.

† 'Manual of Geology of India,' introduction, p. lx.; also p. 393; second edition, p. 428.

area east of Delhi; and although the sea in early Tertiary times occupied the Indus Valley, together with the greater part of Baluchistan and Persia, it appears to have deserted the Indus region since the Miocene period, and even in Miocene times it is not known to have extended north of the neighbourhood of Quetta and Jacobabad. To the eastward, marine Eocene rocks reappear south of the Gáro Hills. Of course, the question whether the plain has been sea or land has an important bearing on the distribution of animal life.

The preliminary subdivision of the whole area is the following :—

A. The Indo-Gangetic Plain.
B. The Indian Peninsula.
C. Ceylon.
D. The Himalayas.
E. Assam and Burma.

These have been again subdivided, as shown in the following pages and on the accompanying map. (Plate 44.)

A. *Indo-Gangetic Plain.*

1. *Punjab Tract.*—The Indo-Gangetic Plain west of Delhi, including the Punjab and Sind. The desert tract of Western Rajputana is included as far as the base of the Arravalli range, as is also the peninsula of Cutch, and to the westward the hills of Sind and the Western Punjab. Baluchistan is also added; it might perhaps equally well have been kept separate, but the only difference in the fauna that is of any importance is that certain Indian species, such as the common antelope, the nylgai, the bárasinga (*Cervus duvauceli*), and the hog-deer, which are found locally in parts of the tract, do not range west of the immediate neighbourhood of the Indus. To the northward also the lower spurs of the Himalayas must be regarded as part of the present subdivision.

The eastern boundary of the Punjab tract coincides with the limit, to the eastward, of the area with an average yearly rainfall of 20 inches or less. The rainfall diminishes to the westward, and parts of Sind are almost rainless.

The whole area is desert or semi-desert, except near the rivers, and cultivation, as in Egypt, is dependent upon irrigation. The hills west of Sind and the Punjab rise to a considerable elevation, and the interior of Baluchistan is from 3000 to 6000 feet above the sea.

2. *North-western Provinces Tract.*—The Indo-Gangetic Plain from Delhi to Rajmahal (or from nearly 77° E. long. to about 88°). This is for the most part cleared and cultivated, and is the most thickly populated area in India; when not cleared the land is covered with long grass 6 to 20 feet high. The average rainfall is about 35 inches, varying from 25 in the western part to 50 inches in the eastern.

3. *Bengal Tract.*—Indo-Gangetic Plain and Ganges delta from the meridian of Rajmahal to the Assam Hills, together with the plain of the Brahmaputra as far as Goalpara, and also Cachar, Sylhet, the plains of Tipperah, and all Lower Bengal. This is a much damper area than the last, with a heavier rainfall and with much more extensive tracts of uncleared ground, chiefly covered with high grass, except near the sea (Sundarbans), where trees of peculiar kinds form forests. Rainfall 50 to 100 inches, annual average 65.

B. *The Peninsula.*

4. *Rajputana or Central Indian Tract.*—Rajputana and Central India* with Kathiawar and all the country south and south-east of the Indo-Gangetic Plain as far south as the Nerbudda River, and east to long. 80°. An undulating and hilly tract cleared and cultivated in parts, elsewhere covered with brushwood or thin forest of small trees. Rainfall 14 to 55 inches, average about 35.

It would perhaps have been an improvement to have continued the southern boundary of this tract to the eastward in an E.N.E. direction from Jabalpur to Sherghaty, near Gya, so as to include the Kaimur Hills and Son Valley.

5. *Deccan tract* from the Nerbudda to lat. 16° N., and from the neighbourhood of the Western Ghats to long. 80° E. This comprises the greater part of the Bombay Presidency east of the Sahyádri or Western Ghats range, together with the western part of the Central Provinces, the whole of Berar, and nearly the whole of the Nizam's territory. The greater part of the area has been cleared of forest, and a large part is cultivated, though there are still extensive tracts of rather thin forest, brushwood, and grass remaining in the more hilly parts, especially to the northward in the Nerbudda and Tapti country, and in parts of the Nizam's territory. The average rainfall is about 30 inches.

This Deccan subdivision almost corresponds to the area covered by the Deccan traps, horizontal or nearly horizontal basaltic lava flows of Upper Cretaceous age.

Perhaps the Mysore plateau, from Bellary to Bangalore and the Nilgiris, should have been included in this tract rather than in the Carnatic.

6. *Behar-Orissa Tract.*—Western and South-western Bengal with Chutia Nagpur, Orissa, the Northern Circars, and the eastern portion of the Central Provinces. This tract lies between the Indo-Gangetic Plain to the north and the Kistna River to the south, and extends from the Bay of Bengal to long. 80° E. It is a hill country covered for the most part with forest, and, except in a few areas, sparsely populated. The rainfall averages about 50 inches, being higher near the coast, and lower inland.

* This is the country usually so named at the present time, not the Central India of JERDON and of some other writers on zoological distribution.

7. *Carnatic or Madras Tract.*—The Peninsula south of the Kistna or of 16° N. lat.,* and east of the Western Ghats, comprising the Carnatic and Mysore. The plains of the Carnatic are much like those of the Deccan and are for the most part cleared, but there are scattered hill groups generally covered with forest and with a much higher rainfall than the plains. The average temperature is slightly higher than that of the Deccan, but more equable, the average annual range of the thermometer being considerably smaller. The average rainfall is about 35 inches.

8. *Malabar Coast Tract.*—The Western Ghats† and the western coastlands of the Peninsula from the Tapti River to Cape Comorin. The northern portion included in the Bombay Presidency is known as the Concan or Konkan; the southern part, in the Madras Presidency, as the Malabar coast. Though in many places near the coast cleared and cultivated, this area is largely covered with high tropical forest. Parts of the Western Ghats rise to a considerable elevation, the Nilgiris and Animalais forming small plateaus about 7000 feet above the sea, the highest summit on the former, Dodabet, being 8640 feet high, and that on the latter, Anamudi, 8840. These are the highest elevations in the Peninsula. The fauna and flora are rich. The rainfall varies greatly, being 74 inches at Bombay, 115 at Cochin, and no less than 261 at Mahableshwar on the edge of the Sahyádri scarp, but throughout the greater part of the area it exceeds 100 inches annually.

C. *Ceylon.*

9. *Northern Ceylon Tract.*—Northern and Eastern Ceylon. This comprises fully three-fourths of the island, and consists of plain and undulating country of no great elevation. It is in fact a part of the Carnatic with higher rainfall, and with much more forest. The rainfall varies from as low as 31 inches at Manaar to 61 at Trinkomali, and the average may be taken at about 50.

10. *Hill Ceylon Tract.*—The hill country of South-western Ceylon, comprising the Central, Western, and Southern Provinces, to which, as Legge has shown,‡ the peculiar fauna of Ceylon is largely restricted, must be regarded as a part of the Malabar tract (No. 7). It is a hilly forest-clad area, with an average rainfall of more than 100 inches.

* This boundary should perhaps be placed further south. Originally these tracts were arranged to mark the distribution of the Cyclophoridæ. After going through all the evidence, I am inclined to think that a more important line might be drawn about 12° N. lat.

† It is important to remember that the Sahyádri or Western Ghats, especially to the northward, are the western scarp of a plateau which slopes gently to the eastward. All the rivers of the Indian Peninsula south of the Tapti run to the Bay of Bengal, and many of them rise almost within sight of the western coast.

‡ 'A History of the Birds of Ceylon,' introduction, pp. xvii., &c., and map, 1880

D. *Himalayas.*

11. *Tibetan Tract.*—The Higher Himalayas above forest range and part of Tibet. The limit of forest is very difficult to define, and it varies greatly in elevation in different parts of the mountain range, there being often a difference of some thousands of feet on the opposite sides of a ridge, but generally above the forest the fauna is purely Holarctic (Palæarctic), all Oriental types having disappeared. Some of the Alpine forms descend to within the forest in winter.

To the west this tract includes all the Upper Indus Valley, including Ladák, Gilgit, &c. The rainfall is generally small; at Leh, the only place in the Upper Indus Valley where the average amount is known, it is only $2\frac{1}{2}$ inches, but in the Upper Himalayas generally it is much more than this, though far less than in the outer ranges.

12. *Western Himalayan Tract.*—Forests of the Western Himalayas from Hazára to the western frontier of Nepal. The lower hills to the westward have the same fauna as the plains, but to the eastward Himalayan types are found in the dense forest down to the base of the hills. The western zoological limit of the Himalayas cannot be exactly determined; Oriental forms disappear gradually to the westward, but a good number are found in Kashmir and even in Hazára. The slopes from the base of the hills to between 10,000 and 14,000 feet, the upper limit of forest, might be divided into two or three zones, but it is rarely possible to obtain accurate information as to the range of different animals, and this range in birds and mammals often changes with the season. The average rainfall varies from 30 to nearly 100 inches annually (and locally even more than 100), being higher to the eastward than to the westward, and more copious on the southern face of a ridge than on the northern.

13. *Eastern Himalayan Tract.*—Forest area of the Eastern Himalayas from the western frontier of Nepal to the head of the Assam Valley (Mishmi Hills). This is more tropical, and far more extensively forest-clad than the Western Himalayas; the rainfall is much heavier, the population scantier, and the clearances for cultivation less general. Average rainfall 50 to 130 inches.

E. *Assam, Burma, &c., East of the Bay of Bengal.*

14. *Assam Tract.*—Assam, with the hills to the southward (Gáro, Khási, Nága), Manipur, Chittagong, and Arrakan, and the hill ranges west of the Irawadi drainage area are best taken together. This is an area of hills and dense forest, closely resembling in physical features, as in the fauna and flora, the Eastern Himalayas. The plain of the Upper Brahmaputra in Assam really belongs to the great Indo-Gangetic Plain area, but the fauna appears to be of the Burmese type. Rainfall very heavy, the average probably exceeding 100 inches.

15. *Upper Burmese Tract.*—Burma, north of Prome and Toungoo, or of about 18° N. lat. This consists principally of the Irawadi drainage area, and extends north to the ranges that form an eastern continuation of the Himalaya. The zoology of the northern and eastern portions is imperfectly known. A great part of the country, including all the hilly tracts, is covered with forest, but the undulating ground in the southern part of the area is chiefly occupied by brushwood. The rainfall is not accurately known, but the Thayet Myo average of 45 inches is probably a fair approximation.

16. *Pegu Tract.*—Pegu, south of Prome and Toungoo from the Arakan Yoma, to the hill ranges east of the Sittang. The hills of this country are forest-clad; the plains of the Irawadi and its delta, except where cultivated, are chiefly covered with high grass. The population is almost confined to these plains. Rainfal about 73 inches.

17. *Tenasserim Tract.*—Including Karenni to the northward and the hill ranges east of the Sittang, and extending south to the neighbourhood of Mergui in about 13° N. lat. A hilly country of dense forest with a rainfall of about 170 inches.

18. *South Tenasserim Tract.*—Tenasserim south of about 13° N. lat. This is part of the Malay subregion, and the fauna differs considerably from that of Burma generally. The line drawn is arbitrary, and many Malay genera extend farther north. Physical features and rainfall as in Northern Tenasserim.

19. *Andaman-Nicobar Tract.*—The Andaman and Nicobar Islands in the Bay of Bengal. The islands are covered with dense forest, and the rainfall exceeds 100 inches.

These islands are included because they are under the Government of British India, but they are of small importance zoologically. Their fauna is by no means identical; that of the Nicobars being more Malayan and resembling that of Sumatra, whilst that of the Andamans is more Burmese.

6. Compilation of Tables.

From the following lists marine forms are omitted. These comprise the Cetacea and Sirenia amongst mammals, the genera *Anous*, *Fregata*, *Sula*, *Phaëton*, and all petrels amongst birds, the sea-turtles *Chelone*, *Thalassochelys*, and *Dermochelys*, together with six genera of Hydrophidæ (sea-snakes) and all marine fishes.

The data are chiefly taken from the eight volumes* of Vertebrata in the 'Fauna of British India,' with a few additions, due to information obtained since the volumes were published. The only important change is in the colubrine snakes, the generic

* Mammalia, one volume, by myself, Part I., published in 1888, Part II. in 1891. Birds, four volumes vol. 1, by E. W. Oates, 1889; vol. 2, by E. W. Oates, 1890; vol. 3, by myself, 1895; vol. 4, by myself, 1898. Reptilia and Batrachia, one volume, by G. A. Boulenger, 1890. Fishes, two volumes, by the late Francis Day, 1889.

classification and distribution of which are taken from BOULENGER'S British Museum Catalogues. These are of later date (1893–6) than his work on Indian Reptiles.

The genera of mammals, reptiles, and batrachians are arranged in orders. The orders of birds, owing to the large number of genera, are divided into families. Fishes are simply arranged in families, because the freshwater forms in many cases belong to a few genera out of large groups chiefly made up of marine forms.

Whilst it is believed that the details of distribution are fairly correct—a very large number of erroneous localities have been detected and omitted*—there can be no doubt that the information is incomplete, and that additions will hereafter be made, especially from Burma and the Eastern Himalayas, as the country is little explored.†

As regards distribution, birds and large mammals are best known, then reptiles,

* Only those that have had occasion to inquire into the details of distribution can be aware of the number of erroneous localities that have crept into museum catalogues and text-books. When in a carefully edited work of high scientific authority like the 'Encyclopædia Britannica,' the statement that the chimpanzee, two kinds of birds of paradise, and the humming-bird inhabit the Malay Peninsula can appear in print, it is manifest that it is very difficult to avoid error. India has suffered greatly in this respect from the geographical vagueness with which the term was formerly applied. A very large number of the animals said to be from India or the East Indies by the naturalists of the eighteenth century came from the Malay Archipelago, some from Australia or China.

The whole of the collections received from BRIAN HODGSON at the British Museum were included in the published catalogues issued in 1846 and 1863 as from Nepal and Tibet, though several specimens were from neither country—for instance, *Bos frontalis*, from Assam; *Cervus eldi*, from Manipur or Burma, and even some estuarine or marine fishes from the Sundarbans. Amongst the species of which the locality appeared to me doubtful was one of *Ratufa indica* (*Sciurus purpureus*, ZIMM., of the Catalogue, p. 22). After some search I identified the specimen and found it labelled from Amarkantak, the source of the Nerbudda, in the heart of the Indian Peninsula, and 350 miles distant from Nepal. Many other instances could be mentioned. Nothing is more common than to find species quoted from Madras which are peculiar to the Malabar coastlands. It will be easily understood that only those who have had occasion to study the fauna in the country can detect mistakes of this kind.

† Only within the last year I have learned, through Col. C. T. BINGHAM, that the genus *Cemas* (the Himalayan Goral) exists in Upper Burma. Where the presence of a mammal the size of a roebuck has not previously been recorded, it is not surprising that smaller animals have escaped attention. Within the preceding twelve months the Brush-tailed Porcupine, *Atherura*, not formerly known to occur in the Himalayas, was found by Mr. G. C. DUDGEON and Mr. W. P. MASSON near Darjeeling in Sikhim ('Proc. As. Soc. Beng.,' 1899, p. 112; 'Jour. As. Soc. Beng.,' 1900, pt. 2, p. 90).

Several important additions to our knowledge of the birds inhabiting the hill ranges south of Assam have been made in Mr. E. C. STUART BAKER'S papers on the "Birds of North Cachar," published in the 'Journal of the Bombay Natural History Society,' vols. 7 to 13 (1892–1900). The occurrence of several genera of birds, not previously recorded from Upper Burma, in the Southern Shan States, has been made known by Colonel C. J. BINGHAM and Mr. H. N. THOMPSON ('Jour. As. Soc. Beng.,' 1900, pt. 2, p. 102), and some additional forms have been obtained by Colonel G. RIPPON ('Bul. Brit. Orn. Cl.,' No. 74, p. 11).

Indian and Burmese Reptiles and Batrachians have continued to receive attention from Mr. G. A. BOULENGER, whose notices of recent discoveries are scattered through the 'Proceedings of the Zoological

micro-mammalia (bats, shrews, rats, &c.) and batrachia less completely. Lizards are probably better known than snakes. Freshwater fishes still need collection and examination, despite the very large amount of work done by Dr. F. Day, and I regard them as less thoroughly known than other classes of vertebrata, and their distribution as imperfectly ascertained.

In the following lists a genus is not marked as inhabiting a tract when it has only been found just within the border. Thus *Gazella*, which is said to occur as far south as Northern Mysore, is not represented as belonging to the fauna of Tract 7, nor is it included in Tract 6, because it is met with to the eastward in the neighbourhood of Palamow. In the same way *Tragulus* and *Tapirus* are not marked as belonging to No. 17 (Tenasserim, north of 13°), although both range north to about 15° N. lat. Similarly, *Melursus* and *Golunda* are not marked as Himalayan, although both inhabit the foot-hills of the Western Himalayas. This limitation can, however, only be applied in the case of genera of which the distribution is fairly well known. Where, as is often the case with animals that attract but little attention, only a few localities at which they occur are on record, the tract in which each occurrence is recorded is marked as inhabited by the genus.

Lastly I should add that I know of no work in which it is easier to make mistakes than in compiling tables of this kind, and the mistakes may be both of omission and commission. Although I have now gone through the tables three times, it is quite possible some errors have been overlooked, though I do not think they occur in any important or characteristic genera.

[The generic names of bats, p. 352, are those used in the Mammalian volume of the 'Fauna of British India.']

Society' and other periodicals. Amongst the more important accessions are the two new genera of frogs and many new species discovered by Mr. L. Fea in Burma ('Ann. Mus. Genov.' (2), xiii., 1893, p. 305).

Many details of distribution are also furnished by Mr. W. L. Sclater's papers on the "Snakes of the Indian Museum" ('Jour. As. Soc. Beng.,' 1891, pt. 2, p. 230), and on the Frogs ('P. Z. S.,' 1892, p. 341).

MAMMALIA.

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PRIMATES—																				
Hylobates . .	2														×	×	×	×	×	
Macacus . .	9		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Semnopithecus	13		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Nycticebus .	1														×	×	×	×	×	
Loris. . . .	1							×	?	×	×									
CARNIVORA—																				
Felis . . .	16	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Cynælurus. .	1	?			×	×	×	?												
Viverra. . .	3		?	×			×		×					×	×	×	×	×	×	
Viverricula .	1		×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Prionodon . .	2													×		×		×	×	
Paradoxurus .	5		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Arctogale . .	1														×	?	?	×	×	
Arctictis . .	1													?	×	?	×	×	×	
Herpestes . .	8	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Hyæna . . .	1	×	×	×	×	×	×	×	×				?							
Canis . . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×				
Cyon . . .	2				×	×	×	?	×			×	×	×	×	×	?	×	×	
Vulpes . . .	5	×	×	×	×	×	×	×	?			×	×	×						
Mustela . .	2								×			×	×	×	?			×	×	
Putorius . .	8	×										×	×	×	×	×		×		
Helictis. . .	2													×	×		×	×		
Mellivora . .	1	×	×		×	×	×	×												
Arctonyx . .	2			×											×	×	×	×	×	
Lutra . . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Ælurus. . .	1													×						
Ursus . . .	3	×										×	×	×	×	×	×	×	×	
Melursus . .	1		×	?	×	×	×	×	×	×	×				?					
INSECTIVORA—																				
Tupaia . . .	3					×	×	×	×					×	×	×	×	×	×	×

Mammalia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
INSECTIVORA (*continued*).																				
Erinaceus . .	5	×	×		?			×												
Gymnura . .	1																		×	
Hylomys . .	1															×		×		
Talpa . . .	3													×	×			×		
Soriculus . .	3													×	×					
Crocidura . .	13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Anurosorex .	1														×	×		×		
Chimarrogale .	1													×		×				
Nectogale . .	1											×								
Galeopithecus	1																		×	
CHIROPTERA—																				
Pteropus . .	3	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Xantharpyia .	1	×	?	?	?	?	×	×	?	×	×				?	?	×	×	?	
Cynopterus .	5	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	×
Carponycteris .	1													×	?	?	?	×	×	
Eonycteris . .	1																	×		
Rhinolophus .	13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hipposiderus .	10	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Cœlops . . .	1			×										×						
Megaderma .	2	×	×	×	×	×	×	×	×	×	×		×	×				×	×	
Plecotus . .	1											×	×	×						
Synotus . .	1											×	×	×	×					
Otonycteris .	1											×								
Vesperugo . .	22	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Nycticejus . .	5	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Harpyiocephalus . .	7								×	?		×	×	×	×	×		×		
Vespertilio. .	10			×			×			×	×		×	×	×	×		×	×	
Cerivoula . .	3			×	×			×	×	×	×			×	×	×	×	×	×	
Miniopterus .	1							×		×	×		×	×		×				×
Emballonura .	1																		×	

Mammalia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4	5.	6.	7.	8.	9.	10	11.	12.	13.	14.	15.	16.	17.	18.	19.
CHIROPTERA (*continued*).																				
Taphozous .	5	×	×	×		×	×	×	×	×	×				×	×	×	×	×	
Rhinopoma .	1	×	×	×	×	×	×	×	×						×	×	×	×	×	
Nyctinomus .	2	×	×	×	×	×	×	×	×						×	×	×	×	×	
RODENTIA—																				
Eupetaurus .	1											×								
Pteromys . .	6				×		×	×	×	×	×		×	×	×	×	×	×	×	
Sciuropterus .	6								×	×	×	×	×	×	×	×	×	×	×	
Sciurus . . .	10													×	×	×	×	×	×	
Ratufa . . .	3						×	×	×	×	×			×	×	×	×	×	×	
Funambulus .	7	×	×	×	×	×	×	×	×	×	×			×	×		×	×	×	
Arctomys . .	3											×								
Sminthus . .	1											×								
Alactaga . .	1	×																		
Platacanthomys . .	1								×											
Gerbillus . .	5	×	×	×	×	×	×	×	?											
Hapalomys .	1																	×		
Vandeleuria .	1		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Chiropodomys	1														×	×		×		
Mus	23	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Nesocia . . .	4	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Acomys. . .	1	×																		
Golunda . .	1	×	×			×		×	×	×	×		?							
Microtus . .	11											×	×	×		×				
Ellobius . .	1	×																		
Cricetus . .	3											×								
Rhizomys . .	3													×	×	×	×	×	×	
Hystrix . .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Atherura . .	1													×	×	×	×	×	×	
Lepus . . .	9	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×		
Lagomys . .	6											×								

Mammalia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
UNGULATA—																				
Elephas . . .	1		×	×			×	×	×	×	×				×	×	×	×	×	
Equus . . .	1	×										×								
Rhinoceros .	3			×											×	×	×	×	×	
Tapirus . . .	1																		×	
Bos	5		×	×	×	×	×	×	×	×					×	×	×	×	×	
Ovis	4	×										×								
Capra . . .	3	×										×								
Hemitragus .	2								×				×	×						
Nemorhædus .	1												×	×	×	×		×	×	
Cemas . . .	1												×	×	?	×				
Boselaphus .	1	×	×		×	×	×	×	×											
Tetraceros . .	1		×		×	×	×	×	×											
Antilope . .	1	×	×	×	×	×	×	×												
Pantholops .	1											×								
Gazella . . .	3	×	×		×	×						×								
Cervulus . .	2				×		?		×	×	×		×	×	×	×	×	×	×	
Cervus . . .	6	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Moschus . .	1											×								
Tragulus . .	3						×	×	×	×	×								×	
Sus	3	×	×	×	×	×	×	×	×	×	×	?	×	×	×	×	×	×	×	×
EDENTATA—																				
Manis . . .	3	×	×	×	×	×	×	×	×	×	×		?	×	×	×	×	×	×	

AVES.

