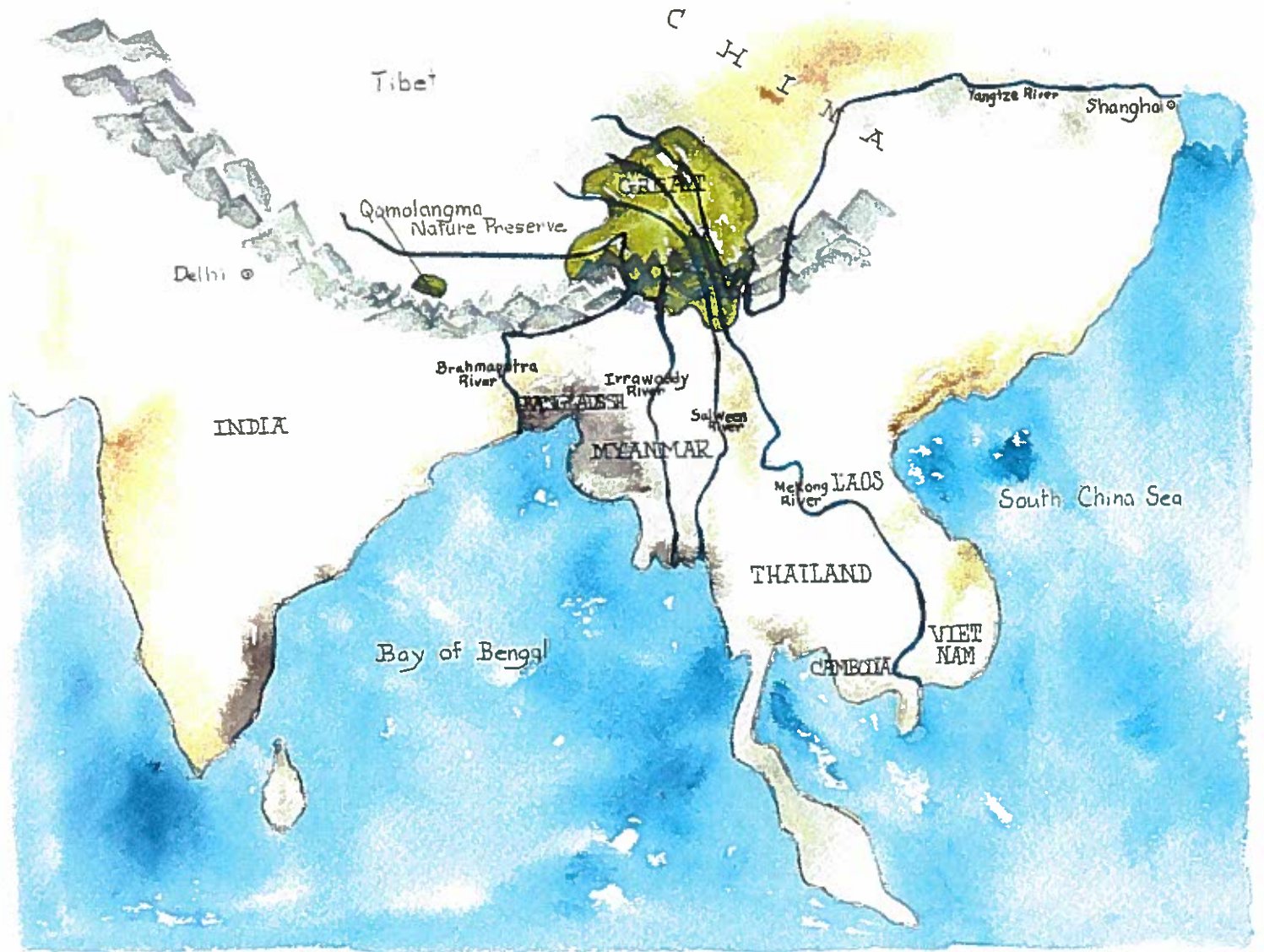


A SUMMARY OF BIODIVERSITY: THE GREAT RIVER ECOSYSTEMS OF ASIA TRUST REGION



Nature Himalayas and Future Generations

Robert L. Fleming, Jr., Ph.D.

A SUMMARY OF BIODIVERSITY: THE GREAT RIVER ECOSYSTEMS OF ASIA TRUST REGION

Robert L. Fleming, Jr., Ph.D.