PASSERES.																				
Corvidæ—																				
Corvus . . .	9	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Pica	2											×	×			×				
Urocissa . .	2												×	×	×	×	×	×		
Cissa . . .	2									×	×		×	×	×	×	×	×		

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Corvidæ—(*continued*).																				
Dendrocitta .	5	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		×
Crypsirhina .	2														×	×	×	×	×	
Platysmurus .	1																		×	
Garrulus . .	3												×	×	×	×		×		
Nucifraga . .	2												×	×						
Graculus . .	1											×								
Pyrrhocorax .	1											×								
Parus . . .	4		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			
Ægithaliscus .	6											×	×	×	×	×		×		
Sylviparus . .	1												×	×	×					
Machlolophus .	3				×	×	×	×	×				×	×	×	×		×		
Lophophanes .	6											×	×	×						
Conostoma . .	1													×						
Paradoxornis .	2													×	×	×				
Suthora . .	7													×	×			×		
Scæorhynchus	2													×	×			×		
Crateropodidæ—																				
Dryonastes .	7													×	×	×	×	×		
Garrulax . .	9								×		×		×	×	×	×	×	×		
Ianthocincla .	4												×	×	×					
Trochalopterum	20								×			×	×	×	×	×		×		
Grammatoptila	2												×	×	×					
Stactocichla .	1														×					
Argya . . .	6	×	×	×	×	×	×	×	×						×	×	×			
Crateropus . .	6	×	×	×	×	×	×	×	×	×	×									
Pomatorhinus .	17				×	×	×		×	×	×		×	×	×	×	×	×	×	
Xiphorhamphus . . .	1													×	×					
Timelia . . .	1			×											×	×	×	×		
Dumetia . .	2		×	×	×	×	×	×	×	×	×		×	×						

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Crateropodidæ—(*continued*).																				
Gampsorhynchus . . .	2													×	×			×		
Pyctorhis . .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Pellorneum .	7					×	×	×	×	×	×			×	×	×	×	×	×	
Drymocataphus	5														×	×	×	×	×	
Corythocichla.	2														×	×		×		
Gypsophila .	1																	×		
Malacopterum	2																		×	
Erythrocichla.	1																		×	
Trichostoma .	1																		×	
Turdinus . .	1													×	×	×	×	×	×	
Thringorhina .	2														×			×	×	
Alcippe . . .	4					×	×		×					×	×	×	×	×	×	
Rhopocichla .	3								×	×	×									
Stachyrhis . .	3													×	×	×	×	×	×	
Stachyrhidopsis	4													×	×	×	×	×	×	
Cyanoderma .	1																		×	
Mixornis . .	2						×							×	×	×	×	×	×	
Schœniparus .	4													×	×	×		×		
Sittiparus . .	2													×	×			×		
Proparus . .	2												×	×	×					
Lioparus . .	1													×	×					
Rimator . .	1													×	×					
Turdinulus .	1														×			×		
Myiophoneus .	3				×	×	×		×			×	×	×	×	×	×	×		
Larvivora . .	2					×	×	×	×				×	×	×		×	×		
Arrenga . .	1										×									
Brachypteryx.	2								×											
Drymochares .	4													×	×			×		
Hodgsonius .	1								×				×	×						
Elaphrornis .	1										×									

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Crateropodidæ—(*continued*).																				
Tesia . . .	1													×	×					
Oligura . . .	1													×	×					
Sibia. . . .	1													×	×	×		×		
Lioptila. . .	7												×	×	×	×		×		
Actinodura. .	2													×	×	×		×		
Ixops . . .	3													×	×					
Staphidia . .	3													×	×			×		
Siva	4												×	×	×	×		×		
Yuhina . . .	4													×	×	×				
Zosterops . .	5	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Ixulus . . .	3												×	×	×			×		
Herpornis . .	1													×	×	×	×	×	×	
Liothrix . .	1												×	×	×	×				
Cutia . . .	1													×	×	×		×		
Pteruthius. .	5												×	×	×	×		×		
Aëthorhynchus	1														×			×	×	
Ægithina . .	3		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Myzornis . .	1													×						
Chloropsis . .	7		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Irena . . .	1								×	×	×			×	×	×	×	×	×	×
Melanochlora .	1													×	×	×	×	×	×	
Hilarocichla .	1													×	×					
Mesia . . .	1													×	×	×		×		
Minla . . .	1													×	×					
Leptopœcile .	1											×								
Cephalopyrus .	1		×		×	×						×	×	×						
Psaroglossa .	1												×	×	×	×	×	×		
Hypocolius .	1	×																		
Chalcoparia .	1													×	×	×	×	×	×	
Criniger . .	4													×	×		×	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Crateropodidæ—(*continued*).																				
Tricholestes	1																		×	
Alophoixus	1																		×	
Hypsipetes	3					×			×	×	×		×	×	×	×		×		
Cerasophila	1															×				
Hemixus	5												×	×	×	×		×		
Alcurus	1													×	×	×		×		
Molpastes	9	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Xanthixus	1														×	×		×		
Otocompsa	3	×	×	×	×	×	×	×	×				×	×	×	×	×	×	×	×
Pinarocichla	1																		×	
Spizixus	1														×	×				
Trachycomus	1																		×	
Iole	4								×						×	×	×	×	×	×
Pycnonotus	13					×	×	×	×	×	×				×	×	×	×	×	
Micropus	4			×					×						×		×	×	×	×
Kelaartia	1									×	×									
Sittidæ—																				
Sitta	11	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Dicruridæ—																				
Dicrurus	8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Chaptia	1								×				×	×	×	×	×	×	×	
Chibia	1			×			×		×				×	×	×	×	×	×	×	
Dissemuroides	2																			×
Dissemurulus	1										×									
Bhringa	1													×	×		×	×		
Dissemurus	1			×	×		×	×	×	×	×		×	×	×		×	×	×	×
Certhidæ—																				
Certhia	6											×	×	×	×	×				
Salpornis	1		×		×	×	×													

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Certhidæ— (*continued*).																				
Tichodroma .	1											×	×	×						
Sphenocichla .	2													×	×					
Anorthura .	2											×	×	×						
Elachura . .	2													×	×					
Urocichla . .	2													×	×					
Pnoëpyga . .	2												×	×	×	×		×		
Regulidæ—																				
Regulus . .	1											×	×	×						
Sylviidæ—																				
Aëdon . . .	1	×																		
Locustella . .	3		×	×	×	×	×	×		×				×	×		×	×	×	×
Acrocephalus .	6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Tribura . .	5											×	×	×	×		×			
Orthotomus .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Lusciniola . .	1	×	×																	
Cisticola . .	4	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Franklinia . .	4	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Laticilla . .	2	×	×	×																
Graminicola .	1			×											×					
Megalurus . .	1			×		×	×								×	×	×	×		
Schœnicola . .	1								×	×	×									
Acanthoptila .	1												×	×	×					
Chætornis . .	1		×	×	×	×	×	×	×						×					
Arundinax . .	1			×				×						×	×	×	×	×	×	×
Hypolais . .	5	×	×		×	×	×	×	×			×	×							
Sylvia . . .	6	×	×	×	×	×	×	×	×	×	×	×	×							
Herbivocula .	1															×	×	×		
Phylloscopus .	15	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Acanthopneuste . . .	11	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Sylviidæ— (*continued*).																				
Cryptolopha .	9			×			×						×	×	×		×	×		
Abrornis . .	4												×	×	×	×	×	×		
Tickellia . .	1													×						
Scotocerca . .	1	×																		
Neornis . .	1												×	×	×					
Horornis . .	7													×	×	×		×		
Phyllergates .	1													×	×			×		
Horeites . .	1												×	×						
Cettia . . .	1	×																		
Urosphena. .	1																		×	
Suya . . .	4	×											×	×	×	×	×	×		
Prinia . . .	7	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Laniidæ—																				
Lanius . . .	16	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hemipus . .	3					×	×	×	×	×	×		×	×	×	×	×	×	×	
Tephrodornis .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Platylophus .	1																		×	
Pericrocotus .	15	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Campophaga .	5		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Graucalus . .	2	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Artamus . .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Oriolidæ—																				
Oriolus . . .	9	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Eulabetidæ—																				
Eulabes. . .	4						×		×	×	×		×	×	×	×	×	×	×	×
Calornis . .	1														×				×	×
Sturnidæ—																				
Pastor . . .	1	×	×	×	×	×	×	×	×	×	×	×	×	×						

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Sturnidæ— (*continued*).																				
Sturnus . .	6	×	×	×	×	?						×	×	×						
Spodiopsar .	1															×				
Sturnia . . .	6		×	×	×	×	×	×	×				×	×	×	×	×	×		×
Agropsar . .	1																×	×		×
Ampeliceps .	1														×		×	×		
Temenuchus .	1	×	×	×	×	×	×	×	×	×		×	×	×	×					
Sturnornis . .	1										×									
Graculipica .	3															×	×	×		
Acridotheres .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Æthiopsar . .	3		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Sturnopastor .	2		×	×	×	×	×								×	×	×	×	×	
Muscicapidæ—																				
Muscicapa . .	1	×										×	×							
Hemichelidon .	2											×	×	×	×		×	×	×	
Siphia . . .	4	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Cyornis . .	14		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Nitidula . .	1													×	×					
Stoparola . .	3		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Muscitrea . .	1														×		×	×	×	×
Anthipes . .	5													×	×			×	×	
Alseonax . .	3		×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ochromela . .	1						?		×											
Culicicapa . .	1		×	×		×	×	×	×	×	×		×	×	×	×	×	×	×	
Niltava . . .	3												×	×	×	×		×		
Philentoma .	2																		×	
Terpsiphone .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hypothymis .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Chelidorhynx .	1												×	×	×	×		×		
Rhipidura . .	4	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES (*continued*).																				
Turdidæ—																				
Pratincola .	6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Oreicola . .	2		×	×									×	×	×	×	×	×	×	
Saxicola . .	13	×	×		×	×						×	×							
Cercomela. .	1				×															
Henicurus . .	5												×	×	×	×	×	×	×	
Hydrocichla .	2																		×	
Microcichla .	1											×	×	×	×					
Chimarrhornis	1											×	×	×	×	×				
Ruticilla . .	7	×	×	×	×	×	×	×	×			×	×	×	×	×	×			
Rhyacornis .	1												×	×	×	×				
Cyanecula. .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Daulias . .	1		×																	
Calliope . .	3		×	×			×					×	×	×	×		×	×		
Tarsiger . .	1												×	×	×					
Ianthia. . .	3											×	×	×	×					
Adelura . .	1											×	×	×						
Grandala . .	1											×								
Notodela . .	1													×	×			×		
Callene . .	1													×						
Thamnobia .	2	×	×	×	×	×	×	×	×	×	×		×	×						
Copsychus .	1	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Cittocincla .	2			×			×	×	×	×	×			×	×	×	×	×	×	×
Merula. . .	17	×	×	×		×	×	×	×		×	×	×	×	×	×	×	×	×	×
Geocichla . .	7		×	×	×	×	×	×	×	×			×	×	×			×	×	×
Petrophila .	4	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Monticola . .	1											×								
Turdus. . .	3											×	×	×						
Oreocincla .	7		×	×			×		×	×	×		×	×	×	×	×	×		
Zoothera . .	2												×	×	×	×	×	×	×	
Cochoa. . .	2												×	×	×			×		

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Turdidæ— (*continued*).																				
Cinclus . .	4											×	×	×	×	×				
Accentor . .	2											×	×	×						
Tharrhaleus .	6											×	×	×						
Ploceidæ—																				
Ploceus . .	5	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Ploceëlla . .	1															×	×	×		
Munia . . .	2		×	×			×	×	×	×	×				×	×	×	×	×	
Uroloncha .	9	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Erythrura .	1																		×	
Stictospiza .	1				×	×	×													
Sporæginthus	2	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Fringillidæ—																				
Coccothraustes	1	×																		
Pycnorhamphus . . .	3											×	×	×						
Mycerobas. .	1											×	×	×	×					
Pyrrhula . .	4											×	×	×						
Pyrrhoplectes.	1												×	×						
Loxia . . .	1											×	×	×						
Hæmatospiza .	1													×	×					
Propyrrhula .	1													×	×					
Pyrrhospiza .	1											×	×	×						
Propasser . .	7											×	×	×						
Carpodacus .	2	×	×	×	×	×	×	×	×			×	×	×	×	×	×			
Erythrospiza .	2	×										×								
Procarduelis .	2											×	×	×						
Carduelis . .	1											×	×							
Callacanthis .	1												×							
Acanthis . .	2											×								

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Fringillidæ— (*continued*).																				
Metoponia . .	1											×	×							
Hypacanthis .	1												×	×	×					
Chrysomitris .	1											×								
Fringilla . .	1	×										×								
Gymnorhis. .	1	×	×		×	×	×	×	×	×	×		×							
Passer . . .	6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Petronia . .	1											×								
Montifringilla.	3											×								
Fringillauda .	3											×	×	×						
Emberiza . .	14	×	×	×	×	×	×		×			×	×	×	×	×	×	×	×	×
Melophus . .	1	×	×	×	×	×	×						×	×	×	×	×	×		
Hirundinidæ—																				
Chelidon . .	4					×	×	×	×			×	×	×	×		×			
Cotile . . .	2	×	×	×	×	×	×								×	×	×	×		
Ptyonoprogne.	3	×	×	×	×	×	×	×	×			×	×	×						
Hirundo . .	13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Motacillidæ—																				
Motacilla . .	13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Limonidromus	1		×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Anthus . . .	13	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Oreocorys . .	1												×	×						
Alaudidæ—																				
Alæmon . .	1	×																		
Otocorys . .	3											×								
Melanocorypha	2	×	×									×								
Alauda . . .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Calandrella .	4	×	×	×	×	×	×	×	×			×	×	×	×		×			
Alaudula . .	3	×	×	×	×							×			×	×	×			
Mirafra . .	5	×	×	×	×	×	×	×	×	×	×				×	×	×			

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PASSERES.																				
Alaudidæ— (*continued*).																				
Galerita . .	3	×	×		×	×	×	×	×			×								
Ammomanes .	2	×	×	×	×	×	×	×												
Pyrrhulauda .	2	×	×	×	×	×	×	×	×	×	×									
Nectariniidæ—																				
Chalcostetha .	1																		×	
Æthopyga .	12					×	×		×				×	×	×	×	×	×		×
Arachnechthra	8	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Anthothreptes	4														×			×	×	
Arachnothera .	5								×				×	×	×	×	×	×	×	
Dicæidæ—																				
Dicæum. . .	8		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Acmonorhynchus .	1										×									
Piprisoma . .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Prionochilus .	2																		×	
Pachyglossa .	1													×	×	×				
Pittidæ—																				
Anthocincla .	1																	×		
Pitta. . . .	10			×	×	×	×	×	×	×	×			×	×		×	×	×	×
EURYLÆMI.																				
Eurylæmidæ—																				
Eurylæmus .	2																	×	×	
Corydon . .	1																	×	×	
Cymborhynchus .	2														×	×		×	×	
Serilophus . .	2													×	×		×	×	×	
Psarisomus. .	1												×	×	×	×	×	×	×	
Calyptomena .	1																	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
PICI.																				
Picidæ—																				
Gecinus . . .	9	×			×		×		×	×	×	×	×	×	×	×	×	×	×	
Chrysophlegma	2												×	×	×		×	×	×	
Callolophus .	1																		×	
Gecinulus . .	2													×	×		×	×	×	
Hypopicus . .	1												×	×	×	×				
Dendrocopus .	11	×		×								×	×	×	×	×		×		×
Liopicus . .	1	×	×		×	×	×	×		×			×			×	×			
Iyngipicus . .	5		×		×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Pyrrhopicus .	2													×	×	×	×	×	×	
Miglyptes . .	3																×	×	×	
Micropternus .	3			×			×		×	×	×		×	×	×	×	×	×	×	
Brachypternus	2	×	×	×	×	×	×	×	×	×	×		×		×					
Tiga	2						?		×				×	×	×	×	×	×	×	
Gauropicoides	1																	×	×	
Chrysocolaptes	3			×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Hemicercus .	2								×						×	×	×	×	×	
Hemilophus .	1												×	×	×	×	×	×	×	
Thriponax . .	4								×							×	×	×	×	×
Picumnus . .	1								×				×	×	×			×		
Sasia. . . .	1													×	×	×	×	×		
Iynx. . . .	1	×	×	×	×	×	×	×				×	×	×		×				
ZYGODACTYLI.																				
Indicatoridæ—																				
Indicator . .	1												×	×						
Capitonidæ—																				
Calorhamphus	1																		×	
Megalæma . .	2												×	×	×	×		×		
Thereiceryx .	3		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Chotorhea . .	1																		×	
Cyanops . .	7		×	×						×	×		×	×	×	×	×	×		
Xantholæma .	3	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
ANISODACTYLI.																				
Coraciadæ—																				
Coracias . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Eurystomus .	1								×		×		×	×	×	×	×	×	×	×
Meropidæ—																				
Merops . . .	4	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×
Melittophagus	1						×		×	×	×		×	×	×	×	×	×	×	×
Nyctiornis . .	2						×		×				×	×	×	×	×	×	×	
Alcedinidæ—																				
Ceryle . . .	2	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Alcedo . . .	5	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ceyx . . .	1			×				×	×	×	×				×	×	×	×	×	×
Pelargopsis .	3		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Halcyon . .	2	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Callialcyon .	1													×	×	×	×	×	×	×
Sauropatis . .	2			×					×						×		×	×	×	×
Caridagrus .	1																		×	
Carcineutes .	1																×	×	×	
Bucerotidæ—																				
Dichoceros . .	1								×				×	×	×	×	×	×	×	
Anthracoceros	2						×		×	×			×	×	×	×	×	×	×	
Aceros . . .	1													×	×	×		×		
Rhytidoceros .	3														×	×	×	×	×	×
Anorrhinus .	1																		×	
Ptilolæmus .	2														×			×		
Berenicornis .	1																		×	
Lophoceros .	3		×	×	×	×	×	×	×	×	×									
Rhinoplax . .	1																		×	
Upupidæ—																				
Upupa . .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
MACROCHIRES.																				
Cypselidæ—																				
Cypselus . .	7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Tachornis . .	2		×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Chætura . .	4					×	×	×	×	×	×		×	×	×	×	×	×	×	×
Collocalia . .	5								×	×	×		×	×	×			×	×	×
Macropteryx .	3		×	×			×	×	×	×	×				×	×	×	×	×	
Caprimulgidæ—																				
Caprimulgus .	7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Lyncornis . .	1								×					×	×	×	×	×	×	×
Podargidæ—																				
Batrachostomus . .	3								×	×	×			×	×			×		
TROGONES.																				
Trogonidæ—																				
Harpactes . .	4						×		×	×	×			×	×	×	×	×	×	
COCCYGES.																				
Cuculidæ—																				
Cuculus. . .	4	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hierococcyx .	4		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Cacomantis .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Penthoceryx .	1						×		×	×	×		×	×	×	×	×	×	×	
Chrysococcyx .	2													×	×	×	×	×	×	×
Surniculus .	1						×		×	×	×			×	×	×	×	×	×	
Coccystes . .	2	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Eudynamis .	1	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Zanclostomus .	1																		×	
Rhopodytes .	4			×			×	×	×	×				×	×	×	×	×	×	
Phœnicophaës.	1									×	×									
Rhamphococcyx . .	1																		×	
Rhinortha . .	1																		×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
COCCYGES.																				
Cuculidæ— (*continued*).																				
Taccocua . .	1	×	×	×	×	×	×	×	×	×	×									
Centropus . .	4	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
PSITTACI.																				
Psittacidæ—																				
Palæornis . .	15	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Psittinus . .	1																		×	
Loriculus . .	2								×	×	×			×	×	×	×	×	×	×
STRIGES.																				
Strigidæ—																				
Strix . . .	2	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×		
Asionidæ—																				
Photodilus . .	2										×			×	×			×		
Asio	2	×	×	×	×	×	×	×				×	×		×	×	×			
Syrnium . .	6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ketupa . . .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Bubo . . .	3	×	×	×	×	×	×	×				×	×		×					
Huhua . . .	2								×		×		×	×	×	×		×	×	
Nyctea . . .	1	×																		
Scops . . .	7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Athene . . .	3	×	×	×	×	×	×	×	×						×	×	×			
Glaucidium .	4			×			×	×	×	×	×		×	×	×	×	×	×		
Ninox . . .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
ACCIPITRES.																				
Pandionidæ—																				
Pandion . .	1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Vulturidæ—																				
Vultur . . .	1	×	×	×	×							×	×	×	×					
Otogyps . .	1	×	×	×	×	×	×	×	×				×	×	×	×	×	×	×	

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
ACCIPITRES.																				
Vulturidæ—(*continued*).																				
Gyps . . .	4	×	×	×	×	×	×	×	×			×	×	×	×	×	×	×		
Pseudogyps .	1	×	×	×	×	×	×	×	×				×	×	×	×	×	×	×	
Neophron . .	2	×	×	×	×	×	×	×	×				×	×						
Falconidæ—																				
Gypaëtus . .	1	×										×	×							
Aquila . . .	7	×	×	×	×	×	×	×				×	×	×	×	×	×	×		
Hieraëtus . .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Lophotriorchis	1						×		×	×	×			×	×	•				
Ictinaëtus . .	1						?		×	×	×		×	×	×	×	×	×	×	
Spizaëtus . .	5		×	×		×	×	×	×	×	×		×	×	×	×	×	×	×	×
Circaëtus . .	1	×	×	×	×	×	×	×												
Spilornis . .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Butastur . .	3	×	×	×	×	×	×	×	×						×	×	×	×	×	
Haliaëtus . .	3	×	×	×	×	×	×	×	×	×	×				×		×	×	×	×
Polioaëtus . .	2		×	×	×	×	×	×	×	×	×		×		×	×	×	×	×	
Haliastur . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Milvus . . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Elanus . . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Circus . . .	6	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Buteo . . .	3	×	×			×	×	×	×	×		×	×	×			×	×		
Archibuteo .	1											×								
Astur . . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Lophospizias .	1						×		×		×		×	×	×	×	×	×	×	
Accipiter . .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Pernis . . .	1	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	×	
Machærhamphus . . .	1																		×	
Baza. . . .	3			×			?		×	×	×			×	×				×	
Falco . . .	8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Erythropus .	1			×		×		×	×	×	×		×	×	×	×	×			

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
ACCIPITRES.																				
Falconidæ— (*continued*).																				
Æsalon . . .	2	×	×	×	×	×	×	×	×	×		×	×	×	×					
Tinnunculus .	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Microhierax .	3												×	×	×	×	×	×	×	
Poliohierax .	1																×	×		
COLUMBÆ.																				
Columbidæ—																				
Crocopus . .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Osmotreron .	7			×			×	×	×	×	×			×	×	×	×	×	×	×
Butreron . .	1																		×	
Treron . . .	1													×	×	×	×	×	×	
Sphenocercus .	2												×	×	×	×	×	×		
Carpophaga .	2						×		×	×	×			×	×	×	×	×	×	×
Ducula . . .	3								×					×	×	×		×	×	
Myristicivora .	1																			×
Calœnas . .	1																			×
Chalcophaps .	1						×		×	×	×		×	×	×	×	×	×	×	×
Columba . .	5	×	×	×	×	×	×	×	×	×	×	×	×			×				
Dendrotreron .	1											×	×	×		×				
Palumbus . .	1	×											×							
Alsocomus . .	5						×		×		×			×	×	×	×	×	×	×
Turtur . . .	7	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Œnopopelia .	1	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Macropygia .	3												×	×	×	×		×	×	×
Geopelia . .	1																		×	
PTEROCLETES.																				
Pteroclidæ—																				
Pterocles . .	4	×	×		×	×		×												
Pteroclurus .	3	×	×		×	×	×	×												
Syrrhaptes .	1											×								

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
GALLINÆ.																				
Phasianidæ—																				
Pavo . . .	2		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Argusianus .	1																		×	
Gallus . . .	3			×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Polyplectrum .	1														×	×		×		
Phasianus . .	2														×	×				
Catreus . . .	1												×	×						
Pucrasia . .	1												×	×						
Lophura . .	1																		×	
Gennæus . .	7												×	×	×	×	×	×		
Lophophorus .	2												×	×						
Tragopan . .	3												×	×	×					
Ithagenes . .	1													×						
Galloperdix .	3		×		×	×	×	×	×	×	×									
Ophrysia . .	1												×							
Bambusicola .	1														×	×				
Rollulus . .	1																		×	
Excalfactoria .	1			×			×	×	×	×	×		×	×	×	×	×	×	×	×
Coturnix . .	2	×	×	×	×	×	×	×	×	×		×			×	×	×	×		
Perdicula . .	2	×	×		×	×	×	×	×	×					×					
Microperdix .	3					×	×	×	×						×					
Arboricola . .	6												×	×	×	×	×	×	×	
Tropicoperdix	1																×	×	×	
Caloperdix .	1																		×	
Caccabis . .	1	×										×	×							
Ammoperdix .	1	×																		
Francolinus ,	5	×	×	×	×	×	×	×		×	×				×	×	×	×		
Perdix . . .	1											×								
Tetraogallus .	2											×								
Lerwa . . .	1											×								
Megapodiidæ—																				
Megapodius .	1																			×

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
HEMIPODII.																				
Turnicidæ—																				
Turnix . . .	5	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
GRALLÆ.																				
Rallidæ—																				
Rallus . . .	2	×	×	×	×					×		×	×		×					
Hypotænidia .	2		×	×	×	×	×	×	×	×					×	×	×	×		×
Crex . . .	1											×								
Porzana . .	3	×	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×
Rallina . . .	3		×	×			×		×	×				×	×	×		×	×	×
Amaurornis .	4	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Gallinula . .	1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Gallicrex . .	1	×	×	×	×	×	×		×	×					×		×	×		×
Porphyrio . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Fulica . . .	1	×	×	×	×	×	×	×	×						×	×	×	×		
Heliornithidæ—																				
Heliopais . .	1														×	×	×	×	×	
Gruidæ—																				
Grus . . .	5	×	×	×	×	×	×								×	×	×			
Anthropoides .	1	×	×		×	×	×	×				×								
Otididæ—																				
Otis	2	×										×								
Eupodotis . .	1	×	×		×	×		×												
Houbara . .	1	×																		
Sypheotis . .	2	×	×	×	×	×	×	×	×						×					
LIMICOLÆ.																				
Œdicnemidæ—																				
Œdicnemus .	1	×	×	×	×	×	×	×	×	×					×	×	×	×		
Esacus . . .	2	×	×	×	×	×	×	×	×	×					×	×	×	×		×

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
LIMICOLÆ (*continued*).																				
Dromadidæ—																				
Dromas . .	1	×					×	×	×	×					?		?			×
Glareolidæ—																				
Cursorius . .	2	×	×	×	×	×	×	×	×	×										
Rhinoptilus .	1						×	×												
Glareola . .	3	×	×	×	×	×	×	×	×	×			×		×	×	×	×	×	×
Parridæ—																				
Metopidius .	1		×	×	×	×	×	×	×						×	×	×	×	×	
Hydrophasianus . . .	1	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×		
Charadriidæ—																				
Strepsilas . .	1	×					×	×	×	×							×			×
Sarcogrammus	2	×	×	×	×	×	×	×	×	×		×	×		×	×	×	×	×	
Sarciophorus .	1	×	×	×	×	×	×	×	×	×										
Microsarcops .	1			×											×	×	×	×		×
Hoplopterus .	1		×	×	×	×	×								×	×	×	×		
Vanellus . .	1	×	×									×								
Chettusia . .	2	×	×	×	×	×			×			×								
Charadrius .	2	×	×	×	×	×	×	×	×	×		×			×	×	×	×	×	×
Squatarola .	1	×	×	×	×	×	×	×	×	×					×	×	×	×	×	×
Ægialitis . .	8	×	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×
Hæmatopus .	1	×						×	×	×							×			
Himantopus .	1	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×		
Recurvirostra .	1	×	×		×	×	×	×	×	×										
Ibidorhynchus	1											×	×	×	×					
Numenius . .	2	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×
Limosa . . .	2	×	×	×	×	×	×	×	×	×		×			×	×	×	×		
Macrorhamphus .	1			×			×	×									×			
Terekia . . .	1	×		×			×	×	×	×							×	×		

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
LIMICOLÆ.																				
Charadriidæ—(*continued*).																				
Totanus . .	8	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Pavoncella. .	1	×	×	×	×	×	×	×	×	×	×	×			×	×	×	×		
Calidris. . .	1	×			×		×	×	×	×							×			
Eurynorhynchus . . .	1			×											×		×	×		
Tringa . . .	9	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Phalaropus. .	2	×	×					×	×											
Scolopax . .	1								×	×		×	×	×	×	×		×	×	
Gallinago . .	5	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Rostratula . .	1	×	×	×	×	×	×	×	×	×	×		×		×	×	×	×		
GAVIÆ.																				
Laridæ—																				
Larus . . .	7	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	
Hydrochelidon	2	×	×	×	×	×	×	×	×	×	×	×	×		×	×	×	×		×
Hydroprogne .	1	×	×	×	×	×	×	×	×	×	×						×	×		
Sterna . . .	16	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Rhynchops .	1	×	×	×		×	×	×							×	×	×			
Stercorariidæ—																				
Stercorarius .	2	×																×		
STEGANOPODES.																				
Pelecanidæ—																				
Pelecanus . .	4	×	×	×	×	×	×	×	×	×					×	×	×	×		
Phalacrocoracidæ–																				
Phalacrocorax	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	?
Plotus . . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
HERODIONES.																				
Ibididæ—																				
Ibis . . .	1	×	×	×	×	×	×	×		×					×	×	×	×		

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
HERODIONES.																				
Ibididæ— (*continued*).																				
Inocotis . .	2	×	×		×	×	×	×								×	×	×	×	
Plegadis . .	1	×	×	×			×	×	×	×					×	×	×			
Plataleidæ—																				
Platalea . .	1	×	×	×	×	×	×	×	×	×	×									
Ciconiidæ—																				
Ciconia . . .	2	×	×	×		×	×	×				×		×	×					
Dissura . . .	1		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Xenorhynchus	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Leptoptilus .	2		×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	
Pseudotantalus	1		×	×	×	×	×	×	×	×	×				×	×	×	×		
Anastomus .	1	×	×	×	×	×	×	×	×	×	×				×		×			
Ardeidæ—																				
Ardea . . .	5	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Herodias . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Bubulcus . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Lepterodius .	2	×						×	×	×					×		×	×	×	×
Ardeola . .	2	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Butorides . .	1	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Nycticorax .	1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Gorsachius. .	1								×	×					×		×	×	×	×
Ardetta . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Dupetor . .	1	×	×	×	×	×		×	×	×	×		×	×	×			×	×	
Botaurus . .	1	×	×	×	×	×	×								×	×				
PHŒNICOPTERI.																				
Phœnicopteridæ—																				
Phœnicopterus	2	×	×	×	×	×		×	×	×										

Aves (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
ANSERES.																				
Anatidæ—																				
Cygnus . . .	2	×												×						
Anser . . .	5	×	×	×	×	×	×					×			×	×				
Sarcidiornis .	1		×	×			×	×	×	×					×	×	×	×		
Asarcornis . .	1														×			×	×	
Rhodonessa .	1		×	×	×		×	×							×	×				
Tadorna . .	1	×	×	×											×	×				
Casarca . . .	1	×	×	×	×	×	×	×		×	×	×	×		×	×	×	×		
Dendrocycna .	2	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Nettopus . .	1		×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Polionetta . .	2	×	×	×	×	×	×	×	×	×					×	×				
Anas. . . .	1	×	×	×	×	×						×	×		×	×				
Eunetta. . .	1	×	×	×											×	×				
Chaulelasmus .	1	×	×	×	×	×	×					×			×	×				
Nettium . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		×
Mareca . . .	1	×	×	×	×	×			×			×			×	×	×			
Dafila . . .	1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Querquedula .	1	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		
Spatula . . .	1	×	×	×	×	×	×	×	×	×	×	×	×		×	×				
Marmaronetta	1	×	×	×	×															
Netta . . .	1	×	×	×	×	×									×	×				
Nyroca . . .	5	×	×	×	×	×	×	×	×			×	×		×	×				
Clangula . .	1	×	×																	
Erismatura. .	1	×	×								×									
Mergus . . .	1	×	×		×		×													
Merganser . .	2	×		×			×		?			×	×	×	×	×				
PYGOPODES.																				
Podicipedidæ—																				
Podicipes . .	3	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		

Reptilia.

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Emydosauria.																				
Gavialis . .	1	×	×	×			×								×					
Crocodilus . .	2	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Chelonia.																				
Trionyx . .	7	×	×	×	×	×	×	×	×						×	×	×	×	×	
Pelochelys . .	1		×	×											×	×	×	×	×	
Chitra . . .	1	?	×	×											×	×	×			
Emyda . . .	3	×	×	×	×	×	×	×	?	×						×	×			
Testudo . .	5	×	×		×	×	×	×		×					×	×	×	×		
Geoemyda . .	3														×		×	×	×	
Nicoria . . .	2	×	×	×		×	×	×		×					×	×	×			
Cyclemys . .	4														×		×	×	×	
Bellia . . .	1																		×	
Damonia . .	1	×	×	×																
Morenia . .	2		×	×													×		×	
Hardella . .	1	×	×	×																
Batagur . .	1		×	×													×	×		
Kachuga . .	7	×	×	×		×	×								×	×	×	×	×	
Platysternum .	1																×	×		
Squamata.																				
Lacertilia—																				
Stenodactylus	2	×																		
Alsophylax .	1	×																		
Agamura . .	1	×																		
Gymnodactylus	18	×				×	×	×	×	×	×	×	×		×			×		×
Pristurus . .	1	×																		
Gonatodes . .	10							×	×	×	×									
Calodactylus .	1							×												
Ptyodactylus .	1	×																		
Hemidactylus.	17	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Teratolepis	1	×				×														

Reptilia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
SQUAMATA.																				
Lacertilia—(*continued*).																				
Gehyra . . .	1									×	×						×	×		×
Lepidodactylus	3							×		×								×	×	×
Hoplodactylus	2								×											
Gecko . . .	3			×						×	×				×	×	×	×	×	×
Ptychozoon .	1														×		×	×	×	×
Phelsuma . .	1																			×
Eublepharis .	2	×					×		×											
Draco . . .	5								×						×	×	×	×	×	
Sitana . . .	1	×	×		×	×	×	×	×	×										
Otocryptis . .	2								×	×	×									
Ptyctolæmus .	1														×					
Cophotis . .	1									×	×									
Ceratophora .	3									×	×									
Lyriocephalus	1										×									
Gonyocephalus	4																?			×
Acanthosaura .	7												×	×	×	×	×	×	×	
Japalura . .	2													×	×					
Salea . . .	2								×		?									
Calotes . . .	18	×	×	×	×	×	×	×	×	×	×		×		×	×	×	×	×	×
Charasia . .	3		×		×		×		×											
Agama . . .	10	×										×	×							
Phrynocephalus . . .	6	×										×								
Liolepis . .	1								×						×			×	×	
Uromastix . .	1	×																		
Ophisaurus .	1													×	×		×			
Varanus . .	6	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Tachydromus .	2													×	×	×	×			
Acanthodactylus . . .	2	×																		
Cabrita . . .	2						×	×		×										

Reptilia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
SQUAMATA.																				
Lacertilia—(continued).																				
Ophiops . .	4	×	×		×		×	×	×											
Eremias . .	4	×																		
Scapteira . .	1	×																		
Mabuia . . .	14	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Lygosoma . .	29	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Ablepharus .	2	×																		
Ristella . . .	4							×	×											
Tropidophorus	2															×	×	×		
Eumeces . .	4	×											×							
Scincus . . .	1	×																		
Ophiomorus .	2	×																		
Chalcides . .	2	×							×											
Sepophis . .	1						×													
Chalcidoseps .	1										×									
Acontias . .	4									×	×									
Dibamus . .	1																			×
Rhiptoglossa—																				
Chamæleon .	1				×	×	×	×	×	×	×									
Ophidia—																				
Typhlops . .	13	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Glauconia . .	1	×																		
Python . . .	2			×	×	×	×	×	×	×	×				×	×	×	×	×	×
Gongylophis .	1	×	×	×			×	×	×											
Eryx . - .	1	×			×	×	×	×	×											
Cylindrophis .	2									×	×					×	×	×		
Uropeltis . .	1										×									
Rhinophis . .	8								×		×									
Silybura . .	22						×	×	×		×									
Pseudoplectrurus . .	1								×											

Reptilia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
SQUAMATA.																				
Ophidia— (*continued*).																				
Plectrurus . .	4								×											
Melanophidium	3								×											
Platyplecturus	3								×											
Xenopeltis . .	1							×									×	×	×	
Chersydrus .	1						×	×	×	×							×			
Stoliczkaia .	1														×					
Polyodontophis	4			×		×	×	×	×	×	×		×	×	×	×	×	×		×
Xenochrophis .	1			?											×		×	×	×	
Tropidonotus .	19	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Macropisthodon . . .	1					×	×	×	×	×	×									
Pseudoxenodon	1													×	×	×	×			
Helicops . .	1			×				×	×	×	×					×				
Trachischium .	5												×	×	×					
Rhabdops . .	2								×						×					
Trirhinopholis.	1															×				
Plagiopholis .	1															×				
Xylophis . .	2								×											
Haplocercus .	1										×									
Aspidura . .	4										×									
Blythia . . .	1														×					
Lycodon . .	9	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Dinodon . .	1														×					
Dryocalamus .	3							×	×	×	×							×		
Zaocys . . .	2													×	×			×		
Zamenis . .	9	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Lytorhynchus	1	×																		
Xenelaphis .	1														×					
Coluber . . .	10	×		×	×			×	×	×	×	×	×	×	×	×	×	×	×	×
Dendrophis .	4			×		×	×		×	×	×			×	×	×	×	×	×	×
Dendrelaphis .	3								×	×	×			×	×					

Reptilia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
SQUAMATA.																				
Ophidia—(*continued*).																				
Coronella . .	1					×														
Simotes . . .	12			×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Oligodon . .	9	×	×	×	×	×	×	×	×	×	×				×					×
Contia . . .	2	×																		
Ablabes . . .	7						×		×	×	×		×	×	×	×		×	×	×
Calamaria . .	2														×	×	×			
Hypsirhina .	4		×	×			×	×	×	×					×	×	×	×	×	
Homalopsis .	1																×	×	×	
Cerberus . .	1	×		×			×	×	×	×							×	×	×	×
Gerardia . .	1								×	×							×	×		
Fordonia . .	1			×													×	×	×	×
Cantoria . .	1																	×		
Hipistes . .	1																×	×	×	
Tarbophis . .	1	×																		
Dipsadomorphus . . .	11	×		×	×		×	×	×	×	×		×	×	×	×	×	×	×	×
Psammophis .	3	×	×	×	×			×					×			×	×			
Psammodynastes . .	1													×	×	×	×	×	×	
Dryophis . .	6		×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Chrysopelea .	2			×					×	×	×				×	×	×	×	×	
Elachistodon .	1			×																
Bungarus . .	7	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×	×	
Naia	2	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Hemibungarus	1						×	×	×											
Callophis . .	4						×	×	×					×	×		×	×	×	
Doliophis . .	2															×				
Amblycephalus	6													×	×		×	×	×	×
Azemiops . .	1															×				
Vipera . . .	2	×	×	×	×	×	×	×	×	×	×		×			×	×			
Eristicophis .	1	×																		

Reptilia (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
SQUAMATA.																				
Ophidia—(*continued*).																				
Echis . . .	1	×	×		×	×	×	×	×											
Ancistrodon .	2								×	×	×	×	×	×	×					
Lachesis . .	10			×			×	×	×	×	×		×	×	×	×	×	×	×	×

BATRACHIA.

ECAUDATA—																				
Oxyglossus .	2			×													×	×	×	
Rana . . .	41	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×
Micrixalus . .	5								×		×									
Nyctibatrachus	2								×											
Nannobatrachus . . .	1								×											
Nannophrys .	2									?	×									
Rhacophorus .	22			×			×	×	×	×	×			×	×		×	×	×	
Phrynoderma .	1																	×		
Ixalus . . .	17						×	×	×	×	×					×	×	×		
Chirixalus . .	1																	×		
Melanobatrachus . . .	1								×											
Calophrynus .	1															×	×	×		
Microhyla . .	4			×		×	×	×	×	×	×		×		×	×	×	×	×	
Callula . . .	5			×		×	×	×	×	×	×					×	×	×		
Cacopus. . .	2		×	×		×	×	×												
Glyphoglossus	1																×			
Calluella . .	1																×	×		
Nectophryne .	1								×											
Bufo. . . .	16	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Cophophryne .	1											×								
Hyla . . .	1														×	×				

Batrachia (*continued*).

	No of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
ECAUDATA— (*continued*).																				
Leptobrachium	6													×	×	×	×	×	×	
CAUDATA—																				
Tylototriton .	1													×						
APODA—																				
Ichthyophis .	2								×		×			×	×	×		×	×	
Uræotyphlus .	2								×											
Gegenophis .	1								×											

PISCES.

Symbranchidæ—																				
Amphipnous .	1	×	×	×			×								×	×	×	×		
Monopterus .	1															×	×	×	×	
Symbranchus .	1			×			×	×	×	×					×	×	×	×	×	
Muræenidæ—																				
Anguilla . .	2	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	×
Siluridæ—																				
Sisor. . . .	1	×	×	×																
Pseudecheneis	1													×	×					
Exostoma . .	4											×	×	×				×		
Chaca . . .	1		×	×											×	×	×			
Clarias . . .	4	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Silurus . . .	3								×					×	×			×		
Olyra . . .	3														×		×	×		
Amblyceps. .	1		×										×	×		×	×	×		
Saccobranchus	2	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Wallago . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Eutropiichthys	1	×	×	×			×									×	×	×		

Pisces (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Siluridæ—(*continued*).																				
Callichrous. .	7	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Ailia. . . .	1	×	×	×		×	×	×							×					
Ailiichthys .	1	×																		
Pseudotropius	7	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Pangasius . .	1	×	×	×			×	×							×	×	×	×		
Silundia . .	2	×	×	×		×	×	×	×						×	×	×	×		
Macrones . .	18	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Liocassis . .	2														×			×		
Rita	4	×	×	×		×	×	×							×	×	×			
Akysis . . .	1																	×	×	
Bagarius . .	1	×	×	×		×	×	×							×	×	×			
Glyptosternum	9	×	×	×		×		×					×	×	×	×	×	×		
Euglypto-sternum . .	1		×												×					
Erethistes . .	4			×			×								×	×	×	×		
Gagata . . .	4	×	×	×		×	×								×	×	×	×		
Nangra . . .	3	×	×	×		×	×													
Cyprinidæ—																				
Botia . . .	6	×	×	×									×	×	×	×	×	×		
Acanthopsis .	1																	×		
Somileptes .	1			×			×								×					
Lepidocephal-ichthys . .	3	×	×	×	×	×	×	×	×	×	×			×				×		
Acanthophthal-mus . . .	1														×	×	×			
Apua . . .	1																×			
Jerdonia . .	1							×												
Nemachilich-thys . . .	1					×														
Nemachilus .	31	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Homaloptera .	3			×					×					×	×			×		

Pisces (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Cyprinidæ—(*continued*).																				
Psilorhynchus.	1														×					
Discognathus .	3	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Oreinus . . .	3											×	×	×						
Schizopygopsis	1											×								
Schizothorax .	2											×	×	×						
Ptychobarbus.	1											×								
Diptychus . .	1											×								
Labeo . . .	25	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×	×	
Osteochilus .	3															×	×	×		
Dangila . .	2																	×	×	
Cirrhina . .	5	×	×	×	×	×	×	×	×				×	×	×	×	×	×		
Semiplotus .	2														×	×	×	×		
Scaphiodon .	5	×							×											
Catla . . .	1	×	×	×	×	×	×								×	×	×			
Thynnichthys	1					×	×													
Amblypharyngodon . .	4	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Matsya . . .	1																	×		
Barbus . . .	70	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
Nuria . . .	1	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Rasbora . .	3	×	×	×	×	×	×	×	×	×					×	×	×	×	×	
Aspidoparia .	2	×	×	×	×	×	×								×					
Rohtee . . .	7	×	×	×	×	×	×	×	×						×	×	×	×		
Barilius. . .	14	×	×	×	×	×	×	×	×	×	×		×	×	×	×	×	×		
Danio . . .	10	×	×	×	×	×	×	×	×	×	×			×	×	×	×	×		
Perilampus .	3	×	×	×	×	×	×	×	×	×	×				×	×	×	×		
Chela . . .	10	×	×	×	×	×	×	×	×						×	×	×	×		
Notopteridæ—																				
Notopterus .	2	×	×	×	×	×	×	×	×						×	×	×	×		
Percidæ—																				
Ambassis . .	? 5	×	×	×	×	×	×	×	×	×					×	×	×	×	×	

Pisces (*continued*).

	No. of species.	Indo-Gangetic plain, &c.			Indian Peninsula.					Ceylon.		Himalaya.			Burma, &c.					
		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Gobiidæ—																				
Gobius . . .	? 2	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Sicydium . .	3								×	×										
Rhynchobdellidæ—																				
Mastacembelus	5	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	
Ophiocephalidæ—																				
Ophiocephalus	9	×	×	×	×	×	×	×	×	×	×				×	×	×	×	×	×
Channa . . .	1									×										
Labyrinthici—																				
Anabas . . .	1	×	×	×			×	×	×	×					×	×	×	×	×	
Polyacanthus .	2							×	×	×										
Osphromenus .	1													×	×					
Trichogaster .	4	×	×	×			×								×	×	×			
Chromididæ—																				
Etroplus . . .	3						×	×	×	×										

7. Principal Zoological Features of the Different Tracts.

It now becomes necessary to pass the faunas of the different subdivisions or tracts in review in order to show their relations to each other. A few remarks will be made on each.

1. *Punjab Tract.*

The whole fauna is poor, only forty-one genera of mammals having been recorded. The following is the list :—

Carnivora.
- Felis.
- Herpestes.
- Hyæna.
- Canis.
- Vulpes.
- Putorius.
- Mellivora.
- Lutra.
- Ursus.

Insectivora.
- Erinaceus.
- Crocidura.

Chiroptera.
- Pteropus.
- Xantharpyia.
- Cynopterus.
- Rhinolophus.
- Hipposiderus.
- Megaderma.
- Vesperugo.
- Nycticejus.
- Taphozous.
- Rhinopoma.
- Nyctinomus.

Rodentia.
- Funambulus.
- *Alactaga.*
- Gerbillus.
- Mus.
- Nesocia.
- *Acomys.*
- Golunda.
- *Ellobius.*
- Hystrix.
- Lepus.

Ungulata.
- *Equus.*
- *Ovis.*
- *Capra.*
- Boselaphus.
- Antilope.
- Gazella.
- Cervus.
- Sus.

Edentata.
- Manis.

The genera, six in number, of which the names are in italics, are not found in any part of the Oriental region to the eastward. *Equus* and *Ovis* occur in Tibet within Holarctic limits. *Capra*, also found in Tibet, should be added to the forms characteristic of the Punjab tract, for although a variety of the Punjab species, *C. falconeri*, the Markhor, inhabits the Pir Panjal range south of Kashmir, it is not found east of the Chenab River, and does not enter the forest region of the Himalayas. *Putorius* and *Ursus* are absent from the Indian Peninsula, but inhabit the Himalayan forests. On the other hand, of the forty-one genera of mammals recorded from the Punjab tract, eleven are bats, which resemble birds more than ordinary mammals in their power of dispersion, and of these bats *Pteropus*, *Cynopterus*, *Megaderma*, and *Nyctinomus* certainly, and *Nycticejus* probably, are only represented by stragglers from the Indian Peninsula. Neither *Boselaphus* nor *Antilope* is known to occur west of the Indus.

The following genera of birds are not known to occur in other parts of the Indian area :—

Passeres.
- Hypocolius.
- Aëdon.
- Lusciniola.
- Scotocerca.
- Cettia.
- Coccothraustes.
- Erythrospiza.*

Passeres.
- Fringilla.*
- Alæmon.
- Melanocorypha.

Striges.
- Nyctea.

Gallinæ.
- Caccabis.*

Gallinæ.
- Ammoperdix.

Grallæ.
- Otis.
- Houbara.†

Anseres.
- Cygnus.‡

Amongst the reptiles the crocodiles, including the gharial, and the chelonians found in the Indus and the other rivers of the Punjab, are the same as those of the Ganges and its tributaries in the North-west Provinces. The Lacertilia and Ophidia are very important and characteristic. The following is a list of the genera of reptiles :—

Emydosauria (Crocodilidæ).
- Gavialis.
- Crocodilus.

Chelonia.
- Trionyx.
- Chitra.
- Emyda.
- Testudo.
- Nicoria.
- Damonia.
- Hardella.
- Kachuga.

Lacertilia.
- *Stenodactylus.*
- *Alsophylax.*
- *Agamura.*
- Gymnodactylus.
- *Pristurus.*
- *Ptyodactylus.*
- Hemidactylus.
- Teratolepis.

Lacertilia.
- Eublepharis.
- Sitana.
- Calotes.
- Agama.
- *Phrynocephalus.*
- *Uromastix.*
- Varanus.
- *Acanthodactylus.*
- Ophiops.
- *Eremias.*
- *Scapteira.*
- Mabuia.
- Lygosoma.
- *Ablepharus.*
- Eumeces.
- *Scincus.*
- *Ophiomorus.*
- Chalcides.

Ophidia.
- Typhlops.

Ophidia.
- *Glauconia.*
- Gongylophis.
- Eryx.
- Tropidonotus.
- Lycodon.
- Zamenis.
- *Lytorhynchus.*
- Coluber.
- Oligodon.
- *Contia.*
- Cerberus.
- *Tarbophis.*
- Dipsadomorphus.
- Psammophis.
- Bungarus.
- Naja.
- Vipera.
- *Eristicophis.*
- Echis.

The eighteen genera in italics do not occur in any other part of the Indian area, except that *Phrynocephalus* inhabits Tibet. Two other genera, *Agama* and *Eumeces*, are found in the Western Himalayas, but not to the eastward in those mountains, nor in the Indian Peninsula.

The Batrachia present no peculiarity except paucity ; only the cosmopolitan genera *Rana* and *Bufo* are known to occur. A single genus of freshwater Siluroid fishes, *Ailiichthys*, has hitherto been found only in the Punjab and Sind.

* These genera occur also in Tibet.

† Found slightly beyond the area in the Rajputana tract.

‡ A solitary stray specimen has been recorded in Nepal.

The river fauna of the Indus is almost identical with that of the Ganges, and if this alone were considered, the whole Indo-Gangetic Plain from Assam to Sind would have to be regarded as a special subregion, as will be shown under the next heading.

In other respects, the Punjab tract is the eastern termination of the great desert or semi-desert area, which occupies all South-western Asia and Northern Africa, and extends from Western India to the shores of the Atlantic. The typically desert fauna is represented by *Alactaga*, *Gerbillus*, *Acomys*, *Equus*, and *Gazella* amongst mammals, *Scotocerca*, *Erythrospiza*, *Alæmon*, *Houbara*, and *Caccabis* amongst birds, *Stenodactylus*, *Ptyodactylus*, *Acanthodactylus*, *Eremias*, and several other lizards, and by snakes like *Tarbophis* and *Lytorhynchus*. It is true that a few of these genera occur in the Indian Peninsula also, for instance, *Gerbillus* and *Gazella*, but *Gerbillus* is represented by one species in the Indian Peninsula, whereas five are known to occur in Sind and the Punjab, and two of these, *G. hurrianæ* and *G. erythrurus*, belong to a section of the genus which is peculiarly characteristic of the desert region, and is regarded by many zoologists as belonging to a distinct genus, *Meriones*.

On the other hand, of the sixty-two genera of mammals inhabiting the Indian Peninsula, twenty-two are wanting in the Punjab tract. Amongst these are all monkeys and lemurs, *Viverra*, *Paradoxurus*, *Cyon*, *Tupaia*, several bats, *Elephas*, *Bos*, *Tetraceros*, *Tragulus*, and *Cervulus*, in short, almost all the most characteristic and important Indo-Malay genera. The Reptilian genera of the Peninsula are ninety-three in number, of which two crocodilians and ten chelonians are aquatic, leaving seventy-one terrestrial generic forms. Of these no less than fifty-three are wanting in the Punjab area. Peninsular Batrachian genera number seventeen, of which only two have been hitherto recorded from the Punjab, Sind, and Baluchistan. These differences in mammals, reptiles, and batrachians show that the Punjab tract is not part of the Indo-Malay or Oriental region.

I think that the Punjab tract, the whole of which is, except part of Cutch, north of the Tropic of Cancer, must be regarded as part of the Mediterranean or Tyrrhenian or Eremian subregion. By some writers* this, like the Sonoran region in North America, is kept apart from the Holarctic, and regarded as a region by itself, but by most writers on the subject, it is classed as a subregion of the Holarctic or Palæarctic.

2 *and* 3. *The Indo-Gangetic Plain.*

The great plain of Northern India, which divides the Peninsular area from the Himalayas, has a fauna belonging to the former. Thus amongst Mammalia, the Cisgangetic genera *Hyæna*, *Mellivora*, *Erinaceus*, *Gerbillus*, *Boselaphus*, *Antilope* occur in suitable localities, whilst no typically Transgangetic genus is represented. The species too are Peninsular, not Himalayan, *e.g.*, *Paradoxurus niger*, *Vulpes bengalensis*,

* Heilprin, 'The Geographical and Geological Distribution of Animals,' pp. 57, 105; 1887.

Funambulus (*Sciurus*) *palmarum*. This might perhaps be expected from the circumstance that the conditions of life are more likely to suit the inhabitants of the plains than those of the hills, but still it is noteworthy that, with the exception of a few birds which migrate to the plains in winter, there is a general absence of Himalayan types. In the Brahmaputra plain in Assam, there is a larger admixture of Transgangetic forms, chiefly birds.

The land genera peculiar to the Indo-Gangetic Plain are very few in number, though there are some characteristic forms. *Laticilla*, a bird inhabiting high grass, and *Elachistodon*, a peculiar genus of Colubrine snakes with gular teeth like those of the African *Dasypeltis*, have not hitherto been observed elsewhere, but both are rare. Amongst the peculiar mammalian species is the curious *Lepus hispidus*, which deserves generic distinction better than some admitted genera. *Cervus porcinus* is almost or quite peculiar to the area in India, but recurs in Burma on the Irawady plain. Of birds, *Francolinus gularis* and *Sypheotis bengalensis*, are worthy of notice.

There is, however, a freshwater fauna, confined, or almost confined, to the Indus, Ganges, and Brahmaputra, with their tributaries, and of considerable interest. This comprises the Cetacean genus *Platanista*, the Crocodilian genus *Gavialis* (not quite restricted to the area, as will be noticed presently), and the Chelonian *Hardella*. The Siluroid fish *Sisor* is equally endemic. Although this fauna is not numerous, it is important, because both *Platanista* and *Gavialis* are amongst the few surviving representatives of groups of animals formerly far more widely spread.