Nature Himalayas and Future Generations

INTRODUCTION

The mountainous region encompassing parts of SE Tibet, WSW Sichuan, NW Yunnan, E Arunachal Pradesh, and the tip of N Burma has a geographical unity which, for sake of ease, may be called the Gorge Area [GA] of the Great River Ecosystems of Asia Trust [or GREAT]. This region covers a total area of about 259, 740 square kilometers [100,000 square miles] and might also be called the "Great Golden Square" for this is the home of the Golden Cat, the Golden-headed Babbler, the Golden Fulvetta, the Golden Birdwing Butterfly and the Golden Nail fern. A map and suggested boundaries are given in Appendix A.

The major geographical unifying feature of the GA is the rivers: the Tsangpo-Bhramaputra, Irrawaddy, Salween, Mekong, and the Yangtse. With the exception of the Irrawaddy, these rivers do not rise in the GA. The GA is neither politically nor biologically uniform as varying administrative divisions within China, India and Myanmar [Burma] control access, economic development, and conservation policies here.

For the field biologist, the entire GA is one of the least traveled tracts on earth. It is a region of incredible contrasts where major rivers churn through narrow chasms that lie deep between ridges rising to over 6100 m [20,000']. It is a region where rain-soaked tropical jungles lie within sight of high, snow-clad peaks. Absolute elevations in the GA range from c. 305 m [1,000'] at the edge of the Assam plains, to the top of Namcha Barwa, 7756 m. [25,446'] in SE Tibet.

BIOGEOGRAPHY

Seven biological zones - reflecting elevation and temperature levels - can be distinguished in the GA: Tropical, Subtropical, Warm Temperate, Cold Temperate, Mountain [Himalayan] Bush, Herbaceous Mountain Tundra, and the Aeolian [wind] Zone. For a more detailed discussion of these seven zones see Appendix B.

Biogeographically, the GA covers parts of two of the world's five biological realms: the Palearctic and the Oriental. Lying within these two realms, and further contributing to the GA's natural history wealth, the following four distinct biological elements can be identified here:

As to the GA *per se*, it was during the first half of this century that explorers and scientists - largely British- obtained permission and funding to lead expeditions into the region. Foremost among the explorer-scientists of SE Tibet was plant collector F. Kingdon-Ward who first visited parts of the GA in 1911 and then led or participated in nineteen expeditions to the GA, terminating in 1956 [see Lyte 1989:207-208]. A prolific writer, Ward produced 25 books covering his exploratory adventures. While F. M. Bailey, was the first to collect birds in SE Tibet, [in 1911 and 1913], detailed collecting of birds was left to Ludlow and Sherriff, who organized various expeditions from 1936 until December 1947 [see Ludlow and Kinnear 1944 and 1951].

In the last half of this century, Chinese scientists associated largely with the Academia Sinica - and various regional offices - have undertaken surveys and collections in Tibet, Sichuan and Yunnan, while Indian scientists of the Zoological Survey of India and the Botanical Survey of India have worked in Arunachal Pradesh.

Biological explorations have been relatively thorough in some areas of the GA. For example, the birds of northeast Myanmar [Burma] were examined in some detail by Stanford who from 1932 to 1936 collected 1,769 specimens of 472 species [Smythies 1953:xvii]. Stanford then returned to northeast Myanmar [Burma] in 1938-1939 with the Vernay-Cutting Burma Expedition, collecting 1,505 specimens of 296 species. On this same expedition, Stanford also collected 1,033 mammal specimens and F. Kingdon-Ward collected approximately 2,500 plant specimens [Cutting 1940:333].

Extreme southern SE Tibet, however - and other regions of the GA - have not had thorough coverage and field work here likely would be quite productive. As an example, a brief morning survey in June 1994 of the birds near Yigong Lake, eastern Linzhi Prefecture, produced five species not listed for Tibet in Cheng's *Birds of Xizang*.

THE EXTRAORDINARY NATURE OF THE GA

While we have little personal first-hand contact with the GA, and while an accurate overall summary of the natural history of the region is somewhat difficult, it is clear that the GA is a remarkable part of Asia's natural history mosaic. F. Kingdon-Ward, speaking of extreme SE Tibet remarked that the flora "taken as a whole is one of the botanical treasure houses of the world." And Vaurie states: "The very rich flora is paralleled by an equally rich avifauna..." [Vaurie:1972:140-141].