The distribution of the genus *Gavialis* is remarkable. It is found in the Ganges, Brahmaputra, and Indus, and in their larger tributaries, but it also occurs in the Mahanadi River,* which, rising in the centre of India near Amarkantak, the source of the Nerbudda, flows past Cuttack into the Bay of Bengal. The same crocodilian is found, it is said, in the Koladyne River, which traverses Northern Arakan and runs into the sea at Akyab. The gharial is not found in any other river of the Indian Peninsula,† nor, so far as is known, anywhere else. Now the gharial is entirely a fluviatile form; it neither traverses the land nor lives in swamps and ponds as *Crocodilus palustris* does, nor does it enter the sea like *C. porosus*, and the only probable way in which it could have become an inhabitant of the Mahanadi and Koladyne is by these rivers having been at one time tributaries of the Ganges. If this was the case, considerable depression must have subsequently taken place in the northern part of the Bay of Bengal.

4–7. *The Indian Peninsula.*

In the general table the Peninsula of India, which I have already defined as the area south of the Indo-Gangetic Plain, is divided into five tracts, for convenience

* I have seen the gharial in this river, and compared a specimen with the Gangetic animal.

† In the 'Catalogue of Chelonians,' &c., in the British Museum, new ed., 1889, p. 276, a skull of a gharial from Poona, in the Deccan, is included. I believe the locality to be a mistake. The skull probably came originally from Sind.

named Rajputana, Deccan, Behar-Orissa, Carnatic, and Malabar. The fauna of the last named differs widely from that of the adjoining areas, and requires separate notice. The differences between the animals inhabiting the other four are chiefly specific, not generic, though the Behar-Orissa tract, which is a forest area with a considerable rainfall, is distinguished by the presence of several genera not found in the Rajputana or Deccan tracts. The Rajputana division in its more desert portions contains many representatives of the forms typical of the Punjab province, but in other respects its fauna is practically identical with that of the Deccan. One genus of birds, *Cercomela*, appears to be in India almost restricted to the Rajputana tract, but the affinities of the only Indian species, *C. fusca*, are by no means clearly ascertained.

The Carnatic or Madras tract is chiefly distinguished, so far as Vertebrata are concerned, by the absence of a few forms, *e.g.*, *Gazella*, and of migratory birds which do not range so far to the southward, whilst, in the hill groups, such as the Shevaroys, that are scattered over the area, several members of the Malabar hill fauna are found. A peculiar species of *Erinaceus* occurs, though the genus has not been observed in the Deccan and Behar-Orissa tracts. Amongst reptiles, *Calodactylus* is peculiar to the Carnatic area, and *Lepidodactylus* and *Xenopeltis* are not found beyond its limits in the Peninsula.

In the Behar-Orissa tract, the great forest area, including Chutia Nagpur, the Eastern Central Provinces, and other tracts between the Ganges and the Godavari, there are found, amongst mammals, *Viverra* and *Ratufa* (*Sciurus*) *indica*, and many birds that are wanting, so far as is known, in the Rajputana and Deccan provinces, and only represented in Malabar, or in a few cases on the hill groups of the Carnatic. The principal of these bird genera are the Passerines *Chibia*, *Dissemurus* (this may be found in some Deccan localities), *Eulabes*, *Cittocincla* and *Oreocincla*, the bee-eaters *Melittophagus* and *Nyctiornis*, the hornbill *Anthracoceros*, the trogon *Harpactes*, the cuckoos *Penthoceryx* and *Surniculus*, the Accipitrine *Lophotriorchis* and perhaps *Ictinaëtus* and *Baza*, and four genera of pigeons *Carpophaga*, *Osmotreron*, *Chalcophaps*, and *Alsocomus*. Besides these, a Himalayan and Burmese Passerine genus, *Mixornis*, occurs in Chutia Nagpur; but it may, like several other birds, he only a winter visitor.

The majority of the genera named are typically forest forms; the species of the Behar-Orissa area are, with very few exceptions, the same as those of Malabar, and may have inhabited the whole of Southern India before the forests of the Deccan and Carnatic were cleared. One circumstance seems strongly to support this view. There are two kinds of *Anthracoceros* in India, one of which inhabits Ceylon and the western or Malabar coast as far north as Ratnagiri, whilst the other inhabits the lower Himalayas and countries to the eastward. Neither is known to be found in the Deccan or Carnatic. The two meet in the Behar-Orissa area, the Malabar form to the south, the Himalayan to the north. It is scarcely probable that the southern species would exist in the area unless it once ranged over the country intervening

between Chutia Nagpur and Malabar. In the same manner the southern grackle (*Eulabes religiosa*) meets the Himalayan and Burmese grackle (*E. intermedia*) in the same area, but is not known to be met with in the Deccan or Carnatic tracts.

That the differences between the Behar-Orissa province and the adjoining provinces of the Indian Peninsula are not ancient is, I think, shown by the absence of distinctive genera amongst the reptiles and batrachia. One genus of Scincoids, *Sepophis*, it is true, is peculiar to the province. But it has been found on some hills (Golconda hills) near Vizagapatam, and the same hills have yielded to its discoverer, Col. BEDDOME, the Uropeltid snake *Silybura ellioti*, thus showing, I think, that we have in the case of *Sepophis* an example of the curiously isolated reptilian and batrachian genera for which South India and Ceylon are remarkable. *Calodactylus*, hitherto only met with in North Arcot, is a similar instance.

8. *The Malabar Tract.*

This area is considerably richer than the remainder of the Peninsula in generic types. Forty-eight genera of mammalia are recorded; of these, one, *Platacanthomys*, is peculiar; four others, *Mustela*, *Harpyiocephalus*, *Sciuropterus*, and *Hemitragus*, are Himalayan (the first three are also Burmese), but do not occur elsewhere in the Peninsula. *Viverra* occurs both in this area and in the Behar-Orissa tract. On the other hand, *Mellivora*, *Antilope*, and *Gazella* are lipotypes, and so is, to a great extent, *Boselaphus*, these genera not being met with near the coast, though they are found in the neighbouring districts inland.

The genera of birds are 274 in number. Of these, the following twenty-eight are not known to occur elsewhere in the Indian Peninsula :—

Passeres.
- Garrulax, *c.*
- Trochalopterum.
- Rhopocichla, *c.*
- Brachypteryx.
- Hodgsonius.
- Irena, *c.*
- Iole.
- Micropus.
- Chaptia.
- Schœnicola, *c.*

Ochromela.
- Arachnothera.

Pici.
- Tiga.
- Hemicercus.
- Thriponax.
- Picumnus.

Anisodactyli.
- Eurystomus, *c.*
- Sauropatis.
- Dichoceros.

Macrochires.
- Collocalia, *c.*
- Lyncornis.
- Batrachostomus, *c.*

Psittaci.
- Loriculus, *c.*

Striges.
- Huhua, *c.*

Accipitres.
- Ictinaëtus, *c.*
- Baza, *c.*

Columbæ.
- Ducula.

Herodiones.
- Gorsachius, *c.*

Of these twenty-eight genera only one (*Ochromela*) is peculiar, and even this genus is reported to have been seen in Berar, though the statement needs confirmation. All

but four (*Rhopocichla*, *Brachypteryx*, *Schœnicola*, and *Ochromela*) are Himalayan or Burmese or both. Only twelve (marked *c*) occur in Ceylon.

Reptiles are sixty-one in number, of which the seventeen following, or nearly 28 per cent., are not found in any other part of the Indian Peninsula.

Lacertilia.	*Ophidia.*	*Ophidia.*
Hoplodactylus.	Rhinophis, *c.*	*Xylophis.*
Draco.	*Pseudoplecturus.*	Dendrelaphis, *c.*
Otocryptis, *c.*	*Plecturus.*	Gerardia, *c.*
Salea.	*Melanophidium.*	Chrysopelia, *c.*
Liolepis.	*Platyplecturus.*	Ancistrodon, *c.*
Chalcides.	Rhabdops.	

Of these seventeen, no less than seven (in italics) are peculiar. Two others, *Otocryptis* and *Rhinophis*, are only found in Malabar and Ceylon. Four more, marked *c*, are also Ceylonese. Seven (*Draco*, *Liolepis*, *Rhabdops*, *Gerardia*, *Dendrelaphis*, *Chrysopelia*, and *Ancistrodon*) are Burmese or Assamese, but of these only the three last are Himalayan.

The following genera of Batrachia occur :—

Ecaudata.	*Ecaudata.*	*Ecaudata.*
Rana.	Ixalus.	Bufo.
Micrixalus.	*Melanobatrachus.*	*Apoda.*
Nyctibatrachus.	Microhyla.	Ichthyophis.
Nannobatrachus.	Callula.	Uræotyphlus.
Rhacophorus.	*Nectophryne.*	*Gegenophis.*

Of these fourteen genera, five (marked in italics) are peculiar; one, *Micrixalus*, is confined to Malabar and Ceylon; of another, *Uræotyphlus*, the only known species not inhabiting the Malabar tract is found in Western Africa. *Rana*, *Rhacophorus*, *Ixalus*, *Microhyla*, *Callula*, *Bufo*, and *Ichthyophis* are Burmese, all of them except *Ixalus* and *Callula* are Himalayan, and all except *Ixalus* and *Ichthyophis* are widely distributed in the Indian Peninsula.

The freshwater fishes found in the Malabar tract, but not elsewhere in the Indian Peninsula, are *Silurus*, two carps (*Homaloptera* and *Scaphiodon*), and *Sicydium*, one of the gobies. None of these is of importance.

The distinctive characters of the Malabar fauna are—(1) the presence of so many genera that do not occur in other parts of the Peninsula; (2) the remarkable fact that amongst mammals and birds many of these forms are Himalayan or Burmese or both, whilst amongst the reptiles the majority, and amongst batrachia one-half, of the peculiar Malabar types are not represented in the Himalayas or Burma, but are for the most part restricted to the Malabar tract. The sole mammalian genus similarly restricted, *Platacanthomys*, is a remarkable murine rodent, with strong

myoxine affinities,* and is the type of a subfamily, the only other member of which is the South Chinese *Typhlomys*.

9 *and* 10. *Ceylon.*

The island of Ceylon contains thirty-nine genera of mammals, none of which is peculiar.

The Birds of Ceylon were so well described by Major W. V. LEGGE in 1880, that but few additions have since been made. The genera known to occur are 240, of which eighty-two belong to the Passeres, and six genera are peculiar, *Elaphrornis*, *Kelaartia*, *Dissemurulus*, *Sturnornis*, *Acmonorhynchus*, and *Phœnicophaës*. The first five of these are Passerine, and although accorded generic rank, they are only distinguished from allied genera by slight distinctions. *Phœnicophaës* is a ground cuckoo, with better claims to be regarded as a genus, and it is most nearly allied to the Malay genus *Ramphococcyx* (including *Urococcyx*, *Dryococcyx*, and *Rhinococcyx*), of which one species is found in Tenasserim.

Two other genera, both Passerine, *Rhopocichla* and *Schœnicola*, are only known from Ceylon and the Malabar province of India, whilst a species of *Cissa*, a well-marked genus of magpie, is exclusively Ceylonese, other forms of the same genus occurring in Transgangetic countries, including the Himalayas, but not in the Peninsula of India. The barbet *Cyanops* has a similar distribution: there are numerous Transgangetic species, none in the Peninsula of India and one (peculiar) in Ceylon. The Ceylonese *Arrenga blighi* also is represented by nearly allied species in Java and Sumatra, whilst the whistling thrushes of India and Burma, though similar in many respects, are kept in the genus *Myiophoneus*.

The Ceylonese land reptiles comprise four chelonians, seventeen lizards, one chamæleon and thirty-two snakes. Of these, the following are unknown in the Indian Peninsula, six genera (in italics) being peculiar to Ceylon —

Lacertilia.	*Lacertilia.*	*Ophidia.*
Gehyra.	*Lyriocephalus.*	Cylindrophis.
Gecko.	*Chalcidoseps.*	*Uropeltis.*
Cophotis.	Acontias.	*Haplocercus.*
Ceratophora.		*Aspidura.*

Gehyra, *Gecko*, *Cophotis*, and *Cylindrophis* occur also in Malay-Asia. The distribution of *Acontias* is very remarkable. Four species are found in Ceylon, none in any other part of the Indo-Malay region, two or three have been brought from Madagascar, four from South Africa.

Otocryptis and *Rhinophis* are only known from Ceylon and the Malabar Province of India.

* O. THOMAS, 'P. Z. S.,' 1896, p. 1016, footnote.

The Ceylon Batrachians are nine in number—

Rana.	Rhacophorus.	Callula.
Micrixalus.	Ixalus.	Bufo.
Nannophrys.	Microhyla.	Ichthyophis.

Of these only one, *Nannophrys*, is restricted to the island, *Micrixalus* being found also in Malabar but not elsewhere. Thus the fauna is inferior both in number and in peculiar types to that of the West Coast of India.

The freshwater fish genera are not numerous and are only characterised by the presence of *Channa* and *Etroplus*, the peculiar distribution of which is noticed elsewhere.

The number of genera found in the Peninsula of India and not represented in Ceylon, is very large and requires notice.

The following is a list. Only forms widely distributed in India are included.

Mammalia.

Carnivora.
- Cynælurus.
- Viverra.
- Hyæna.
- Cyon.
- Vulpes.
- Mellivora.

Insectivora.
- Tupaia.
- Erinaceus.

Chiroptera.
- Rhinopoma.
- Nyctinomus.

Rodentia.
- Gerbillus.

Ungulata.
- Boselaphus.
- Tetraceros.
- Antilope.
- Gazella.

Birds.

Passeres.
- Machlolophus.
- Argya.
- Alcippe.
- Myiophoneus.
- Larvivora.
- Otocompsa.
- Chibia.
- Salpornis.
- Megalurus.
- Chætornis.
- Arundinax.
- Hypolais.
- Sturnia.
- Sturnopastor.
- Ruticilla.
- Calliope.
- Carpodacus.
- Emberiza.
- Melophus.
- Chelidon.
- Ptyonoprogne.
- Calendrella.

Passeres.
- Galerita.
- Ammomanes.

Pici.
- Iynx.

Anisodactyli.
- Nyctiornis.

Striges.
- Bubo.
- Athene.

Accipitres.
- Otogyps.
- Gyps.
- Pseudogyps.
- Aquila.
- Circaëtus.
- Butastur.

Pterocletes.
- Pterocles.
- Pteroclurus.

Gallinæ.
- Microperdix.

Gralle.
- Fulica.
- Grus.
- Anthropoides.
- Eupodotis.
- Sypheotis.

Limicolæ.
- Chettusia.

Gaviæ.
- Rhynchops.

Herodiones.
- Inocotis.
- Ciconia.
- Botaurus.

Anseres.
- Anser.
- Chaulelasmus.
- Mareca.
- Netta.
- Nyroca.
- Merganser.

The ducks, many of the other water birds, and a few Passerines are migratory, but this is not without interest. The absentees include practically all vultures (only an occasional straggling Neophron has been observed), sand grouse, cranes, and bustards.

Reptiles.

Chelonia.
- Trionyx.
- Kachuga.

Lacertilia.
- Gonatodes.
- Eublepharis.
- Charasia.
- Ophiops.

Ophidia.
- Gongylophis.
- Eryx.
- Psammophis.
- Callophis.
- Echis.

The only Indian Batrachian of any importance not recorded from Ceylon is *Cacopus.*

Owing to the circumstance that specimens are often only labelled "Ceylon," it is impossible in very many cases to say whether genera are confined to the hilly tract in the south-western part of the island (Tract No. 10). The distribution of the birds, as in so many other parts of India, is better known than that of other classes of vertebrates. It is probable, however, that most of the reptiles and batrachians peculiar to the island are restricted to this hill area.

11. *Tibetan Tract.*

The fauna of this tract, which consists of the higher Himalayas and part of Tibet, is entirely that of Central Asia, and Holarctic (Palæarctic) not Indo-Malay.

The following is a list of the mammalian genera :—

Carnivora.
- Felis.
- Canis.
- Cyon.
- Vulpes.
- Mustela.
- Putorius,
- Lutra.
- Ursus.

Insectivora.
- Crocidura.
- *Nectogale.*

Chiroptera.
- Rhinolophus.
- Plecotus.
- Synotus.
- *Otonycteris.*
- Vesperugo.
- Harpyiocephalus.

Rodentia.
- *Eupetaurus.*
- Sciuropterus.
- *Arctomys.*
- *Sminthus.*
- Mus.
- Microtus.
- *Cricetus.*
- Lepus.
- *Lagomys.*

Ungulata.
- *Equus.*
- *Ovis.*
- *Capra.*
- *Pantholops.*
- Gazella.
- *Moschus.*

Genera not found in any other part of the Indian area (except the Punjab tract in the case of *Equus*, *Ovis*, and *Capra*) are in italics, being twelve out of thirty-one. *Capra* should be included in this list, for the reasons already mentioned in reference to its occurrence in the Punjab. *Plecotus*, too, has only been observed at considerable

elevations in the Himalayas, whilst *Synotus* and *Microtus* only range into the northernmost part of the Indo-Malay region. There are no monkeys, lemurs, nor edentates. On the other hand, every genus in the list is found in other parts of the Holarctic region except *Nectogale*, *Eupetaurus*, and *Pantholops*, which are peculiar to Tibet. As I have shown elsewhere,* the Tibetan plateau with the higher Himalayas forms a particularly well-marked subregion of the Holarctic.

The birds afford the same evidence as the mammals, except that a few Indian forms, such as *Myiophonus temmincki* and *Temenuchus pagodarum*, appear, chiefly in the summer, at Gilgit and in similar valleys; but the fauna in the main, even in the valleys, is Holarctic, and above 10,000 to 12,000 feet almost entirely confined to temperate Holarctic forms. The following list of genera recorded from the Tibetan tract, but not known to occur in the Indo-Malay region (three genera, marked P, are met with in the Punjab), sufficiently illustrates the affinities of the birds inhabiting the area.

Passeres.
- Graculus.
- Pyrrhocorax.
- Leptopœcile.
- Grandala.
- Monticola.
- Erythrospiza, P.
- Acanthis.
- Chrysomitris.

Passeres.
- Fringilla, P.
- Petronia.
- Montifringilla.
- Otocorys.

Accipitres.
- Archibuteo.

Pterocletes.
- Syrrhaptes.

Gallinæ.
- Perdix.
- Tetraogallus.
- Lerwa.

Grallæ.
- Crex.
- Otis, P.

Only nine genera of Reptiles have been recorded—

Lacertilia.
- Gymnodactylus.
- Agama.
- Phrynocephalus.
- Lygosoma.

Ophidia.
- Tropidonotus.
- Zamenis.
- Coluber.
- Naia.
- Ancistrodon.

—all found elsewhere in Central Asia, whilst the batrachians are represented by the cosmopolitan *Rana* and *Bufo* and by one genus, *Cophophryne*, only known from the high Himalayas of Sikhim.

A particular group of carps (Cyprinidæ) amongst fishes, comprising the genera *Oreinus*, *Schizopygopsis*, *Schizothorax*, *Ptychobarbus* and *Diptychus*, is well represented in the rivers of Tibet and the high Himalayas. Two of the genera named, *Oreinus* and *Schizothorax*, are found in Himalayan streams at lower elevations, whilst the remaining three are not known to occur, within Indian limits, outside of the Tibetan tract. The small group is characteristic of Central Asia, and so far as is known is not found elsewhere.

* 'Geol. Mag.,' 1892 (3), vol. 9, p. 164; 'P. Z. S.,' 1893, p. 448.

12 *and* 13. *The Himalayas.*

The wooded slopes of the Himalayas form a belt of very variable breadth between the Indo-Gangetic Plain on one hand, and the Tibetan subregion of the Holarctic on the other. The area is difficult to define zoologically; genera that belong to the plains of India penetrate far up the deep warm valleys of the mountains, whilst Tibetan forms descend on cold slopes to within the forest area. The admixture of Holarctic types increases to the westward, where the limits of forest, both upward and downward, are more restricted, and the fauna, as has already been remarked, passes gradually into that of the Holarctic region.

The Himalayan fauna is rich, specifically and generically, in mammals and birds, poor in reptiles, batrachians and fish. The eastern portion, as will be shown presently, is much richer than the western.

It would take up too much space to give a separate list of the Himalayan genera. The following mammals and birds are found in the Himalayan forest area, but in no other part of British India or its dependencies. The genera marked in italics are, so far as is known, restricted to the Himalayas.

Mammalia.

Ælurus. Plecotus.

Birds.

Passeres.	*Passeres.*	*Passeres.*
Nucifraga.	Turdus.	*Callacanthis.*
Lophophanes.	Accentor.	Metoponia.
Conostoma.	Tharrhaleus.	Fringillauda.
Myzornis.	Pycnorhamphus.	*Oreocorys.*
Tichodroma.	Pyrrhula.	*Zygodactyli.*
Anorthura.	*Pyrrhoplectes.*	Indicator.
Regulus.	Loxia.	*Gallinæ.*
Tickellia.	Pyrrhospiza.	*Catreus.*
Horeites.	Propasser.	Pucrasia.
Adelura.	*Procarduelis.*	Lophophorus.
Callene.	Carduelis.	Ithagenes.
		Ophrysia.

Reptilia.	Batrachia.	Pisces.
None.	Tylototriton.	Oreinus.
		Schizothorax.

This is a remarkably small list, and the number of peculiar genera is much less than would be expected. *Ælurus* and *Tylototriton* might perhaps be regarded as restricted to the Himalayas; but both are found to the eastward in the mountains

south-west of Yunnan. *Ophrysia* is only known by a few rare and occasional appearances and is probably an inhabitant of some part of Central Asia.

Indicator is chiefly an African genus with one Himalayan representative, and one in the Malay Peninsula and Borneo. All the remaining genera in the above list which are not marked as peculiar are Holarctic forms, many of them common and well-known European genera. Even amongst the peculiar generic types there are three finches, *Pyrrhoplectes*, *Procarduelis*, and *Callacanthis*, and a pheasant *Catreus* with Holarctic and not Oriental affinities, and the only genera not occurring elsewhere that show an Oriental relationship are six genera of Passerine birds, the affinities of most of which are rather doubtful. It is scarcely necessary to repeat that Passerine genera are not as a rule of quite the same importance as genera in other orders and classes of vertebrata.

But few names require to be added to the list already given in order to complete the enumeration of the genera found in the Himalayas, but not in Assam south of the Brahmaputra or in Burma. Amongst mammals, the only additional genera are *Vulpes*, *Cœlops*, and *Hemitragus*, and of these *Cœlops*, a peculiar leaf-nosed bat, doubtless inhabits Burma, though it has not hitherto been observed there, for the only known species of the genus has been recorded from Sikhim, Lower Bengal, Siam, and Java. The Himalayan fox is a Holarctic species, distinct from that of the Indian Peninsula. *Hemitragus* is a genus of goats composed of three species, one of which is Himalayan, the second inhabits the higher ranges of South India, and the third is found in Southern Arabia.

The Himalayan birds found also in the Indian Peninsula, but not in Assam or Burma, are the following :—

Passeres.	*Passeres.*	*Accipitres.*
Dumetia.	Sturnus, m.	Neophron.
Hodgsonius.	Muscicapa, m.	*Columbi.*
Cephalopyrus, m.	Saxicola, m.	Palumbus, m.
Hypolais, m.	Thamnobia.	
Sylvia, m.	Gymnorhis.	
Pastor, m.	Ptyonoprogne.	

Of these thirteen genera eight are migratory Holarctic forms (marked m), which pass the winter in the plains of India but do not breed there. The Himalayan *Ptyonoprogne* is a Holarctic species that is only found occasionally in the Peninsula and then is probably migratory. It is said to have occurred in Tenasserim but no specimen was obtained. *Neophron* is another western type, and haunts the neighbourhood of human dwellings. *Gymnorhis* appears to be one of the Indian genera that have found their way into the Lower Himalayas to the westward. In the whole list there are but three genera of any importance, *Dumetia*, *Hodgsonius* and *Thamnobia*, and of these *Hodgsonius* is only recorded in the Indian Pensinula from the Palni Hills, to which it may be an occasional migrant from the Himalayas.

Dumetia and *Thamnobia* are typical genera of the Indian Peninsula, and only in these two cases do we probably have instances of birds that have spread into the Himalayas from Cisgangetic India.

The supplementary list leads to the same conclusion as the former one, and shows that Oriental forms found in the Himalaya and wanting in Assam and Burma, are few in number and confined to Passerine birds.

When on the other hand the Himalayan fauna is compared with that of Cisgangetic India, a very different aspect is presented. The following are the Himalayan genera, in addition to those quoted in the list of peculiar forms, that are wanting in Peninsular India and Ceylon :—

Mammalia.

Carnivora.
- Prionodon.
- Putorius.
- Helictis.
- Ursus.

Insectivora.
- Talpa.

Insectivora.
- Soriculus.
- Chimarrhogale.

Chiroptera.
- Carponycteris.
- Synotus.

Rodentia.
- Sciurus (restricted).
- Microtus.
- Rhizomys.
- Atherura.

Ungulata.
- Nemorhædus.
- Cemas.

The genera of Himalayan birds not found in the Indian Peninsula or Ceylon are 135 in number, including the thirty-two generic names on p. 399. It is unnecessary to print the list at length ; but it may be as well to quote a few of the best known and most important genera in addition to those already cited.

Passeres.
- Urocissa.
- Garrulus.
- Paradoxornis.
- Suthora.
- Xiphorhamphus.
- Stachyris.
- Proparus.
- Rimator.
- Sibia.
- Lioptila.
- Siva.
- Yuhina.
- Ixulus.
- Liothrix.
- Pteruthius.
- Melanochlora.
- Psaroglossa.
- Chalcoparia.
- Criniger.

Passeres.
- Hemixus.
- Bhringa.
- Certhia.
- Pnoëpyga.
- Abrornis.
- Neornis.
- Niltava.
- Henicurus.
- Chimarrhornis.
- Ianthia.
- Cochoa.

Eurylæmi.
- Serilophus.
- Psarisomus.

Pici.
- Chrysophlegma.
- Hypopicus.
- Hemilophus.
- Sasia.

Zygodactyli.
- Megalæma.

Anisodactyli.
- Callialcyon.
- Aceros.

Coccyges.
- Chrysococcyx.

Accipitres.
- Microhierax.

Columbi.
- Treron.
- Sphenocercus.
- Macropygia.

Gallinæ.
- Gennæus.
- Tragopan.
- Arboricola.

The following are the genera of Reptilia and Batrachia :—

Reptilia.

Lacertilia.
- Acanthosaura.
- Japalura.
- Ophisaurus.
- Tachydromus.

Ophidia.
- Pseudoxenodon.
- Trachischium.
- Zaocys.
- Psammodynastes.
- Amblycephalus.

Batrachia.

Leptobrachium.

It is true that a few of these genera, for instance, amongst the mammals, *Ursus*, *Talpa*, *Synotus*, *Microtus*, are Holarctic rather than Indo-Malay, but still the majority are typically Indo-Malay and Transgangetic forms. So far as it is possible to judge from the evidence, the Himalayan fauna is so much more nearly allied to the Burmese than to that of the Peninsula of India that the two first must be united in a subregion and kept separate from the last.

In dividing the Himalayas into two, the dividing line has been drawn arbitrarily at the western end of Nepal. The fauna to the westward is pretty well known, that to the eastward is really only well explored in Sikhim, but large collections have been made around Khatmandu in Nepal. East of Sikhim the country is for the most part inaccessible to Europeans.

There is a great difference between the faunas of the Eastern and Western Himalayas, and the former, as already pointed out, is by far the richer. I cannot find that any genus of mammals inhabits the forests of the Western ranges which does not occur in the Eastern,* but the following is a list of those which have been recorded from the Eastern, but not from the Western Himalayas :—

Carnivora.
- Viverra.
- Prionodon.
- Helictis.
- Ælurus.

Insectivora.
- Tupaia.
- Talpa.
- Soriculus.
- Chimarrhogale.

Chiroptera.
- Cynopterus.
- Carponycteris.
- Cælops.
- Cerivoula.

Rodentia.
- Sciurus.
- Ratufa.
- Funambulus.
- Rhizomys.
- Atherura.

* Lepus is marked on the accompanying table as occurring in 12, but not in 13. In this case as in some others, an Indian Peninsular species occurs in Kashmir.

Ælurus, *Talpa* and *Soriculus* have Holarctic rather than Oriental affinities (although a *Talpa* is found in Pegu and a *Soriculus* in Manipur), but the other genera are Oriental and most of them exclusively so.

In the birds the same peculiarity of distribution is repeated. Not only are the Eastern Himalayan genera considerably more numerous than the Western, but the difference is greatest in the groups which are most characteristic of the Oriental region and especially of its eastern portion. Thus in the whole class Aves there are 314 genera in the Eastern Himalayas, and 276 in the Western; amongst Passerine birds I find 191 Eastern Himalayan genera against 146 Western, but in the Crateropodidæ there are no less than fifty-seven Eastern against only twenty-five Western genera. The whole of the little group of *Paradoxornithinæ*, comprising four genera in OATES'S classification, are found in the eastern half of the mountains, but none in the western. The few genera of Passerine birds that occur in the Western but not in the Eastern Himalayas are forms like *Hypolais*, *Muscicapa*, *Saxicola*, *Carduelis*, *Callacanthis*, and *Metoponia*, Holarctic types, chiefly migratory. A few Indian genera like *Brachypternus*, *Halcyon*, *Polioaëtus*, and *Sarcogrammus* ascend the comparatively thinly wooded Western Himalayas to some extent, but keep to the base of the forest-clad mountains to the eastward.

Reptiles exhibit the same distribution. In the Batrachia the difference is very great, there being only three genera recorded in the Western Himalayas, *Rana*, *Microhyla* and *Bufo*, whilst from Sikhim six are known, *Rana*, *Rhacophorus*, *Bufo*, *Leptobrachium*, the newt *Tylototriton* and the Apodous Cæcilian *Ichthyophis*. The occurrence of *Microhyla* to the westward in Kashmir and its apparent absence to the eastward is a precisely similar case to those of *Lepus*, *Brachypternus*, and *Sarcogrammus*, and is probably another instance of Peninsular Indian species belonging to Indo-Malay genera ranging to a greater elevation to the westward, and especially in the valley of Kashmir, under favourable local conditions.

In the Western Himalayas the vertebrate representatives of the Indo-Malay fauna are almost restricted to a few mammals and some birds. Amongst the mammals that are found in Kashmir are the following. Many of these range west as far as Murree.

Macacus assamensis, *b*.
Semnopithecus schistaceus, *b*.
Megaderma lyra, *c*.
Pteromys inornatus, *c*.
Sciuropterus fimbriatus, *c* (ranges beyond Indo-Malay limits).
Nemorhædus bubalinus, *a*.
Cemas goral, *b* (?*a*).

The undermentioned are some of the birds—

Urocissa flavirostris, *b*.
Machlolophus xanthogenys, *c*.
Garrulax albigularis, *b*.
Ianthocincla rufigularis, *a*.
Trochalopterum simile, *c*.
T. lineatum, *b*.
Pomatorhinus erythrogenys, *a*.
Stachyridopsis pyrrhops, *b*.
Hodgsonius phœnicuroides, *b*.
Lioptila capistrata, *b*.
Pteruthius erythropterus, *a*.
Hypsipetes psaroides, *a*.
Siphia strophiata, *a*.
Cyornis leucomelanurus, *a*.
Niltava sundara, *a*.
Henicurus maculatus, *b*.
Rhyacornis fuliginosus, *a*.
Ianthia rufilata, *a*.
Picumnus innominatus, *a*.
Megalæma marshallorum, *a*.
Spilornis cheela, *a*.
Sphenocercus sphenurus, *a*.
Gallus ferrugineus.
Gennæus albicristatus, *c*.
Hydrophasianus chirurgus, *a*.

A species in this list is marked *a* if it ranges throughout the Himalayas and into the hills south of Assam, or farther south; *b* if it extends throughout the whole or greater part of the Himalayas, but not into the ranges south of Assam; *c* if it is only found in the Western Himalayas. All species marked *c* are replaced by other members of the same genus in each case in the Eastern Himalayas.

Coming east from Kashmir, of which the longitude is about 72° E., the number of typically Oriental forms increases steadily. Thus *Arboricola torqueola* has been recorded as far west as Chamba (76° 15′), *Paradoxurus grayi* from Simla (77°), *Cervulus muntjac* from the same neighbourhood. *Liothrix*, *Ixulus*, and *Proparus* range westward to the Sutlej Valley (about 78°), *Hipposiderus armiger* and *Chloropsis hardwickii* to Mussooree (78° 10′). No more typically Indo-Malay bird could be named than the beautiful *Psarisomus dalhousiæ*, the range of which extends from Mussooree to Borneo. *Cissa chinensis*, another conspicuous species, is known to occur about equally far to the westward. *Arboricola rufigularis* appears first in Kumaun (about 80°). Of snakes, an *Ablabes* has been recorded from Simla, and a *Simotes* from Kumaun, but the range of Himalayan reptiles is not as well known as that of mammals and birds.

These details are only a few of those which might be given to show the gradual disappearance of Indo-Malay forms to the westward in the Himalayas.

The principal facts to be remembered with regard to the Himalayan fauna are the admixture of Indo-Malay and Holarctic forms, the former prevailing to the eastward, the latter to the westward, the gradual diminution in number of Indo-Malay types in the west, the generic and very often specific identity of Himalayan vertebrates with those of Assam and Burma, and the marked difference between the Himalayan fauna and that of Cisgangetic India.

There is yet another peculiarity in the Himalayan forest fauna to which attention may be directed. Although, especially in the eastern portion of the range, in Nepal and Sikhim, Holarctic types are less numerous than Indo-Malay, the former comprise more genera that are peculiar or almost peculiar to the area. Thus amongst

mammals there is no genus actually restricted to the Himalayas, but *Ælurus* is nearly so, and it is distinctly Holarctic in affinity as is shown by extinct forms having been met with in Europe. *Tylototriton*, with a similar range to *Ælurus*, has strong Holarctic relationships. Amongst birds there are only two peculiar genera belonging to the Transgangetic *Paradoxornithinæ* and *Liotrichinæ*, *Conostoma* and *Myzornis*, and the only other distinctly Oriental form in the list of those restricted to the Himalayas is *Callene*. *Tickellia*, *Horites* and *Oreocorys* are of uncertain affinity, but the two latter are probably Holarctic rather than Oriental. The finches *Pyrroplectes*, *Procarduelis*, and *Callacanthis*, and the gallinaceous genera *Catreus* and *Ophrysia* are characteristically Holarctic.

Now, although it cannot be stated as a definite fact that the oldest inhabitants of a region present the greatest amount of peculiarity and furnish the largest number of distinct generic types, there is much probability in this being the rule, and if it is, it follows necessarily that the Holarctic members of the Himalayan fauna have inhabited the area longer than the Indo-Malay contingent, as is probable for other reasons.

14–17. *Assam and Burma.*

This includes the whole area from the base of the Eastern Himalayas in Assam, and farther east, from the limits of British territory on the north to the latitude of Mergui (about 12° 30′ N. lat.) on the south. The western boundary is formed by the Gangetic alluvium and the Bay of Bengal, the eastern by Chinese and Siamese territory. The fauna of parts of Upper Burma is still imperfectly known, and even that of other parts of the country is far from exhaustively examined, though much has been done of late years in collecting.

The following genera are found in the Burmese Province and also in countries to the east and south but not to the westward either in the Himalayas or in the Peninsula of India. Genera marked C extend into China, but not into the Malay countries.

Mammalia.

Primates.
- Hylobates.
- Nycticebus.

Carnivora.
- Arctogale.
- Arctictis.*

Insectivora.
- Hylomys.
- Anurosorex, C.

Chiroptera.
- Eonycteris.

Rodentia.
- Chiropodomys.
- Hapalomys.

* Said also to be found at the base of the Himalayas in Sikhim.

Birds.

Passeres.
- Crypsirhina.
- Timelia.
- Drymocataphus.
- Thringorhina.
- Turdinulus.
- Aëthorhynchus.
- Spizixus, C.
- Herbivocula, C.
- Calornis.
- Spodiopsar.
- Agropsar.
- Ampeliceps.

Passeres.
- Graculipica.
- Ploceella.
- Anthothreptes.

Eurylæmi.
- Eurylæmus.
- Corydon.
- Cymborhynchus.
- Calyptonema.

Pici.
- Miglyptes.
- Gauropicoides.

Anisodactyli.
- Carcineutes.
- Rhytidoceros.

Accipitres.
- Poliohierax (also African).

Gallinæ.
- Polyplectrum.
- Phasianus, C.
- Bambusicola, C.
- Tropicoperdix.

Grallæ.
- Heliopais.

Reptiles.

Chelonia.
- Geoemyda.
- Cyclemys.
- Platysternum, C.

Lacertilia.
- Ptychozoon.
- Tropidophorus.

Ophidia.
- Xenelaphis.
- Xenochrophis.
- Trirhinopholis, C.
- Calamaria.
- Stoliczkaia.

Ophidia.
- Homolopsis.
- Cantoria.
- Hipistes.
- Doliophis.

Batrachians.

- Oxyglossus.
- Hyla.
- Calophrynus.

Fishes.

- Monopterus.
- Liocassis.
- Akysis.
- Acanthopsis.
- Osteochilus.
- Dangila.
- Osphromenes.

A few genera which occur both in the Burmese province and in the Peninsula of India, but not in the Himalayas, will be noticed under the Cisgangetic subregion, p. 419. The following genera are, so far as is known, peculiar to the Burmese province :—

Mammalia.

None.

Birds.

Passeres.
- Stactocichla (A).
- Corythocichla.
- Gypsophila.

Passeres.
- Cerasophila.
- Xanthixus.
- Anthocincla.

Anisodactyli.
- Ptilolæmus

Reptilia.

Lacertilia.
Ptyctolæmus, A.
Ophidia.
Blythia, A.
Ophidia.
Plagiopholis.
Azemiops.

Batrachia.

Phrynoderma.
Chirixalus.
Glyphoglossus.
Caluella.

Fishes.

Siluridæ.
Olyra.
Cyprinidæ.
Acanthophthalmus.
Apua.
Cyprinidæ.
Psilorhynchus, A.
Semiplotus.
Matsya.

The genera marked A are only known from the Assam area, including the Gáro, Khási and Nága Hills and Manipur. The snakes *Plagiopholis* and *Azemiops* are from Northern Burma. Some, perhaps most, of these Assamese and North Burmese genera may extend to the eastward into China. If these generic types are omitted the number of peculiar genera is very small.

The Assamese tract contains a considerable fauna, chiefly in common with the Eastern Himalayas, which does not extend south into Burma. The following is a list of the genera found in this tract No. 14, but not in Burma (15, 16, 17). A few Indian forms only found in the Assam Valley itself are omitted.

Mammalia.

Soriculus.
Synotus.

Aves.

Passeres.
Sylviparus.
Paradoxornis.
Ianthocincla.
Grammatoptila.
Stactocichla.
Xiphorhamphus.
Proparus.
Lioparus.
Rimator.
Tesia.
Oligura.
Ixops.
Hilarocichla.
Minla.
Sphenocichla.
Passeres.
Elachura.
Urocichla.
Acanthoptila.
Neornis.
Nitidula.
Microcichla.
Tarsiger.
Ianthia.
Mycerobas.
Hæmatospiza.
Propyrrhula.
Hypacanthis.
Pici.
Brachypternus.
Striges.
Bubo.
Accipitres.
Lophotriorchis.
Gallinæ.
Tragopan.
Perdicula.
Microperdix.
Grallæ.
Rallus.
Limicolæ.
Ibidorhynchus.
Herodiones.
Ciconia.

Reptilia.

Lacertilia.
Ptyctolæmus.
Japalura.
Ophidia.
Stoliczkaia.
Ophidia.
Trachischium.
Rhabdops.
Blythia.
Ophidia.
Dinodon.
Xenelaphis.
Ancistrodon.

No batrachia are found in the Assamese area that are not also recorded from Burma.

Several of the genera in the above list, *e.g.*, *Synotus*, *Bubo*, *Rallus*, and *Ancistrodon*, are Holarctic forms that extend no further southward than the hill range south of the Assam valley. Of the thirty-six genera of birds, all but nine are Passerine and twelve belong to the Crateropodidæ. The lizard *Ptyctolæmus*, and the snakes *Stoliczkaia* and *Blythia* are rare forms hitherto only obtained from the Assam hills. Several genera of birds not previously known to occur south of the Assam ranges have recently* been discovered in the Shan States of Upper Burma, and the list given above may in time undergo further reduction.

It is, I think, clear that the Assamese fauna differs from the Burmese very much in the same way, and approximately to the same extent, as the fauna of the Eastern Himalayas does from that of the ranges south of Assam. All must be classed in the same subregion.

18. *South Tenasserim.*

The Malayan is one of WALLACE'S subregions of his Oriental region, and it comprises the Malay Peninsula and Archipelago. It is probable that some of the boundaries as mapped by WALLACE may require modification, but his inclusion of the southern portion of Tenasserim in the Malayan subregion appears to be confirmed by the additional evidence since obtained. The following Malay genera range into Southern Tenasserim, but not farther north :—

Mammalia.

Gymnura.
Galeopithecus.
Emballonura.
Tapirus.
Tragulus (found also in Peninsular India and Ceylon).

* Chiefly by Colonel BINGHAM, Mr. H. W. THOMPSON, and Colonel RIPPON, 'Jour. As. Soc. Beng.,' vol. 59, 1900, Part 2, p. 102; 'Bull. Brit. Orn. Cl.,' vol. 11, p. 11; October, 1900.

Birds.

Passeres.
- Platysmurus.
- Malacopterum.
- Trichostoma.
- Cyanoderma.
- Tricholestes.
- Alophoixus.
- Pinarocichla.
- Trachycomus.
- Platylophus.
- Philentoma.
- Hydrocichla.
- Erythrura.
- Chalcostetha.
- Prionochilus.

Pici.
- Callolophus.

Zygodactyli.
- Calorhamphus.
- Chotorhæa.

Anisodactyli.
- Caridagrus.
- Anorrhinus.
- Berenicornis.
- Rhinoplax.

Coccyges.
- Zanclostomus.
- Rhamphococcys.
- Rhinortha.

Accipitres.
- Machærhamphus

Psittaci.
- Psittinus.

Columbæ.
- Butreron.
- Geopelia.

Gallinæ.
- Argusianus.
- Lophura.
- Rollulus.
- Caloperdix.

Reptilia.

Bellia.

The apparent absence of Malayan Reptilia and Amphibia may be due to these animals not having been collected or observed as fully as mammals and birds have been. One remarkable Malay genus, *Dibamus*, the sole member of a peculiar family of lizards, is found in the Nicobar Islands. But the mammals alone are sufficient to show how distinct the fauna is from that of the Indo-Chinese subregion. *Galeopithecus*, *Tapirus*, and *Tragulus* represent families and *Gymnura* a subfamily. Amongst the birds, too, *Geopelia* represents a family. *Calorhamphus* is a most remarkable barbet, very different from any other eastern genus, and *Rhinoplax* is an equally peculiar hornbill. *Machæramphus* again is perfectly distinct from all other accipitrine genera. Though unknown in Asia north or west of Southern Tenasserim, this genus reappears in Madagascar and South Africa. Amongst Gallinaceous birds no genera stand more clearly apart from others than do *Argusianus* and *Rollulus*.

19. *The Andaman and Nicobar Islands.*

The Andaman and Nicobar Islands have been included in the lists, because all species recorded from them are described in the 'Fauna of British India.' The Andaman Islands contain an impoverished Burmese fauna and that of the Nicobars approximates more to Sumatran types, but neither needs discussion in connection with the distribution of animals in India and Burma. Birds have in this case, as in several others, received more attention than other groups of vertebrates.

8. The Principal Subregions.

The result of this zoological comparison of the different tracts into which, for the purposes of this enquiry, the area of the British Indian Empire has been divided, has been to show that whilst three of the mainland divisions, the Punjab tract, the High Himalayas, and South Tenasserim, are parts of subregions that extend far beyond the limits of the country under consideration, the remainder may be grouped in two subregions; a western, entirely contained within the area, and consisting of the Indian Peninsula and Ceylon, and an eastern and northern, which includes Burma, Assam, and the forest area of the Himalayas. For the former of these the best name is Cisgangetic, and the eastern subregion may be termed Transgangetic.* The latter comprises Burma (except South Tenasserim), Assam, and the Himalayan forest region, together with South China, Siam and the French possessions in Tonquin and Cochin China.

It is now desirable to point out some of the principal zoological features of the Cisgangetic subregion as a whole, and of the Himalayan and Burmese portion of the Transgangetic.

9. The Cisgangetic Subregion.

The Indian Peninsula and Ceylon taken together, after the exclusion of the Punjab tract, form a well marked subregion, distinguished from the Transgangetic subregion by the absence of the mammalian families Simiidæ, Procyonidæ (*Ælurus*), Talpidæ, and Spalacidæ (*Rhizomys*), and by the presence of Hyænidæ, of the Insectivorous subfamily *Erinaceinæ*, and of a subfamily of Muridæ, the *Gerbillinæ*, besides some peculiar genera, amongst which are three antilopes and the peculiar rodent genus *Platacanthomys*. Amongst birds the Eurylæmi are wanting, and the less important Indicatoridæ and Heliornithidæ (*Heliopais*), whilst the orders Pterocletes (sand grouse) and Phœnicopteri (flamingoes) and the families Otididæ (bustards) and Plataleidæ (spoon-bills), together with the subfamily Cursoriinæ (coursers or courier-plovers) are resident in the Indian Peninsula, but not in the Himalayas or Burma.† The Reptilian families Eublepharidæ, Chamæleontidæ, and Uropeltidæ, with the subfamily Boinæ, all inhabit India, but do not range to the east or north of the Indian Peninsula, and the family of Uropeltidæ or earth-snakes, comprising seven genera and so far as known forty-two species, is not only

* These are the terms already adopted by Gadow (Bronn's 'Klassen u. Ordn. Thier-reichs,' vol. 6, abth. 4; Vögel, Part 2, p. 296). He classed the Oriental region as a subregion of the Palæotropical region, and divided the subregion into three provinces, Cisgangetic, Transgangetic, and Malayan.

† It is doubtful whether flamingoes breed in India, though they are said to do so in Cutch, and some observers think they breed in part of Ceylon. One bustard, *Sypheotis bengalensis*, is found in the plain of Assam. Spoon-bills occur in Eastern China, but not in Burma or the Malay countries.

peculiar to the subregion but is confined to the southern part of it. There are many other important genera of Reptilia and several Batrachia restricted to the area. The only freshwater fish genus of any importance is *Etroplus*, a member of the African freshwater family Cichlidæ (Chromididæ).

From the Cisgangetic subregion as above defined, sixty-two genera of mammals have been recorded, of which fourteen do not extend their range into the Transgangetic subregion. The following are the fourteen genera, those restricted to the subregion, six in number, being in italics :—

Primates.
Loris.
Carnivora.
Cynælurus.
Hyæna.
Mellivora.
Melursus.
Insectivora.
Erinaceus.
Rodentia.
Platacanthomys.
Gerbillus.
Golunda.*
Ungulata.
Tetraceros.
Boselaphus.
Antilope.
Gazella.
Tragulus.†

Of birds 347 genera are known, and of these the following forty-three do not occur in the Transgangetic subregion. Genera peculiar to India or Ceylon or to both are in italics. Those marked C are only found in Ceylon :—

Passeres.
Crateropus.
Rhopocichla.
Arrenga, C.
Elaphrornis, C.
Brachypteryx.
Kelaartia, C.
Dissemurulus, C.
Salpornis.
Lusciniola.
Laticilla.
Schœnicola.
Sturnornis, C.
Ochromela.
Cercomela.
Daulias.
Stictospiza.
Melanocorypha.
Ammomanes.
Passeres.
Pyrrhulanda.
Alaudula.
Acmonorhynchus, C.
Anisodactyli.
Lophoceros.
Coccyges.
Phœnicophaës.
Taccocua.
Accipitres.
Circaëtus.
Pterocletes.
Pterocles.
Pteroclurus.
Gallinæ.
Galloperdix.
Grallæ.
Anthropoides.
Eupodotis.
Limicolæ.
Cursorius.
Rhinoptilus.
Sarciophorus.
Vanellus.
Chettusia.
Recurvirostra.
Phalaropus.
Herodiones.
Platalea.
Phœnicopteri.
Phœnicopterus.
Anseres.
Marmaronetta.
Erismatura.
Clangula.
Mergus.

* This genus is said to have been obtained at Dagshai near Simla and in Nepal. I believe the first locality to be misleading, and the second untrustworthy. The specimen labelled "Dagshai" was, I think, probably from the lower spurs of the Western Himalaya, in which some animals of the plains of India occur. The Nepal specimen was from HODGSON'S collection, some of the animals of which, though labelled "Nepal" at the British Museum, were not from the Himalayas; see foot-note, p. 349.

† Malay, but not Transgangetic.

Two of the above genera, *Salpornis* and *Rhinoptilus*, recur in tropical Africa, but not, so far as is known, anywhere else.

A few genera are almost confined to Cisgangetic India, but range a short distance over the border of the Transgangetic province. Of these the most important are two Passerine birds, *Dumetia*, belonging to the Crateropodidæ, and *Thamnobia* referred to the Turdidæ, and also the florican forming the genus *Sypheotis*, a near ally of the African *Lissotis*. All these three forms must be regarded as characteristic of the Indian Peninsula with Ceylon, but *Dumetia* and *Thamnobia* are also found in the Lower Eastern Himalayas, and one species of *Sypheotis* ranges throughout the Northern Indo-Gangetic plain from Oudh to Upper Assam.

The Reptilian genera of the Cisgangetic area are ninety-three in number, and of this total, which exceeds those known from the Transgangetic area included in the limits of the Indian fauna, thirty-nine are wanting in the Himalayas and Burma, though four of these are found in the Malayan subregion. No less than twenty-four genera are peculiar to the Cisgangetic subregion,* showing a remarkable proportion of special forms. This specialization is most marked amongst the Lacertilia, comprising thirty genera, of which eleven are restricted to the subregion.

Owing to their importance a full list of the Reptiles is added. Peculiar genera are in italics, and those which although not peculiar, are wanting in the Transgangetic subregion, are marked with a dagger †.

Crocodilia.
- Gavialis.
- Crocodilus.

Chelonia.
- Trionyx.
- Pelochelys.
- Chitra.
- Emyda.
- Testudo.
- Nicoria.
- Damonia.
- Morenia.
- *Hardella.*
- Batagur.
- Kachuga.

Lacertilia.
- Gymnodactylus.
- Gonatodes.
- *Calodactylus.*
- Hemidactylus.
- *Teratolepis.*
- Gehyra
- Lepidodactylus.
- Hoplodactylus.†
- Gecko.
- Eublepharis.† ‡
- Draco.
- *Sitana.*
- Otocryptis.
- Cophotis.†
- *Ceratophora.*
- *Lyriocephalus.*
- *Salea.*
- Calotes.
- *Charasia.*
- Liolepis.
- Varanus.

Lacertilia.
- *Cabrita.*
- Ophiops.†
- Mabuia.
- Lygosoma.
- *Ristella.*
- Chalcides.†
- *Sepophis.*
- *Chalcidoseps.*
- Acontias.†

Rhiptoglossa.
- Chamæleon.†

Ophidia.
- Typhlops.
- Python.
- *Gongylophis.*
- Eryx.†
- Cylindrophis.
- *Uropeltis.*

* *Hardella*, *Teratolepis* and *Sitana*, marked as peculiar, range as far west as the Indus plain in the Punjab and Sind, but not farther west.

‡ The type specimen of *E. hardwickii* in the British Museum is said to be from "Penang, Chittagong," two places more than 1,200 miles apart. I think the locality may be disregarded.

Ophidia.	*Ophidia.*	*Ophidia.*
Rhinophis.	*Aspidura.*	Fordonia.
Silybura.	Lycodon.	Dipsadomorphus.
Pseudoplecturus.	Dryocalamus.†	Psammophis.
Plecturus.	Zamenis.	Dryophis.
Melanophidium.	Coluber.	Chrysopelia.
Platyplecturus.	Dendrophis.	*Elachistodon*
Xenopeltis.	Dendrelaphis.	Bungarus.
Chersydrus.	Coronella.†	Naia.
Polyodontophis.	Simotes.	Hemibungarus.†
Tropidonotus.	Oligodon.	Callophis.
Macropisthodon.†	Ablabes.	Vipera.
Helicops.	Hypsirhina.	Echis.†
Rhabdops.	Cerberus.	Ancistrodon.
Xylophis.	Gerardia.	Lachesis.
Haplocercus.		

The batrachians also are numerous, though they only just exceed in number those found within British limits in the Transgangetic subregion. They comprise seventeen genera, of which nine are not known to occur in the Transgangetic subregion, and no less than seven are peculiar. No Caudata occur, but there are in Southern India three genera, containing five species, of Apoda or Cæcilians, of which only sixteen genera are known scattered throughout the Tropics of the world. Only a single genus, *Ichthyophis*, occurs in any other part of the Oriental region; of the other two genera, one, *Uræotyphlus* contains two South Indian (Malabar) species and one from West Africa, the other, so far as is known, is confined to Malabar.