To summarize, the GA is outstanding in at least twelve ways as follows:

1] In the GA, biological habitats are very closely squeezed together.

A look at the map shows that nowhere else in Asia [and perhaps on earth] is the land surface more rumpled and dissected than in the GA. This physical feature allows a remarkable variety of habitats - ranging from the tropics to mountain herbaceous tundra and the aeolian - to be closely juxtaposed.

2] The climatic regime of the GA is diverse and severe.

In the lowlands, some south-facing slopes may experience a rain-fall of over 200 inches a year. And even when the yearly total rainfall is not substantial, much of the southern lowlands and middle

elevations, are covered with an almost constant cloud cover accompanied by frequent drizzle. Thus Ward found that at 3660 m. [12,000 '] - around the Doshung La area of Namcha Barwa - the year's weather pattern was basically seven months of snow cover and five months of constant drizzling rain.

Also, within the GA, there is a very distinct south to north moisture gradient ranging from exceedingly wet to true desert conditions. Desert terrain, with less than 25 cms (10 inches) of precipitation a year, occurs along the floors of desiccated valleys that lie in the rain-shadow zone immediately north of high ranges or ridges.

3] The region is ecologically fragile.

The recent uplifting of these mountains has resulted both loose underlying strata and impressively steep slopes. These combined with a high precipitation level creates a distinct natural erosion potential. Should humans use poorly balanced forest management practices - leading to extensive loss of plant cover in the GA - one can guarantee increased flooding and siltation in the downstream flood plains of the five rivers under consideration. Indeed, the recently increased Tsangpo-Bhramaputra flooding may be due - in part - to deforestation in the eastern Himalayas.

4] Much of the GA has a remarkably sparse human population.

For example, the entire Linzhi Prefecture of SE Tibet [76,000 sq. km under Chinese control] has current [1993] population figure of only about 130,000 people [Jang, pers com].

5] There is a remarkable amount of mountain forest still standing in the GA.

Again referring to Linzhi in SE Tibet, it is calculated that 8.4 billion cubic meters of the forest still exists. This would amount to more than 80% of original forest cover standing today.

6] For some classes of plants and animals, the GA has one of the highest counts for any similar size area in Asia.

The Class Aves, for example, is well represented and the birds known or thought possible in the GA numbers 808 species [see Appendix C for total list].

Of these 808 species, some 170 are of "marginal" interest relative to the GA. Marginal interest species fall into the following categories: 1] widespread birds rare in the GA but very common in some other areas, 2] visitors wintering here in very limited numbers, 3] migrants passing over the GA, 4] accidentals or strays, and 5] common tropical Asian species found here in limited habitats along the southern margins of the GA [egrets for example, in wet, lowland areas of the Putao valley]. This leaves 638 birds of special interest.

Of these 638 species, 606 likely breed in the area and the majority also winter here. The other 32 breed to the north and winter in the GA. Major emphasis is correctly given to the breeding birds of a region, but considerable weight should also be given to the wintering element for the preservation of wintering grounds may be essential in the survival of some species,

The number of endemic species [those found virtually only in the GA] number nine while another seven are "near-endemics". This rather small number reflects the fact that the GA is not a discrete or isolated biological "island".

If, however, one expands the size of "endemic area" to include neighboring regions, the number of endemics greatly increases. For example, Ripley lists 121 species as endemic to Southeast Tibet alone [Ripley 1981:993-996]. And this number rises dramatically if one includes the forests of Arunachal Pradesh and North Burma and extending west to Nepal and east into the hills of Yunnan and northern Indochina.

Thus the GA compares well with other areas of Asia as the following chart shows:

REGION	NUMBER OF BIRD SPECIES	APPROXIMATE TOTAL AREA	
India as a whole.....	1230±	7 030 805 km ²	[2,706,860 mi ²]
China as a whole.....	1195±	11 623 376 km ²	[4,475,000 mi ²]
Burma as a whole.....	953±	679 971 km ²	[261,789 mi ²]
GA.....	808±	259 740 km²	100 000 mi²
Xizang [Tibet] as a whole.....	473±	c.779 220 km ²	[c.300,000 mi ²]
Sumatra.....	397±	426 355 km ²	[164,147 mi ²]
Borneo.....	358±	757 050 km ²	[292,220 mi ²]
Sulawesi.....	242±	189 040 km ²	[72,970 mi ²]

The data listed above from various sources including Meyer de Schauensee [1984:15]; Smythies [1953:xxiii], Zheng, et al [1983:4-37], MacKinnon and Phillipps [1993:18].