It is doubtful if any region of the world with the same area has so large and peculiar a batrachian fauna as the Malabar tract of India.

Batrachia.

Ecaudata.	*Ecaudata.*	*Ecaudata.*
Oxyglossus.	Rhacophorus.	Nectophryne.†
Rana.	Ixalus.	Bufo.
Micrixalus.	*Melanobatrachus.*	*Apoda.*
Nyctibatrachus.	Microhyla.	Ichthyophis.
Nannobatrachus.	Callula.	Uræotyphlus.†
Nannophrys.	*Cacopus.*	*Gegenophis.*

Of freshwater fish fifty-eight genera are known to occur, but several of these are only met with in the great rivers of the Indo-Gangetic plain. Only five genera are peculiar, the Siluroids *Sisor* and *Nangra*, two small loaches, *Jerdonia* and *Nemachilichthys*, and *Etroplus* already noticed. The Cyprinoid *Scaphiodon* is a western genus ranging into the Indian Peninsula but not farther east, and another Cyprinoid, *Thynnichthys*, is found in the Indian Peninsula and the Malay Archipelago, but not in the Transgangetic subregion. The genus *Channa*

(Ophiocephalidæ) is met with in Ceylon and China, but not in any of the intervening countries.

If zoological regions were founded on reptiles or batrachia, it would probably be necessary to regard the Cisgangetic and Transgangetic areas as belonging to distinct regions.

There is evidently, as LYDEKKER has shown,* an admixture of different faunas in the Cisgangetic subregion. There is, in the first place, what may be regarded as the Indo-Malay fauna, consisting of genera found throughout the Oriental or Indo-Malay region, or the greater portion of it. This is represented amongst mammals by such genera as *Semnopithecus*, *Paradoxurus*, *Tupaia*, *Pteropus*, *Cynopterus*, *Pteromys*, *Elephas* (Euelephas) and *Cervulus*, and by species like *Felis bengalensis* *Bos gaurus*, and *Cervus unicolor*.

The birds are very numerous. As examples of the Passerines *Dendrocitta*, *Pyctorhis*, *Chloropsis*, *Otocompsa*, *Dissemurus*, *Orthotomus*, *Pericrocotus*, *Acridotheres*, *Copsychus*, *Munia*, *Arachnecthra*, and *Dicæum* may be mentioned; of woodpeckers *Liopicus* and *Iyngipicus*, of barbets *Xantholæma*, of kingfishers *Pelargopsis* and *Ceyx*, of hornbills *Anthracoceros*, of cuckoos *Hierococcyx* and *Eudynamis*, of owls *Ketupa*, *Glaucidium* and *Ninox*, of birds of prey *Polioaëtus* and *Haliastur*, of pigeons *Crocopus* and *Carpophaga*, of game birds *Pavo* and *Gallus*. Amongst reptiles, the chelonian genera *Emyda* and *Kachuga*, the lacertilian *Calotes*, the snakes *Lycodon*, *Dendrophis*, *Dryophis*, and *Bungarus* afford good instances; amongst batrachians *Callula* and *Microhyla*; but the Indo-Malay reptiles and batrachians do not form so large or conspicuous a part of the Indian Peninsular fauna as do the mammals and birds. The freshwater fishes, as DAY has shown, belong chiefly to Indo-Malay genera. The genera named here are widely distributed in India, and are supplemented by several other Indo-Malay types in Malabar.

This is a forest fauna for the most part, and in those parts of the Indian Peninsula which still retain their woodland nature, and have not been completely cleared for husbandry, it is still the predominant type. With it, however, there is associated throughout the Peninsula a considerable number of genera and species which are not found in other parts of the Indo-Malay region. Amongst the principal members of this group of animals, which for want of a better name may be called the Aryan† constituent of the Cisgangetic fauna, may be included the Mammalian genera *Melursus*, *Golunda*, *Tetraceros*, *Boselaphus*, and *Antilope*. Several birds appear to belong to this group of animals, amongst them *Salpornis*, *Lophoceros*, *Taccocua*, *Galloperdix*, *Sypheotis*, and *Rhinoptilus*; whilst among reptiles *Sitana*, *Charasia*, *Cabrita*, and *Eryx* should probably be included in the Aryan contingent.

* 'Geog. Hist. Mam.,' p. 288.

† Aryan is a general term applied to nations of the Indo-European stock, and to languages of the Sanscrit family. In India it used to distinguish the races which are believed to be immigrants from Central Asia.

The typical genera of this Aryan fauna are for the most part represented in the tropics of Africa at the present day, but not in Western Asia or Northern Africa. There are, however, many other forms associated with the first named in Peninsular India, which either range into Western Asia or are represented there by allied species of the same genera, for instance, *Hyæna*, *Mellivora*, *Gerbillus*, and *Gazella*, and many birds. Both of these groups of genera are well represented in the Pliocene Siwalik fauna of the Himalayan foot hills,* and it is probable that most of them are descended from animals which appeared in India, so far as is known at present, in the Pliocene period, though a few may be later immigrants.

On the whole this Aryan element of the Indian fauna is subtropical rather than tropical, and is best developed in parts of the country where the rainfall is moderate. Several of its most characteristic and conspicuous members, such as the Indian antelope and nylgai, are not found in the extreme south of India or in Ceylon, and they are inhabitants of grassy and bush-covered plains with scattered trees, not of the dense tree forests and bamboo jungle in which the gaur and Indian elephant delight.

The more general diffusion of the Indo-Malay or Oriental constituent, which is more richly represented in the tropical damp forests of Malabar and Ceylon than in the drier plains of the Indian Peninsula generally, renders it probable that this Indo-Malay portion of the fauna of Peninsular India is an older inhabitant than the Aryan. Still it is probably immigrant and not indigenous, for it is only an impoverished representative of the typical Oriental life found in the countries to the eastward of the Bay of Bengal.

The Oriental fauna of the Transgangetic and Malay subregions has been shown by several writers† to contain representatives of genera found in the Lower Miocene and Oligocene of Europe, genera, moreover, that are not known to be found in later European strata. Amongst these genera are *Hylobates* and *Gymnura*. It has hence been inferred that the typical Indo-Malay or Oriental fauna may have been driven into the tropics by the diminishing temperature of the Holarctic region in Miocene times, and that it was replaced in that region by the Upper Miocene fauna of Central Europe to which the Pliocene Siwalik of India is allied. If this view be correct, the Oriental and Aryan contingents of the Cisgangetic fauna represent two successive waves of migration from the north.

There is, moreover, in Southern India and Ceylon some evidence of a third fauna, which is no more Oriental than it is Aryan. For the sake of distinction it may be called the Dravidian‡ element of the Cisgangetic fauna. It is thoroughly tropical, heat and damp-loving. It is represented by lower forms than those of the other two

* LYDEKKER, 'Rec. Geol. Surv. Ind.,' vol. 20, p. 54; 'Geog. Hist. Mam.,' pp. 291, &c.

† O. FRAAS, 'Württemb. Ver. Jahreshefte,' vol. 26, p. 297, 1870; v. PELZELN, 'Africa-Indien, Verh. Zool.-bot., Ges. Wien,' vol. 25, p. 60, 1875; LYDEKKER, 'Geogr. Hist. Mam.,' p. 291.

‡ Dravidian is a term applied to the races and languages of Southern India, and is often used to distinguish them from the Aryans. See YULE and BURNELL'S 'Glossary,' p. 251.

Cisgangetic contingents, no birds can be referred to it, but one genus of mammalia, *Platacanthomys*, has a very doubtful claim to be included in its lists. This mammal, which is represented by another isolated form, *Typhlomys*, in Southern China, is one of those generalised types which it is difficult to classify; the genus appears to be intermediate between the true mice (Muridæ) and the dormice (Gliridæ). But the principal members of the Dravidian fauna are reptiles and batrachians, to which certain invertebrates may have to be added.* Amongst the Lizards, the curious Scincoids, *Ristella*, *Sepophis*, *Chalcidoseps*, and *Acontias* may be included; and possibly some of the Agamoids, *Otocryptis*, *Ceratophora*, *Lyriocephalus*, *Salea*, &c.; but this is doubtful, for these agamoids have Oriental allies, which the scincoids lack. Amongst snakes, naturally the Uropeltidæ take the first place, though the genera *Xylophis*, *Haplocercus*, and *Aspidura* may perhaps be added to the list. After the Uropeltidæ, however, the most conspicuous members of this Dravidian fauna are the batrachians already noticed. The fish *Etroplus* is another example.

Unfortunately, owing to the paucity of Tertiary fossils in the Peninsula of India, scarcely anything is known of the vertebrate land fauna of the country before the Pleistocene epoch. The Siwalik Pliocene is only represented within peninsular limits at one spot, Perim Island, in the Bay of Cambay; and its occurrence so far to the westward is not satisfactory evidence of its extension to Southern India. It should here be mentioned that whilst the Siwalik fauna, as a whole, contains numerous types allied to animals now confined to Africa, it also comprises several representatives of Indo-Malay (Transgangetic and Malay) genera, such as *Semnopithecus*, *Rhizomys*, *Tragulus*, and Oriental types of *Cervus*. This is quite consistent with the view that in Pliocene times as now there was an admixture of Aryan and Indo-Malay genera in Northern India, but so far as the evidence serves, the Aryan type appears to have predominated to a greater extent than at the present day. It must, however, not be forgotten, as LYDEKKER has pointed out, that many of the characteristic Oriental genera are of small size, and that owing to the manner in which the Siwalik deposits were accumulated small fossils are rare in them.

A slight knowledge of the Indian Pleistocene vertebrate fauna has been obtained from the Nerbudda river gravels† and the Karnul caves.‡ Of the two, the Nerbudda fauna is perhaps the older, but both appear to come within the human period, as indications of the presence of man have been found in both cases. The remains described are chiefly mammalian, though a few birds and reptiles have been identified from the Karnul deposits which contain smaller bones than are found in the Nerbudda gravels. From the latter, besides mammals, only crocodiles and chelonians

* Amongst Land Mollusca, *Acavus* and *Rhachis*, and probably *Ariophanta*, *Glessula* and *Cyclotopsis*.

† LYDEKKER, 'Palæontologia Indica,' Series X., vol. 3, p. 123, 1884; 'Records Geol. Surv. Ind.,' vol. 20, p. 73, 1887.

‡ LYDEKKER, 'Pal. Ind.,' Series X., vol. 4, Part 2, 1886; 'Rec. Geol. Surv. Ind.,' vol. 19, p. 120; vol. 20, p. 72. Karnul is 90 miles N.E. of Bellary in the Madras Presidency.

have been obtained. All the Karnul birds and reptiles, so far as they have been identified, belong to species still inhabiting the country, and whilst the evidence afforded by them is small, it coincides, so far as it goes, with that yielded by the mammalia.

The mammals of the Nerbudda comprise species of *Elephas*, *Rhinoceros*, *Equus* and *Hippopotamus*, a buffalo apparently identical with the one still living wild in India, a large taurine *Bos*, and a nylgai (*Boselaphus*), together with rusine deer (the Indo-Malay type of *Cervus*). In some deposits of apparently about the same age on the Jumna river, in the plain of Northern India, *Semnopithecus* and *Antilope* have been found.

The Karnul mammals are still more interesting; they are much more numerous, and they comprise several small species. Besides Oriental genera, such as *Semnopithecus*, *Tragulus*, *Cervus* (*unicolor*) and *Atherura*, the last not now living in the Indian Peninsula, and Aryan types in considerable numbers—for instance, *Melursus*, *Boselaphus*, *Antilope*, *Tetraceros*, *Gerbillus*, and *Golunda*—there are some species allied to Siwalik forms and others with distinct affinities to Ethiopian mammals. Amongst the latter are three forms *Hyæna crocuta*, *Equus asinus* and *Manis gigantea*, not to be distinguished from the living African species, also a baboon (*Cynocephalus*), and a *Rhinoceros* nearly related to the African *R. bicornis*.

Both of these Pleistocene faunas agree in this respect, that whilst they contain typical representatives of both the Indo-Malay and the Aryan constituents of the Cisgangetic fauna, the Aryan element predominates to a much larger extent than at the present day, and comprises several forms that have now disappeared from the area.

Reference has already been made (pp. 338, 339) to a view first put forward by Mr. Elwes and accepted by Dr. R. B. Sharpe, that the mountains of Southern India should be classed with the Himalayas and the mountains of Burma and Malayana in a special subregion. This view is founded on the birds, and as far as I can see, the principal evidence in its favour is furnished by that class. The only mammals common to the ranges of Southern India and the Himalayas, but wanting elsewhere in the Indian Peninsula, are *Mustela*, *Harpyiocephalus*, *Sciuropterus*, and *Hemitragus*. Of these *Hemitragus* does not occur in Burma or the Malay countries, *Sciuropterus* does occur there, but is not restricted to the hills. *Mustela* and *Harpyiocephalus* are the only two genera out of forty-eight found on the Malabar tract that are characteristic of the Burmese and Malayan hill fauna, and are also Himalayan. It is noteworthy that in these two genera the South Indian hill species are identical with the Himalayan, which is not the case with *Hemitragus* and *Sciuropterus*. This may indicate that *Mustela* and *Harpyiocephalus* are comparatively recent additions to the South Indian fauna.

The Himalayan genera of birds found on the South Indian hills are not, as a rule, characteristic of a hill fauna. Of the list, twenty-eight in number, on p. 393, of Malabar birds not occurring elsewhere in the Indian Peninsula, four are not found on

either the Himalayas or the Burmese hills; six more are not Himalayan, although they are found in Burma; one *Hodgsonius*, is not Burmese, and some of the remaining genera, such as *Sauropatis*, are not hill-birds at all, whilst a much larger number (*e.g.*, *Garrulax*, *Tiga*, *Eurystomus*), are not restricted to the hill groups in Burma, but are met with in high tree forests throughout the country. Of the whole list only two genera, *Trochalopterum* and *Picumnus*, appear to belong to the special hill-fauna of Burma, and even about these I feel doubtful; they are by no means so characteristic as *Cochoa*, *Pteruthius*, *Sibia*, *Siva* and other Himalayan genera found on the mountains of Burma, Southern China, the Malay Peninsula, and even, in some cases, the islands of the Malay Archipelago.

The reptiles and batrachians of the South Indian and Ceylonese mountains differ so widely from those of the Himalayas and of the ranges in the east of the Bay of Bengal, that it is impossible to regard them as belonging to the same subregional fauna: not a single genus, so far as I am aware, can be regarded as belonging to a special mountain type.

It is perfectly true that there are on the higher ranges of Southern India forms of plants and animals such as *Rhododendron arboreum* and *Mustela flavigula*, which are not found in other parts of the Indian Peninsula, but which occur on the Himalayas and on some of the ranges east of the Bay of Bengal. A similar fact, the reappearance of northern forms on southern mountain tops, is a familiar feature throughout the Northern hemisphere, and has generally been attributed to the migration of such forms southward during the Glacial epoch. I think the appearance of Himalayan vertebrates on the Nilgiris and other South Indian ranges may be thus accounted for, but the occurrence of forest forms in these ranges, and the absence of the same in the greater part of India proper, is largely due to the destruction of forest by man and domestic animals in tracts suitable for agriculture. So far as I can see, the number of genera of birds and mammals peculiar to the Himalayas and to the hills of Southern India and of Burma, is insufficient to entitle these areas to separation as a distinct subregion, and the other classes of vertebrata do not support the theory.

I was long disposed to accept WALLACE'S classification slightly modified, and to regard the Malabar tract, together with the hills of south-western Ceylon, as forming a distinct subregion from the rest of the Indian Peninsula. But the occasional occurrence of typically Malabar forms, such as the Uropeltidæ, in the hill groups that are scattered over Southern India, and even as far as the Golconda hills and the Jeypore hills near Vizagapatam, induces me to believe that the paucity of these forms now found in the Peninsula generally may have been caused by the destruction of the forests, and that the Peninsula is best classed as a single subregion with an area of maximum richness in the south-western portion. Snakes like the Uropeltidæ are not conspicuous, and require to be carefully looked for, so it is quite possible that their range in the Indian Peninsula is not yet completely known.

Mention has already been made of the alliance between a member of the Cisgangetic fauna and species inhabiting Madagascar and South Africa in the case of the scincoid *Acontias*. The fish *Etroplus* is another example of Malagasy affinities. It is not impossible that in the peculiar lizards, snakes and frogs now isolated in Southern India and Ceylon, we have a remnant of the fauna which once inhabited the lands that in secondary and early tertiary times appears to have united India with South Africa across the Indian Ocean.* There are also some remarkable alliances between the Burmese batrachian genera *Calophrynus* and *Caluella* and some Madagascar frogs, so that the connection with Madagascar is not confined to the Cisgangetic subregion.

Note on Genera occurring in India and Burma, but not in the Himalayas, and on relations between India and Tropical America.

Amongst the animals that inhabit the Indian Peninsula and Ceylon, there are several genera that occur also in Burma or the Malay subregion, but not in the Himalayas. Several of these are absent, not only from the Himalayas but from part or the whole of Burma. Instances occur in all classes of vertebrates.

Amongst mammals the most striking case is afforded by *Tragulus*. *T. meminna*, the Indian chevrotain or mouse deer, inhabits Ceylon and the Peninsula of India as far north as about 20° N. to the westward, and in the Central Provinces and Orissa 22°. *T. javanicus* is found in the Malay Peninsula and Tenasserim about as far north as 15°, and *T. napu* first appears a little farther south. The genus occurs fossil in the Siwaliks of the sub-Himalayan hills; so it inhabited northernmost India in Pliocene times. A somewhat similar instance is afforded by the *Lemuridæ*, of which one genus, *Loris*, is found in Ceylon and the Indian Peninsula south of the Godávari, whilst another, *Nycticebus*, is found east of the Bay of Bengal as far north as Assam, but not in the Himalayas.

Amongst birds three genera of bulbuls, *Iole*, *Pycnonotus*, and *Micropus* (*Microtarsus*), have a distribution resembling that of the Lemuridæ, but other species of bulbuls, so nearly allied that their generic distinction is an open question, are found in the Lower Himalayas. *Pycnonotus* is also an African type. A few other Passerine genera that are wanting in the Himalayas, though found almost throughout India and Burma, owe their peculiar distribution to their being birds of the plains and not of the hills. The same is the case with many water birds. Instances like those of the woodpeckers, *Hemicercus* and *Thriponax*, are more important. Both occur throughout Burma and reappear on the Malabar coast of India. Another case to be noted is that of the cuculine genus *Phænicophaës* peculiar to Ceylon, but represented in southern Tenasserim and the Malay countries by allied genera, *Ramphococcyx* and *Rhinortha*.

* 'Man. Geol. Ind.,' pp. xxxix., 292; 1879. 'Proc. Geol. Soc.,' 1890, p. 95.

Amongst the Reptilia and Batrachia there are several instances worthy of attention. The following is a list of the principal :—

Reptilia.

Lacertilia.

Geckonidæ.

Gonatodes.—Ten species in Southern India and Ceylon, one in Preparis Island, two in the Malay Archipelago, six in Tropical America.

Gehyra.—One species in Ceylon, Southern Burma, Andamans, Malay Archipelago, Polynesia, and Central America; other species in Malay Archipelago, Australia, and Polynesia.

Lepidodactylus.—One species in Southern India (Shevaroy Hills), one in Ceylon, one in South Burma, Andamans, and Nicobars, Malay Archipelago, &c., several other species in Malay subregion, Australia, and Polynesia.

Hoplodactylus.—One species found in Southern India, other species in New Zealand.

Gecko.—A Malay species is recorded from Ceylon; other members of the genus range from Eastern Bengal to the Solomon Islands.

Agamidæ.

Draco.—One species in Malabar, Cochin, and Travancore. The other species of the genus are found throughout the Oriental region from Assam to the Philippines, Timor, and the Moluccas.

Cophotis.—Two species, one inhabiting Ceylon, the other Sumatra.

Calotes.—Two species are reported from Himalayan localities, but on doubtful authority, one widely spread form, *C. versicolor*, inhabiting the whole of India south of the Himalayas, and ranging to Baluchistan, Ceylon, Burma, and China, doubtless occurs in the lower spurs of the Western Himalayas. Of the twenty-two species known, eight are peculiar to Southern India and Ceylon, two to the hills south of Assam, two to the ranges of Northern Tenasserim; the remainder are met with in various parts of the Indo-Malay region.

Liolepis.—A single species occurs in Arakan and other parts of Burma, the Malay Peninsula, Siam, and Southern China. It has also been found in South Kanara on the Malabar coast.

Scincidæ.

Mabuia.—Fourteen species occur within Indian limits; of these one, *M. dissimilis*, occurs throughout Northern India from Sind to Bengal ranging to the Western Himalayas. No other species inhabits the Himalayas (some reported instances appear to be due to error); four species are peculiar to Peninsular India

with Ceylon, three to Burma, two are Malay forms ranging to Burma, and two are found in both India and Burma, but not, so far as is known, in the Himalayas.

Ophidia.

Cylindrophis.—One species found in Ceylon, another throughout the greater part of Burma.

Xenopeltis.—One species only, found in Southern India (Trichinopoli), also in Pegu, Tenasserim and the Malay subregion.

Macropisthodon.—One species in Indian Peninsula and Ceylon, two species in the Malay Peninsula and Archipelago.

Rhabdops.—One species in South India (Wynaad), the other in the Assam hills and Yunnan.

Dryocalamus.—Two species inhabit Southern India and Ceylon, a third Tenasserim and Siam, a fourth the Malay Peninsula and Sumatra.

Oligodon.—The genus comprises eighteen species; of these eight are Cisgangetic, seven of them being peculiar to Southern India or Ceylon; one inhabits the hills south of Assam, eight occur in the Malay Archipelago and Philippines, one in Syria and Egypt.

Hemibungarus.—One species in the hills of South India, Shevaroys included; two species in the Philippines, one in the Loo Choo Islands.

Batrachia.

Ixalus.—Of twenty known species fourteen are confined to the Malabar coast region and Ceylon, none being known to occur north of North Kanara (about 15° N.); one species is found in Upper Burma (Bhámo), the others inhabit the Malay Peninsula and Archipelago.

Callula.—Eight species; four occur in Ceylon and Peninsular India south of the Godávari, the others in Burma, the Malay Peninsula and Archipelago, one species occurring on both sides of the Bay of Bengal.*

Nectophryne.—One species occurs in Malabar, another in Borneo, a third in West Africa.

Amongst freshwater fishes the Cyprinoid genus *Thynnichthys* is found in the Godávari and Kistna rivers of the Indian Peninsula and also in the Malay Archipelago. *Channa*, an ally of *Ophiocephalus*, inhabits the freshwaters of Ceylon and China.

Some of the cases enumerated are doubtless those of ancient forms now represented by a few scattered survivors in tropical countries. But the instances amongst Oriental genera of Agamoid lizards (*Calotes*, *Draco*, and *Liolepis*) and the woodpeckers, *Thriponax* and *Hemicercus*, cannot be thus explained. In all these cases,

* Specimens of *C. pulchra*, the species alluded to, have been obtained in the Calcutta Botanical Gardens, whether introduced or not is uncertain.

except *Calotes*, the genera range throughout Burma to the hills south of Assam, and only reappear in India in the neighbourhood of the Malabar coast. It will be shown subsequently that this particular distribution may be connected with some peculiarities in the Himalayan fauna.

Yet one more case of peculiar distribution deserves brief recognition. It is, of course, a well-known fact that there are in the Indian Peninsula numerous representatives of African animals. The majority of these, however, are forms like *Hyæna*, *Mellivora*, *Gazella*, amongst mammals; *Pterocles*, *Eupodotis*, *Phœnicopterus*, amongst birds; *Chameleon* and *Eryx*, amongst reptiles—to quote a few well-known examples only—and in these cases the Indian and African forms are connected by species which inhabit South-western Asia and the Mediterranean area. Instances, such as *Golunda* amongst mammals, *Salpornis* and *Rhinoptilus* amongst birds, of genera only known in tropical Africa and India are much less common.

Now it is a noteworthy fact that there are a few genera or larger groups inhabiting India, the nearest allies of which are found, not in Africa, but in tropical America. There are several similar cases of a connection between the Eastern part of the Indo-Malay region and the Neotropical, as in the case of the genus *Tapirus*, but the most striking examples are amongst Invertebrata. Two of these may be noticed. One is that of the Thelyphonidæ,* or whip-scorpions, a family of Arachnida which inhabit Southern India and Ceylon (not Northern India or the Himalayas), Burma, and the Eastern Indo-Malay region, including the Malay Archipelago, with the Papuan area as far as the New Hebrides and Fiji Islands. They also occur in tropical America, but not in Africa. The second case is even more curious. It consists in the recent discovery by Mr. Daly of a species of the bivalve mollusk *Muelleria* inhabiting rivers in Mysore.† Now *Muelleria* is one of the South American members of the Ætheriidæ, a family allied to the Unionidæ, which are freshwater bivalve mollusca of great antiquity, and the Indian shell is almost identical with the type from New Grenada, whilst the African representative of the family is a different genus, *Ætheria*.

The following examples, showing connection between the faunas of India and tropical America, are found in reptiles:—

Gonatodes and *Gehyra*, two geckonid lizards already mentioned.

In *Gehyra*, where the species is the same, the case is possibly one of transport by drifting, this species and some other geckoes being widely distributed on oceanic islands.

Eublepharis.—Two species Indian(Cisgangetic), three Central American.

Polydontophis.—Three species in Madagascar, five in India, Burma, &c., two in Central America.

Lachesis, of which more than twenty species are known from Central and South

* Pocock, 'Nat. Sci.,' vol. 14, p. 218, 1899; 'Fauna Brit. Ind.,' Arachnida, p. 102.

† E. A. Smith, 'Proc. Mal. Soc.,' vol. 3, p. 14, 1898.

America, is united by BOULENGER with *Trimeresurus*, a typically Indo-Malay genus of Viperine snakes.

Yet another case is that of the Ilysiidæ, a family of snakes represented by one genus, *Ilysia*, in tropical South America, one in Sumatra, and one, *Cylindrophis*, in the Malay Archipelago and Peninsula, Burma, and Ceylon. This family, too, is more nearly allied than any other to the peculiar Indian and Ceylonese family of Uropeltidæ.

So far as this evidence goes, it appears to show that the tropical American-Indian connections are exhibited by lower and probably more ancient forms of life than the African-Indian. If the view be accepted that the survival of similar forms in distant tropical localities is due to their belonging to groups that formerly had a wide range, but were exterminated by unfavourable conditions, such as diminished temperature, except in a few suitable areas, it would result that the American-Indian types represent a much more ancient fauna than the African-Indian, and that the restriction of the former is due to an agent less recent than the Pleistocene Glacial epoch.

10. THE TRANSGANGETIC SUBREGION.

This subregion, in which the Himalayas and Burma are included, is zoologically distinguished from the Cisgangetic subregion by the characters already mentioned, especially the presence of the families Simiidæ, Procyonidæ, Talpidæ, and Spalacidæ, and of the subfamily Gymnurinæ, amongst mammals; of Eurylæmidæ, Indicatoridæ, and Heliornithidæ amongst birds; of Platysternidæ and Anguidæ amongst reptiles; and of Discophidæ, Hylidæ, Pelobatidæ, and Salamandridæ amongst batrachians.

The Transgangetic differs from the Malayan subregion in the presence of Procyonidæ, Talpidæ, Platysternidæ, Anguidæ, Discophidæ, and Salamandridæ, and in the absence of many important families and genera; for instance, amongst the mammalia, of the Tarsiidæ, Galeopithecidæ, and Tapiridæ.

Some of these groups are of small importance; thus the Anguidæ are represented by a single species in the northern part of the Transgangetic area, and this species can only be regarded as a Holarctic outlier. The single representative of the Indicatoridæ found in the Himalayas is also of small weight, although in this case another species in Malayan, nor should much value be attached to the presence of Hylidæ and Salamandridæ, each represented in the subregion by two species, of which one occurs within Indian limits. On the other hand, although *Platysternum megacephalum* is the only species of the family Platysternidæ, it deserves attention from being restricted to the subregion, and yet found throughout a large area in Southern China, Burma, and Siam. The Procyonidæ, Heliornithidæ, and Discophidæ are also each represented by a single species in the Transgangetic subregion. The Eurylæmidæ are the most important group; they form a distinct order or suborder, Eurylæmi, and they are completely wanting in the Indian Peninsula and Ceylon,

whilst six genera, comprising altogether nine species, are found in the Himalayas, Assam, and Burma.

It is as well to point out that in certain groups of birds there is a well-marked distinction between the Transgangetic and Cisgangetic areas. Thus, in the great ill-defined mass of Passerines, now frequently associated to form the Timelidæ, or Crateropodidæ, and comprising in OATES's work the sub-families *Crateropodinæ*, *Timelinæ*, *Brachypteryginæ*, *Sibiinæ*, *Liotrichinæ*, and *Brachypodinæ*, seventy-two genera are found in the Transgangetic region within the Indian Empire, and only thirty in the Cisgangetic area. The little group of *Paradoxornithinæ* included in the Timelidæ by some authors, but referred by OATES to a different family, is entirely restricted to the Transgangetic subregion. It comprises five genera (of which the most important are *Paradoxornis* and *Suthora*), and twenty-one species in the British Museum Catalogue. The pheasants, too, are represented by eight genera and seventeen species in the Himalayas and Burma, whilst the only member of the group (from which I think *Pavo* and *Argusianus* may be omitted) found in India and Ceylon is *Gallus*, with three species.

Lists of the genera restricted within Indian limits to the Himalayas and to the Assam-Burmese province respectively have already been given (pp. 399, 405). To these the following, found in both the Himalayas and in Burma (including Assam), but not in the Indian Peninsula or Ceylon, must be added to complete the list of Transgangetic forms that are not Cisgangetic also. Forms peculiar to the subregion, inclusive of Southern China, &c., are in italics. Those marked (A) are found in the Himalayas and Assam hills, but not further south.

Mammalia.

Carnivora.
- Prionodon.
- Putorius.
- Helictis.
- Arctonyx.
- Ursus.

Insectivora.
- Talpa.
- Soriculus, A.
- Chimarrogale, A.*

Chiroptera.
- Carponycteris.
- Synotus, A.

Rodentia.
- Sciurus (restricted).
- Microtus.
- Rhizomys.
- Atherura.

Ungulata.
- Nemorhædus.
- Cemas.

Aves.

Passeres.
- Pica.
- Urocissa.
- Garrulus.
- Ægithaliscus.

Passeres.
- *Sylviparus*, A.
- *Paradoxornis.*
- *Suthora.*
- *Scæorhynchus.*

Passeres.
- *Ianthocincla*, A.
- *Grammatoptila*, A.
- *Xiphorhamphus*, A.
- Gampsorhynchus.

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* Found in the Khakhyen (Kachin) Hills north of Burma, but not known to occur further south, except in Borneo.

Aves—*continued.*

Passeres.
- Turdinus.
- Stachyris.
- Stachyridopsis.
- *Schœniparus.*
- *Sittiparus.*
- *Proparus*, A.
- *Lioparus*, A.
- Rimator, A.
- *Drymochares.*
- *Tesia.*
- *Oligura*, A.
- *Sibia.*
- *Lioptila.*
- *Actinodura.*
- *Ixops*, A.
- *Staphidea.*
- Siva.
- *Yuhina.*
- *Ixulus.*
- Herpornis.
- Liothrix.
- *Cutia.*
- Pteruthius.
- *Melanochlora.*
- *Hilarocichla*, A.
- Mesia.
- *Minla*, A.
- *Psaroglossa.*
- Criniger.
- *Hemixus.*
- *Alcurus.*

Passeres.
- Bhringa.
- Certhia.
- *Sphenocichla*, A.
- *Elachura*, A.
- *Urocichla*, A.
- Pnoëpyga.
- Tribura.
- *Acanthoptila*, A.
- *Abrornis.*
- *Neornis*, A.
- *Horornis.*
- Phyllergates.
- *Nitidula*, A.
- Anthipes.
- Niltava.
- *Chelidorhynx.*
- Henicurus.
- *Microcichla*, A.
- Chimarrhornis.
- Rhyacornis.
- *Tarsiger*, A.
- Ianthia, A.
- Notodela.
- Zoothera.
- Cochoa.
- Cinclus, A.
- *Mycerobus*, A.
- *Hæmatospiza*, A.
- *Propyrrhula*, A.
- *Hypacanthis*, A.

Passeres.
- Chalcoparia.
- *Pachyglossa.*

Eurylæmi.
- *Serilophus.*
- Psarisomus.

Pici.
- Chrysophlegma.
- Gecinulus.
- Hypopicus, A.
- Pyrrhopicus.
- Hemilophus.
- Sasia.

Zygodactyli (Capitonidæ).
- Megalæma.

Anisodactyli.
- Callialcyon.
- *Aceros.*

Coccyges.
- Chrysococcyx.

Accipitres.
- Microhierax.

Columbæ.
- Treron.
- Sphenocercus.
- Macropygia.

Gallinæ.
- *Gennæus.*
- Tragopan, A.
- Arboricola.

Limicolæ.
- Ibidorhynchus, A.

Reptilia.

Lacertilia.
- Acanthosaura.
- Japalura, A.
- Ophisaurus.
- Tachydromus.

Ophidia.
- *Trachischium.*
- Zaocys.
- Pseudoxenodon.

Ophidia.
- Psammodynastes.
- Amblycephalus.

Batrachia.

Leptobrachium.

Pisces.

Siluridæ.
- Pseudecheneis.
- Exostoma.

The number of genera peculiar to the Transgangetic region is small, except amongst birds. In mammals, reptiles, and batrachians the Cisgangetic subregion appears to be richer in peculiar generic types. Altogether seventy-five genera of mammalia have been recorded as represented in the subregion within Indian limits. Of these, but two do not occur elsewhere, *Ælurus* and *Soriculus*, both of which have Holarctic relationships, and are only found near the northern border of the subregion. *Hapalomys*, very imperfectly known and until recently only recorded from Burma, has lately been found in the Malay Peninsula. A few additional genera from Southern China have to be added to the subregional lists, but only one of these, *Typhlomys*, the ally of *Platacanthomys*, appears to be peculiar; the two important Cervine genera, *Elaphodus* and *Hydropotes*, though classed as Indo-Malay by some writers, appear to have been rightly regarded as Holarctic (Palæarctic) by WALLACE.

11. SUMMARY.

In the tables which follow an attempt has been made to present the details of the previous pages in a concise form.

In the first table the first column gives the number of genera (exclusive of marine forms) in each order and class of vertebrates known to inhabit the British Indian Empire. Freshwater fishes are arranged in families, members of other classes in orders. The second column gives the number of genera occurring in the Punjab Province (Punjab-Sind-Baluchistan), but not in the Indian Peninsula, the Himalayas, or Burma. The third column shows the number of genera similarly restricted, within Indian limits, to the Higher Himalayas and Tibet,* inclusive of Ladak, Gilgit, &c. The seventh and eighth columns contain the enumeration of generic forms similarly represented within these limits, only in Southern Tenasserim, or in the islands of the Andaman and Nicobar groups.

The other columns illustrate the distribution of Cisgangetic and Transgangetic genera. The fourth column is divided into two, of which the first shows the number of genera known to inhabit Cisgangetic India (the Peninsula with Ceylon), as already defined, and the second the number of the same which do not occur in the Transgangetic tracts (Himalayas, Assam, and Burma). The sixth column, similarly divided, gives the whole number of Transgangetic genera within Indian limits, and the forms restricted within those limits to the Transgangetic area. The fifth column shows how many genera are common to the Cisgangetic and Transgangetic subregions within Indian limits.†

* In the few instances in which genera are found both in the Punjab tract and in Tibet, but not elsewhere within Indian limits, they are enumerated in the Punjab list.

† Cisgangetic genera not found in the Transgangetic area within Indian limits, but reappearing beyond within the Transgangetic subregion, are very few indeed in number, too few to be of any importance. The only instances I can recall are those of the spoonbill, *Platalea*, already mentioned, and of the water tortoise, *Damonia*.

Mammalia.

Orders.	1. Total number of genera.	2. Peculiar to Punjab.	3. Peculiar to Tibet.	4. Cisgangetic. Total.	4. Cisgangetic. Not found in Transgangetic.	5. Common to Cisgangetic and Transgangetic.	6. Transgangetic. Total.	6. Transgangetic. Not found in Cisgangetic.	7. Peculiar to S. Tenasserim.	8. Peculiar to Andamans and Nicobars.
Primates . .	5	0	0	3	1	2	4	2	0	0
Carnivora .	22	0	0	15	4	11	18	7	0	0
Insectivora .	11	0	1	3	1	2	7	5	2	0
Chiroptera .	22	0	1	16	0	16	20	4	1	0
Rodentia .	26	3	5	12	3	9	15	6	0	0
Ungulata .	20	3*	2	12	5†	7	9	2	1	0
Edentata .	1	0	0	1	0	1	1	0	0	0
	107	6	9	62	14	48	74	26	4	0

* These three are also found in the Tibetan area, but are not included in the number of peculiar forms enumerated as belonging thereto.

† *Tragulus*, also found in South Tenasserim, is included.

Aves.

	1.	2.	3.	4.		5.	6.		7.	8.
Passeres	294	8	10	133	21	112	238	126	16	1
Eurylæmi	6	0	0	0	0	0	6	6	0	0
Pici	21	0	0	12	0	12	20	8	1	0
Zygodactyli . . .	7	0	0	3	0	3	5	2	2	0
Anisodactyli . . .	24	0	0	15	1	14	19	5	4	0
Macrochires . . .	8	0	0	8	0	8	8	0	0	0
Trogones	1	0	0	1	0	1	1	0	0	0
Coccyges	15	0	0	11	2	9	10	1	3	0
Psittaci	3	0	0	2	0	2	2	0	1	0
Striges	12	1	0	11	0	11	11	0	0	0
Accipitres	35	0	1	30	1	29	32	3	1	0
Columbæ	18	0	0	9	0	9	14	5	2	2
Pterocletes	3	0	1	2	2	0	0	0	0	0
Gallinæ	30	1	3	8	1	7	20	13	4	1
Hemipodii	1	0	0	1	0	1	1	0	0	0
Grallæ	17	2	1	13	2	11	12	1	0	0
Limicolæ	35	0	0	34	7	27	28	1	0	0
Gaviæ	6	0	0	5	0	5	6	1	0	0
Steganopodes . . .	3	0	0	3	0	3	3	0	0	0
Herodiones	21	0	0	21	1	20	20	0	0	0
Phœnicopteri . . .	1	0	0	1	1	0	0	0	0	0
Anseres	25	0	0	23	4	19	21	2	0	0
Pygopodes	1	0	0	1	0	1	1	0	0	0
	587	12	16	347	43	304	478	174	34	4

Reptilia.

	1.	2.	3.	4.		5.	6.		7.	8.
Crocodilidæ . . .	2	0	0	2	0	2	2	0	0	0
Chelonia	15	0	0	11	1	10	12	3	1	0
Lacertilia	55	13	0	30	19	11	20	9	0	3
Rhiptoglossa . . .	1	0	0	1	1	0	0	0	0	0
Ophidia	72	5	0	49	17	32	50	18	0	0
	145	18	0	93	38	55	84	30	1	3

Batrachia.

Ecaudata	22	0	1	14	7	7	14	7	0	0
Caudata	1	0	0	0	0	0	1	1	0	0
Apoda	3	0	0	3	2	1	1	0	0	0
	26	0	1	17	9	8	16	8	0	0

Pisces.

	1.	2.	3.	4.		5.	6.		7.	8.
Symbranchidæ . . .	3	0	0	2	0	2	3	1	0	0
Murænidæ	1	0	0	1	0	1	1	0	0	0
Siluridæ	27	1	0	20	2	18	24	6	0	0
Cyprinidæ	36	0	3	23	4	19	29	10	0	0
Notopteridæ . . .	1	0	0	1	0	1	1	0	0	0
Percidæ	1	0	0	1	0	1	1	0	0	0
Gobiidæ	2	0	0	2	0	2	2	0	0	0
Rhynchobdellidæ . .	2	0	0	2	0	2	2	0	0	0
Ophiocephalidæ . .	2	0	0	2	1	1	1	0	0	0
Labyrinthici . . .	4	0	0	3	1	2	3	1	0	0
Chromididæ . . .	1	0	0	1	1	0	0	0	0	0
	80	1	3	58	9	49	67	18	0	0

The relationship of the Cisgangetic and the Himalo-Burmese Transgangetic fauna so far as this can be expressed numerically, is the following :—

I.

Of 62 genera of	Cisgangetic	mammals . . .	14, or 22·5 per cent.,	are not	Transgangetic.
„ 347 „	„	birds . . .	43, or 12·5	„	„
„ 93 „	„	reptiles . . .	38, or 41	„	„
„ 17 „	„	batrachians . .	9, or 53	„	„
„ 58 „	„	freshwater fishes	9, or 15·5	„	„
		Mean . . .	29	„	„

II.

Of 74	genera of	Transgangetic	mammals . . .	26, or 35	per cent.,	are not Cisgangetic.
„ 478	„	„	birds	174, or 36·5	„	„
„ 84	„	„	reptiles. . . .	30, or 35·5	„	„
„ 16	„	„	batrachians . .	8, or 50	„	„
„ 67	„	„	freshwater fishes	18, or 27	„	„
			Mean . . .	36·8	„	„

Owing to the power of flight and consequently much greater facilities for wandering possessed by birds, to the circumstance that many genera are annually migratory, and consequently their distribution depends upon different factors from those that influence the range of sedentary animals, the class Aves must be regarded as less adapted for inquiries into regional classification than mammals, reptiles, and batrachians, and if it be included it must be treated separately. For one of the reasons given above, their powers of migration, which enable them to traverse obstacles such as seas, deserts, and even mountains, impassable barriers to vertebrata in general, the Chiroptera must be omitted from the Mammalia. The distribution of freshwater fishes depends so largely on the presence or absence of large navigable rivers and extensive marshes, that it is best to leave them out of consideration also. Perhaps the Crocodilians and Chelonians should also be left out, and, as will be seen presently, their omission is in some cases imperative; but they are more generally distributed than freshwater fishes, and several tortoises live partly or wholly on land. Omitting bats, the number of Cisgangetic Mammal genera is 46, of which 14, or 30 per cent., are not Transgangetic, whilst the Transgangetic genera become 54 in number, of which 22, or 40 per cent., are not known from the Cisgangetic area.

The mean percentage of the three classes of Cisgangetic vertebrata, mammals (bats not included), reptiles, and batrachians, wanting in the Transgangetic area is 41·6 per cent., and that of the Transgangetic genera of the same classes wanting in the Cisgangetic sub-region is 41·8, almost exactly the same.

The relation between the Himalayan vertebrate (forest) fauna and that of Burma with Assam is shown in the following table, only the total number of genera in each class being inserted :—

	Total number of genera.	Himalayas.		Common to both.	Burma.	
		Total.	Not found in Burma.		Total.	Not in Himalayas.
Mammals	74	55	5	50	69	19
Birds	475	357	50	307	425	118
Reptiles	84	35	2	33	82	49
Batrachians	16	7	1	6	15	9

Fishes are omitted because the Himalayas are poor in fish life, and it is impossible to compare the genera found in mountain torrents with those inhabiting a navigable river like the Irawady with extensive marshes in the neighbourhood of its banks.

The above numbers give the following percentage of Himalayan genera wanting in Burma and *vice versâ* :—

	Himalayan not Burmese.	Burmese-Assamese not Himalayan.
Mammals	9 per cent.	27·5 per cent.
Birds	14 ,,	28 ,,
Reptiles	5·5 ,,	60 ,,
Batrachians . . .	14 ,,	60 ,,

If the Chiroptera are omitted from the calculation (14 Himalayan genera, of which 2 are not Burmese, and 18 Burmese genera, of which 6 are not Himalayan), the percentage of Himalayan mammals wanting in Burma becomes 7, and that of Burmese genera not found in the Himalayas 25·5. Another part of the comparison in which alteration is necessary is due to the fact that whilst 2 Crocodilians and 12 tortoises are included in the Burmese list, none are Himalayan, there being no suitable habitat for these reptiles in the mountains. The removal of these would reduce the number of Burmese Reptilian genera to 68, of which 35, or 51·5 per cent., are not Himalayan. The comparison of the residual faunas, omitting birds, would then take this form :—

	Himalayan not Burmese.	Burmese (and Assamese) not Himalayan.
Mammals	7 per cent.	25·5 per cent.
Reptiles	5·5 ,,	57·5 ,,
Batrachians . . .	14 ,,	60 ,,
Mean . .	8·8 ,,	45·6 ,,

At first sight these proportions do not appear quite to bear out the view already expressed that the two areas are part of the same subregion, since the mean percentage, 45·6, of Assamese-Burmese types wanting in the Himalayas is greater than the mean percentage of Transgangetic types wanting in the Peninsula of India, 41·8 per cent. The small percentage of Himalayan forms not found in Burma is entirely composed of the Holarctic element in the Himalayan fauna, whilst the large percentage of Burmese genera absent in the Himalayas is partly explained by the existence in the plains of Burma of animals unfitted for a life on mountain slopes, but mainly by the richness of the Burmese area and the poverty of the Himalayas, especially in reptiles and batrachians. As already pointed out, the Himalayan fauna is an impoverished Assamese fauna, but with an admixture of Holarctic genera, mainly mammals and birds.

The following affords a numerical comparison of the genera of vertebrata inhabiting

the Himalaya (Nos. 12, 13), with those found in the Peninsula of India and Ceylon, Nos. 4–10.

	Total No. of genera.	Himalayas.		Common to both.	Cisgangetic.	
		Total.	Peculiar.		Total.	Peculiar.
Mammals	79	55	17	38	62	24
Birds	482	357	135	222	347	125
Reptiles	103	35	10	25	93	68
Batrachians	19	7	2	5	17	12

Fishes are again omitted. The following are the proportions :—

	Himalayan not Cisgangetic.	Cisgangetic not Himalayan.
Mammals	31 per cent.	38·5 per cent.
Birds	38 ,,	36 ,,
Reptiles	28·5 ,,	73 ,,
Batrachians . . .	28·5 ,,	70 ,,
Mean . .	31·5 ,,	54·3 ,,

If bats, birds, crocodiles, and tortoises be omitted, the two means will be 30·3 and 60 per cent.

It will be observed that the differences in every class is greater than between the Himalayas and Burma.

The comparison of the mammals (omitting bats), reptiles (omitting tortoises and crocodiles) and batrachians in the Punjab tract and Cisgangetic subregion gives the following result :—

	Total in Punjab area.	Wanting in Cisgangetic subregion.
Mammals	30	8, or 26·5 per cent.
Reptiles	46	20, ,, 43·5 ,,
Batrachians . . .	2	0, ,, 0 ,,
	Mean . . .	23·5 ,,

	Total in Cisgangetic.	Wanted in Punjab area.
Mammals	46	24, or 52 per cent.
Reptiles	80	57, ,, 64 ,,
Batrachians . . .	17	15, ,, 88 ,,
	Mean . . .	68 ,,

Owing to the want of batrachia in the dry Punjab area, this is misleading. If they are omitted, the mean percentage of Punjab mammals and reptiles wanting in the Indian Peninsula becomes 35, and the mean percentage of the same classes in the Cisgangetic subregion wanting in the Punjab area is 58.

The mammalian genera of the Tibetan area within Indian limits are 25 in number, bats excluded; of these, 11 or 44 per cent. are not found in the Indo-Malay region Reptiles and batrachians are too few in Tibet to be of any importance.

In this summary merely numerical results are given. It is not suggested that genera, even in the same class, are of equivalent value; for instance, the fact that Eurylæmi are found in the Transgangetic area and not in the Cisgangetic area, and that bustards and sand grouse inhabit the latter subregion and not the former, although only a few genera are affected, is much more important than the presence or absence of a far larger number of genera amongst ordinary passerine birds. But the generic relationships of different areas, at all events amongst mammals, reptiles, and batrachians, provided all are fairly represented, do afford a good idea of the affinity existing between the faunas, although, like all other statistics, such numerical results are likely to mislead at times.

12. Conclusions.

I. *The Subregional Divisions.*—The Empire of British India, consisting of India, Ceylon, and Burma, may be classed in the following zoological subdivisions:—

1. The Punjab and Sind, with Western Rajputana and Baluchistan, must be removed from the Oriental (or as it might more appropriately be called the Indo-Malay) region, and regarded as the south-eastern extremity of the Eremian, or Tyrrhenian, or Mediterranean subregion of the Holarctic region.
2. The Himalayas above forest range, together with such portions of Tibet as come within Indian political limits, belong to the Tibetan subregion of the Holarctic region.
3. India proper, from the base of the Himalayas to Cape Comorin, and from the Arabian Sea and the eastern boundary of the Punjab area to the Bay of Bengal and the hills forming the eastern limit of the Gangetic alluvium should, with the addition of the Island of Ceylon, be regarded as a single subregion, and may be conveniently entitled the Cisgangetic subregion. The forests of the Sahyádri Range and of the western or Concan and Malabar coasts and the hill area of Southern Ceylon, are far richer in vertebrate genera than the remaining area, but are not sufficiently distinct to require subregional separation.
4. The forest area of the Himalayas belongs to the same subregion as Assam, Burma (except South Tenasserim), Southern China, Tonquin, Siam, and Cambodia, and to this subregion the name Transgangetic may be applied.

5. Southern Tenasserim agrees best in its vertebrata with the Malay Peninsula, and should be included in the Malayan subregion of the Oriental region. The continental area of the Oriental or Indo-Malay region is divided into three subregions—Cisgangetic, Transgangetic, and Malayan.

II. *The Cisgangetic Fauna.*—The Cisgangetic fauna is very different from the Transgangetic, the difference being greatest in batrachians, of which half the genera are distinct in each case, whilst in mammals and reptiles from 22·5 to 42 per cent. of the genera inhabiting each area are wanting in the other. In the most important orders of mammals, reptiles and batrachians—omitting bats, tortoises, and crocodiles —an average of only about three-fifths or 60 per cent. of the genera in each case is common to the two subregions. The difference in reptiles and batrachians by itself would justify the classification of the two areas as distinct regions. The difference between the Cisgangetic vertebrate fauna and that inhabiting the rest of the Oriental or Indo-Malay region is partly due to the absence in the former of numerous Eastern types, and partly to the presence of two constituents besides the Indo-Malay genera which, especially in forest, form a majority of the animals present. One of these two constituents consists of mammals, birds, and reptiles having a distinct relationship with Ethiopian and Holarctic genera, and with the Pliocene Siwalik fauna. This constituent of the Cisgangetic fauna it is proposed to distinguish by the term Aryan. The other constituent is composed of reptiles and batrachians, and may be termed the Dravidian element. The latter is well developed in the south of the peninsula, and especially along the south-west or Malabar coast and in Ceylon, and it gradually disappears to the northward, its northern limit, so far as is known at present, not extending to the 20th parallel of north latitude. It is probable that this is the oldest part of the Cisgangetic fauna, and it may have inhabited the country since India was connected by land with Madagascar and South Africa, across what is now the Indian Ocean, in mesozoic and early cenozoic times. The other two elements, the Indo-Malay and the Aryan, are probably later immigrants, and its wider diffusion may indicate that the Indo-Malay element has inhabited the Indian Peninsula longer than the Aryan has. There appears some reason for regarding the Indo-Malay portion of the fauna as dating in India from Miocene times and the Aryan from Pliocene, whilst in the Pleistocene epoch the proportion of Aryan to Indo-Malay types of mammals in India was much larger than at the present day.

III. *The Himalayan Fauna.*—The fauna of the Himalayan forest area is partly Holarctic, partly Indo-Malay. It is remarkably poor, when compared with the Cisgangetic and Burmese faunas, in reptiles and batrachians. It also contains but few peculiar genera of mammals and birds, and almost all the peculiar types that do occur have Holarctic affinities. The Indo-Malay element in the fauna is very richly represented in the Eastern Himalayas, and gradually diminishes to the westward, until in Kashmir and further west it ceases to be the principal constituent. Almost all the Indo-Malay genera, and a very large proportion of the species, are identical with

Assamese or Burmese forms. These facts are consistent with the theory that the Indo-Malay part of the Himalayan fauna, or the greater portion of it, has migrated into the mountains from the eastward at a comparatively recent period. It is an important fact that this migration appears to have been from Assam and not from the Peninsula of India.*

Thus there are several points left which require explanation. There is the much greater richness of the Oriental constituent in the Cisgangetic fauna to the southward in Malabar and Ceylon, although this is far away from the main Oriental area, and the occurrence also in the southern part of the peninsula of various mammalian, reptilian, and batrachian genera, such as *Loris*, *Tragulus*, *Draco*, *Liolepis*, and

* There is no result of the present enquiry into the distribution of Indian vertebrates which is so surprising as the close connection shown between the Himalayas and Burma, and the evidence in favour of the principal elements in the Himalayan fauna having been derived, probably at no distant period geologically, from the Assam range. As this view of the relations exhibited by the Himalayan fauna is opposed to the opinions of some authorities, and in order further to test the zoological affinities of the area, I have made a list of the species of mammals belonging to the orders Primates, Carnivora, Insectivora, Rodentia, and Ungulata which inhabit the Himalayan forest tract in order to see how far their evidence agrees with that afforded by the genera. The result is interesting.

Excluding Indian forms, like *Lepus ruficaudatus*, which are not adapted for forest life, and have invaded the open parts of Kashmir, and also animals such as *Cervus axis* and *Melursus ursinus*, Cisgangetic species which have established themselves in the western Himalayan foot-hills, the number of mammalian species is eighty-one. Of these two, *Felis torquata* and *Talpa europæa*, may be omitted as doubtful, leaving seventy-nine. Of these nineteen are not known to occur south of the Himalayan range in India or Burma, twenty-one are species of wide range and are found both in Burma and the Indian Peninsula, one only, *Hystrix leucura*, is common to the Himalayas and the Indian Peninsula but not to Burma, whilst thirty-eight range to the east of the Bay of Bengal but not to Cisgangetic India. Of these thirty-eight, eight are not known to occur south of the Assam ranges, nineteen are met with in Burma proper, and eleven range to the Malayan Peninsula or Archipelago. In other words, fifty-nine Himalayan species, or 74·7 per cent., are common to other parts of the Transgangetic subregion, whilst only twenty-two, or 28 per cent., are found also in the Cisgangetic.

Of the nineteen species that do not range to the southward, one, *Vulpes alopex*, is a common Holarctic species, another, *Cervus cashmirianus*, an ally of the red deer, belongs to the Holarctic section of *Cervus*, five are species of the Holarctic genera *Microtus* and *Lagomys*, three belong to *Soriculus* and one to *Ælurus* —peculiar genera, but with Holarctic, not Indo-Malay, affinities,—whilst three, *Sciuropterus fimbriatus*, *Mus niveiventer*, and *Hemitragus jemlaicus* may be regarded as neutral. There remain three forms of *Pteromys*, which are scarcely more than races of species found in Southern China and Burma, and, lastly, one really important form, *Semnopithecus schistaceus*. This, which lives in forest above 7,000 feet and ranges to Kashmir, is probably a comparatively ancient inhabitant of the mountains; its nearest ally is *S. entellus*, the common langur of Northern India.

[This paragraph has been slightly altered in the press. The discovery of three Himalayan species, *Prionodon pardicolor*, *Putorius strigidorsus*, and *Putorius subhemachalanus*, by Fea in Burma (Thomas, 'Ann. Mus. Civ. Genov.' (2), x., pp. 917, 918, 919) was overlooked when the paragraph was first written, and the three species were regarded as Himalayan only. Hence the numbers quoted above differ from those in the abstract of this paper, 'Proc. Roy. Soc.,' vol. 67, p. 489.]

The relations exhibited by the genera of the Himalayan mammalian fauna are thus confirmed by the species. I ought to add that the results of the analysis of the Himalayan species were quite unexpected.

Ixulus, which are represented in Burma and the Malay countries, but not in the Himalayas or Northern India. In connection with this the limitation of the Dravidian element to the south of India should also be remembered. Then there is the occurrence of certain Himalayan species on the mountains of Southern India and Burma, and even further south, but not in the intervening area. There is also the predominance of the western or what I have proposed to call the Aryan element in the Pleistocene fauna of the Nerbudda Valley and of Karnul in the north of the Carnatic tract. Lastly, we have to account for the apparently recent immigration of Indo-Malay types into the Himalayas.

Whilst it is quite possible that other explanations may be found, it is evident that all these peculiarities of the Indian fauna may have been due to the Glacial epoch. The great terminal moraines occurring at about 7,000 feet in Sikhim, first discovered by Sir J. HOOKER,* whose observations have been confirmed by myself† and others, and the occurrence of similar moraines and other indications of ice action at even lower levels in the Western Himalayas,‡ clearly show that the temperature of the mountain range must have been much lower than at the present day, when no glacier in Sikhim is known to descend much below 14,000 feet, and some of the principal glaciers end at 17,000 to 18,000 feet above the sea.

During the coldest portion of the Glacial epoch, a large part of the higher mountains must have been covered by snow and ice, and the tropical Indo-Malay fauna, which had occupied the range and which may have resembled that of the Indian Peninsula more than is the case at present, must have been driven to the base of the mountains or exterminated. The Holarctic forms apparently survived in larger numbers. The Assam Valley and the hill ranges to the southward would afford in damp, sheltered, forest-clad valleys and hill-slopes a warmer refuge for the Indo-Malay fauna than the open plains of Northern India and the much drier hills of the country south of the Gangetic plain. The Indo-Malay types of the Peninsula generally must have been driven southwards, and some of them, such as *Loris* and *Tragulus*, which must originally have been in touch with their Burmese representatives, have never returned. It was probably during this cold period that the ossiferous Nerbudda beds and the deposits in the Karnul caves were accumulated. The tropical, damp-loving Dravidian fauna, if it inhabited Northern India, must have been driven out of the country. Unless the temperature of India and Burma generally underwent a considerable diminution, it is not easy to understand how plants and animals of temperate Himalayan types succeeded in reaching the hills of Southern India and Ceylon, as well as those of Burma and the Malay Peninsula.

When the whole country became warmer again after the cold epoch had passed away, the Oriental fauna appears to have poured into the Himalayas from the east-

* 'Himalayan Journals,' vol. 2, pp. 7, &c.

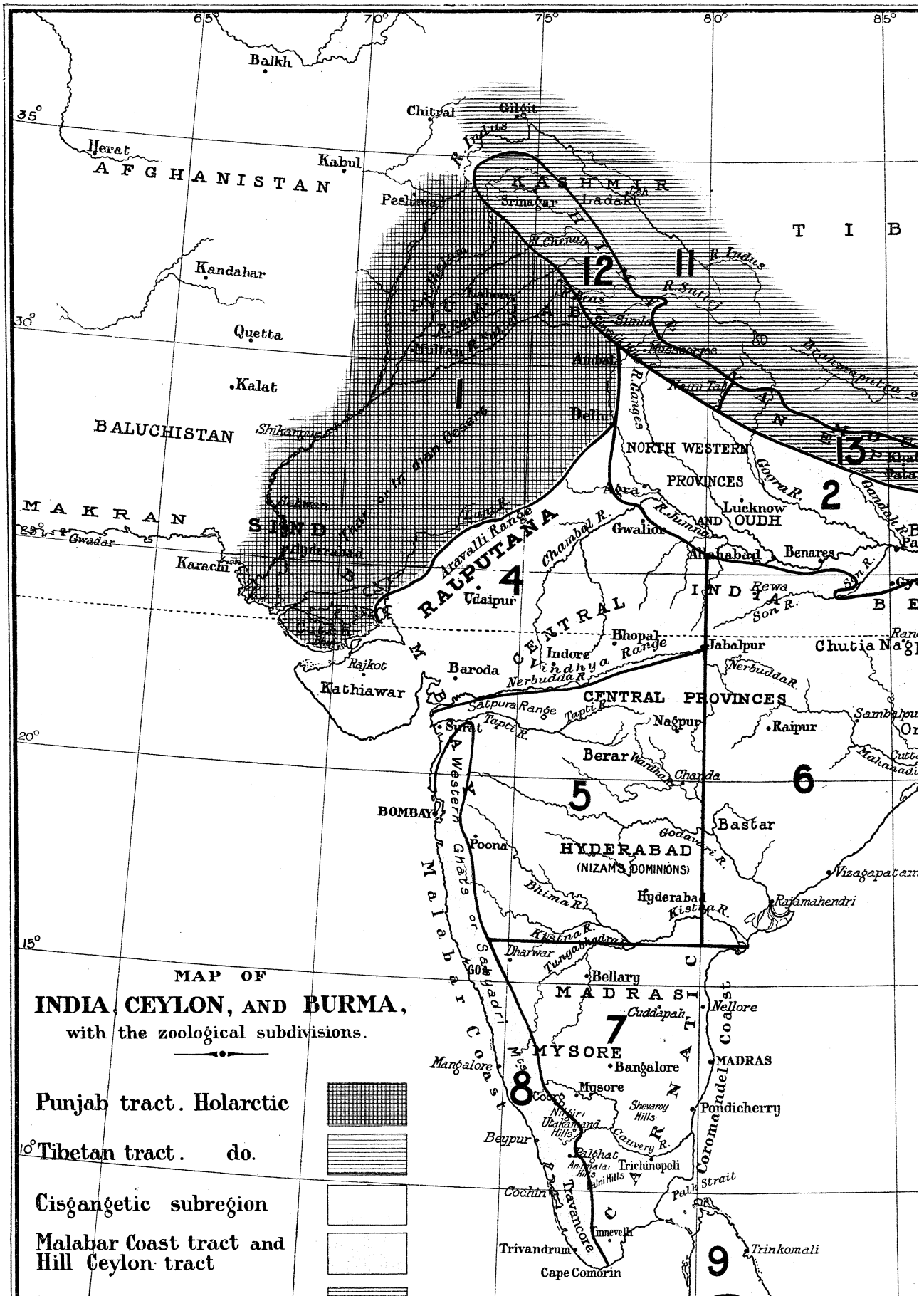
† 'Journ. As. Soc. Beng.,' vol. 40, 1871, Part II., pp. 395, 411.

‡ 'Manual of the Geology of India,' ed. 1, p. 373; ed. 2, p. 14 and references there quoted.

ward. At the present day, the comparatively narrow Brahmaputra plain in Assam is far more extensively forest clad, especially to the eastward, than is the much broader Gangetic plain of Northern India, and if, as is probable, the same difference between the two areas existed at the close of the Glacial epoch, it is easy to see how much greater the facilities for the migration of a forest-haunting fauna must have been across the Brahmaputra Valley than over the great plain of the Ganges. This difference alone would give the Transgangetic fauna of Burma an advantage over the Cisgangetic fauna in a race for the vacant Himalayas, even if the latter had not been driven farther to the southward than the former, as it probably was during the Glacial epoch.

This theory is only put forward as a possible explanation of some remarkable features in the distribution of Indian vertebrates. At the same time it does serve to account for several anomalies of which some solution is necessary. If thus accepted, it will add to the evidence, now considerable, in favour of the Glacial epoch having affected the whole world, and not having been a partial phenomenon induced by special conditions, such as local elevation.

Blanford.



MAP OF

INDIA, CEYLON, AND BURMA,

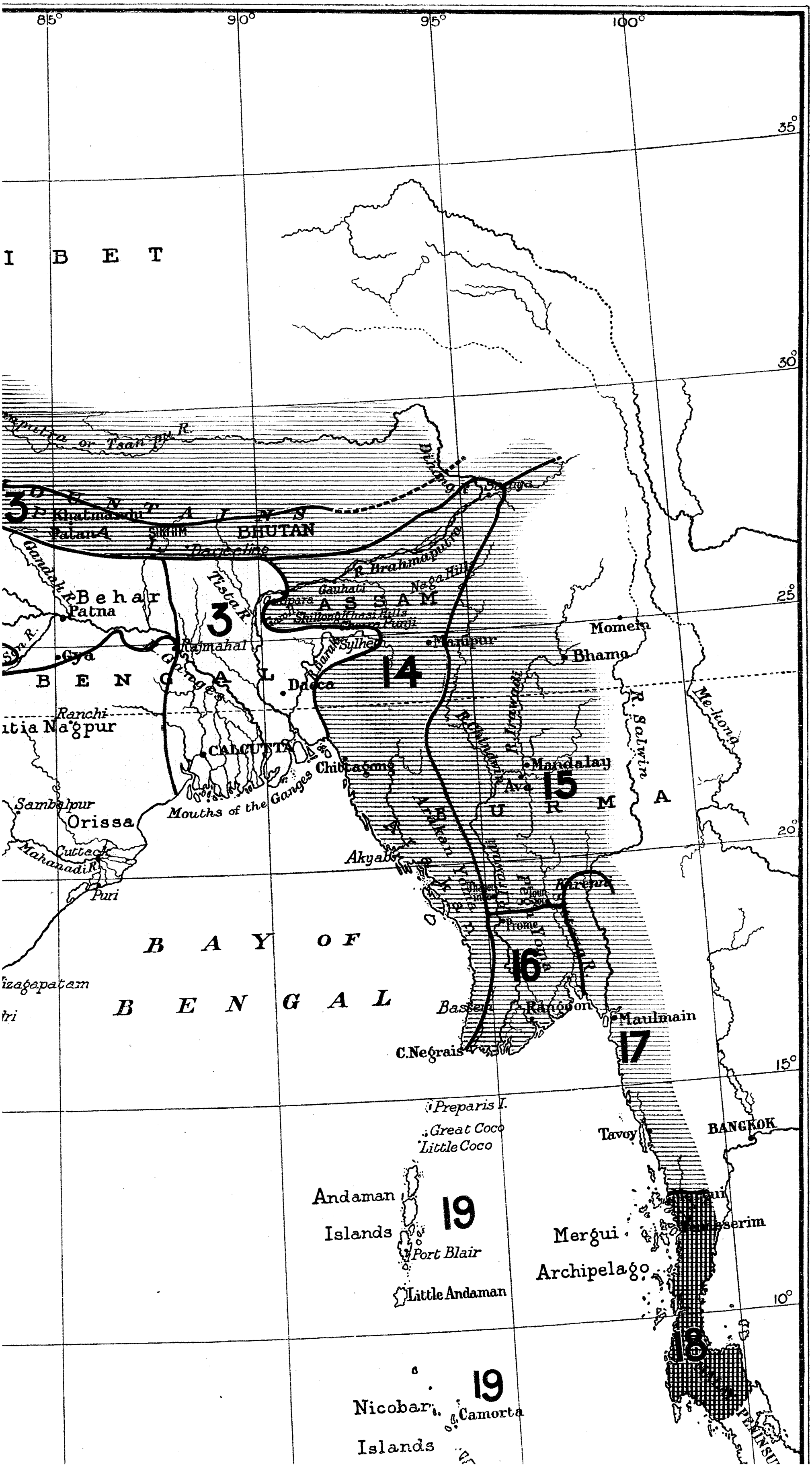
with the zoological subdivisions.

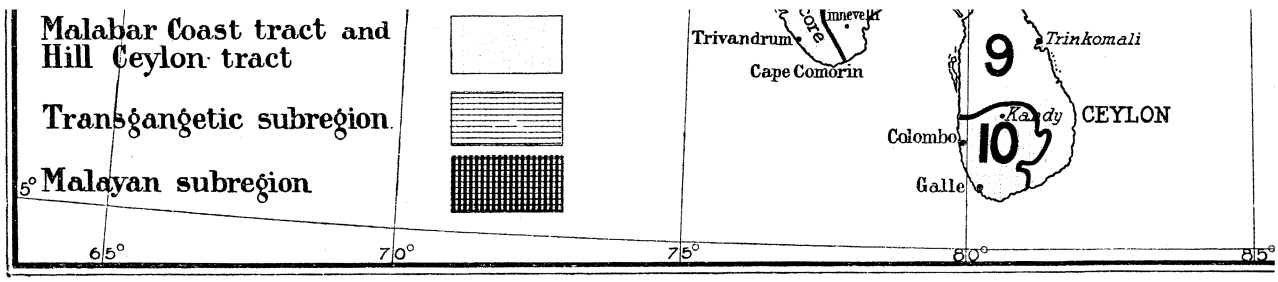
Punjab tract. Holarctic

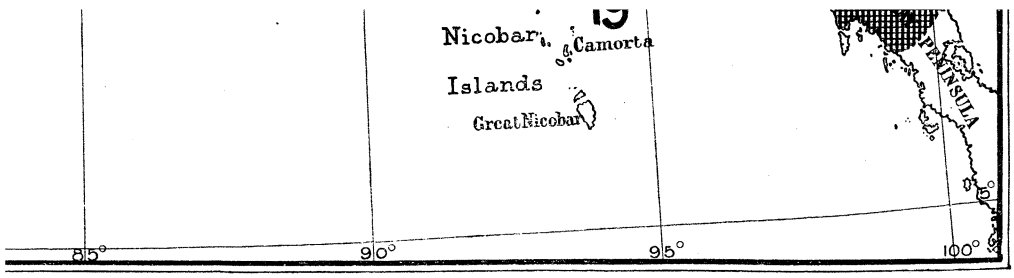
Tibetan tract. do.

Cisgangetic subregion

Malabar Coast tract and Hill Ceylon tract


85°
90°
95°
100°
35°
30°
25°
20°
15°
10°
TIBET
BHUTAN
SIKKIM
Khatmandu
Patan
Darjeeling
Gandak R.
Behar
Patna
Gya
BENGAL
Ganges
Rajmahal
Tista R.
ASSAM
R. Brahmaputra
Gauhati
Goalpara
Naga Hills
Khasi Hills
Shillong
Cherra Punji
Sylhet
Manipur
Dacca
Ranchi
Chota Nagpur
CALCUTTA
Chittagong
Sambalpur
Orissa
Mouths of the Ganges
Cuttack
Mahanadi R.
Puri
Akyab
Arakan Yoma
R. Chindwin
R. Irawadi
Mandalay
Ava
BURMA
Momein
Bhamo
R. Salwin
Me-kong
Prome
Karenni
Rangoon
Bassein
C. Negrais
Maulmain
Tavoy
BANGKOK
Mergui
Tenasserim
BAY OF BENGAL
Vizagapatam
Preparis I.
Great Coco
Little Coco
Andaman Islands
Port Blair
Little Andaman
Mergui Archipelago
Nicobar Islands
Camorta
3
14
15
16
17
18
19


Malabar Coast tract and Hill Ceylon tract
Transgangetic subregion
Malayan subregion
5°
65°
70°
75°
80°
85°
Trivandrum
Cape Comorin
9
Trinkomali
Kandy
CEYLON
Colombo
10
Galle


Nicobar
Camorta
Islands
Great Nicobar
PENINSULA
85°
90°
95°
100°

MAP OF
INDIA, CEYLON, AND BURMA,
with the zoological subdivisions.

- Punjab tract. Holarctic
- Tibetan tract. do.
- Cisgangetic subregion
- Malabar Coast tract and Hill Ceylon tract
- Transgangetic subregion
- Malayan subregion

Blanford.

MAP OF INDIA, CEYLON, AND BURMA,

with the zoological subdivisions.

Punjab tract. Holarctic

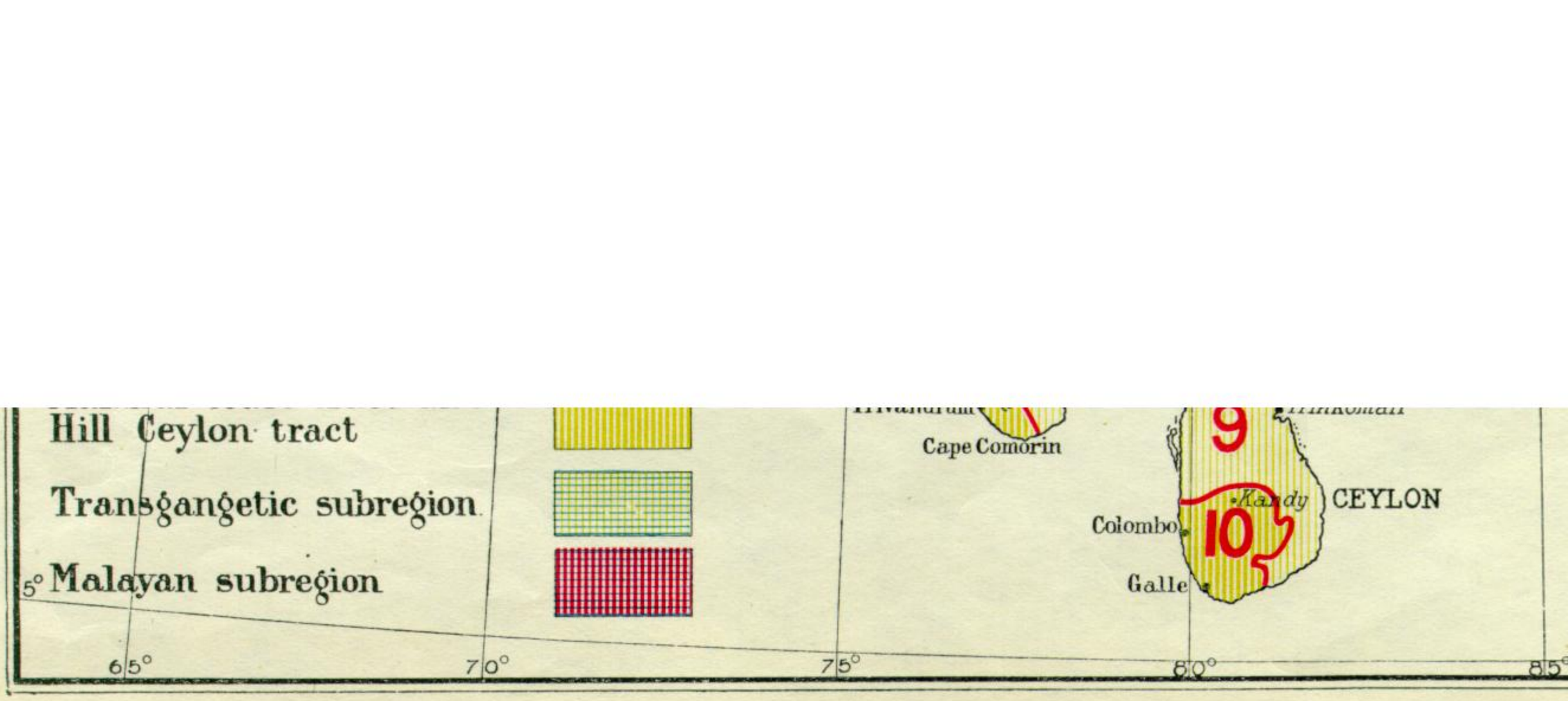
Tibetan tract. do.

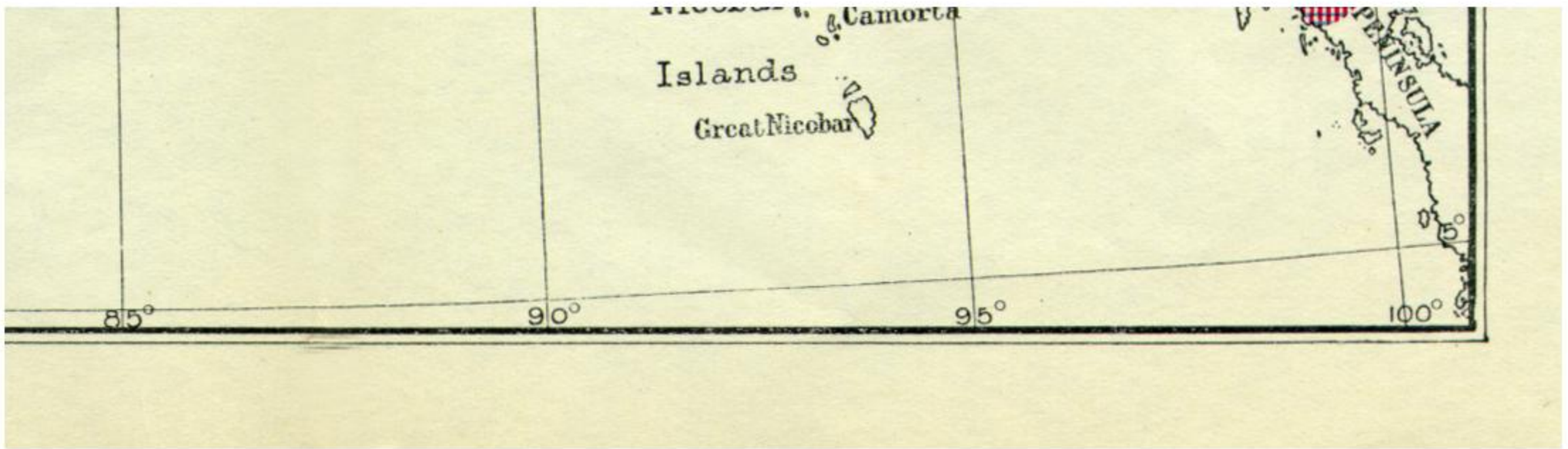
Cisgangetic subregion

Malabar Coast tract and Hill Ceylon tract

Transgangetic subregion


85°
90°
95°
100°
35°
30°
25°
20°
15°
10°
TIBET
Brahmaputra or Tsan pu R.
MOUNTAINS
3
Khatmandu
Patan
SIKKIM
BHUTAN
Darjeeling
Gandak R.
Behar
Patna
3
Tista R.
Goalpara
Gauhati
ASSAM
Shillong
Khasi Hills
Cherra Punji
Naga Hills
R. Brahmaputra
Dihang R.
Sadiya
Son R.
Gya
Rajmahal
R. Ganges
Sylhet
R. Barak
BENGAL
Dacca
14
Manipur
Ranchi
Chutia Nagpur
CALCUTTA
Chittagong
Mouths of the Ganges
Sambalpur
Orissa
Cuttack
Mahanadi R.
Puri
Akyab
Arakan
Arakan Yoma
BAY OF BENGAL
Vizagapatam
Momein
Bhamo
R. Chindwin
R. Irawadi
Mandalay
Ava
15
BURMA
R. Salwin
Me-kong
Karenni
Prome
Pegu Yoma
Sittang R.
16
Bassein
Rangoon
Maulmain
17
C.Negrais
Preparis I.
Great Coco
Little Coco
Tavoy
BANGKOK
Andaman Islands
19
Port Blair
Little Andaman
Mergui Archipelago
Mergui
Tenasserim
18
MALAY PENINSULA
19
Nicobar Islands
Camorta
Great Nicobar


Hill Ceylon tract
Transgangetic subregion
Malayan subregion
Cape Comorin
9
Kandy
CEYLON
Colombo
10
Galle
5°
65°
70°
75°
80°
85°


Camorta
Islands
Great Nicobar
PENINSULA
85°
90°
95°
100°