7) Some families of plants and animals are more thoroughly represented in the GA than in any other place of similar size in the world.

For example, the African-Asian avian family of Babblers, Laughing-Thrushes and Allies includes some 290 species of which 117 species - or 40% - occur within the GA.

8) For some genera the GA is outstanding, and the proliferation here often unequaled in any other part of the world

F. Kingdon-Ward, speaking of the botany of the higher elevations of the GA says:

"Characteristic orders [sic] which are well represented are Ranunculaceae, Papveraceae, Rosaceae, Saxifragaceae, Umbelliferae, Compositae, Primulaceae, Gentianaceae, Scrophulariaceae, and Liliaceae, while the following genera present a richness of species I have never seen equaled elsewhere: Rhododendron, Gentiana, Saxifraga, Meconopsis, Primula, Pedicularis, and Corydalis". [bold face added here] [see Ward 1913:270].

Rhododendrons are particularly outstanding and Ward mentions that in just a very small area near Namcha Barwa: "If we include the gorge of the Tsangpo in Pemakö, the number of Rhododendrons alone amounts to some sixty species." [Ward 1926:116]. This compares with thirty-two species of Rhododendrons for all Nepal.

Similarly the Laughing-Thrush [*Garrulax*] genus, a visually secretive but audibly conspicuous component of Asian forests, numbers 51 species Asia-wide, of which nearly 50% [25 species] live in the GA.

9) The GA harbors a number of endemic or extraordinary species.

A sampling of these are:

The Giant Cypress, *Cupressus gigantea*, often grows to an exceptional diameter [at the height of a human chest]; found only in a very limited range in SE Tibet.

Taiwania flousiana, a magnificent tree grows to 75 m in height to make it, possibly, the tallest tree in China. While much cut for its special timber, this tree still grows in northeast Burma and north Yunnan. Specimens also known from Hubei and Guizhou [see Rushforth 1987:202]. A related species survives in Taiwan.

The Golden Monkey of Yunnan, *Pygathrix [Rhinopithecus] bieti*, is a primate of very restricted range, found only in the mountains on the left bank of the Upper Mekong [towards the eastern edge of the GA]. [Wilson 1993:272]

The "Black" Barking deer *Muntiacus gongshanensis*, lives only in N Burma, SE Tibet and W Yunnan [Wilson 1990:389]. Little is known about this secretive deer.

The Red Ghoral, *Naemorhadus baileyi*, occurs primarily in SE Tibet where authorities have established a reserve specifically for this species. This goat-antelope is also found in Assam, Yunnan, and N Burma [Wilson 1993:407].

The splendid Harman's [Elwe's] Eared Pheasant, *Crossoptilon harmani*, is found only in SE Tibet, restricted almost entirely to Linzhi Prefecture.

The rare Austin's Babbler, *Stachyris oglei*, is found only from 850 to 1800 m in the Lohit and Tirap hills north of Sadiya [Ripley 1982:335]

10) The GA harbors threatened or endangered species.

While we know that a fine array of plants and animals lives in the GA, we often have little information concerning the most elemental aspects of their natural history. For example, we have limited data on population numbers, behavior patterns and ecological requirements for each species in the GA. Despite our lack of ecological data, it is evident that in some regions of the GA many of the large mammals and the most edible birds, face threats to their populations through hunting or from habitat change due to increasingly unwise agricultural practices.

Threatened species in the GA, besides those mentioned in section seven above, include the remarkable mountain ungulate, the Takin [*Budorcas taxicolor*] which is listed in CITIES Appendix II. Similarly the Red Panda [*Ailurus fulgens*] is listed in CITIES in Appendix II and the Asian Black Bear [*Ursus thibetanus*] in CITIES Appendix I [see Wilson 1993].

11) The GA undoubtedly holds undescribed species.

At the invertebrate level, it would not be surprising to find that more than 50% of the species of some genera are undescribed. At the higher vertebrate levels, there is a slight possibility of undescribed species. Two birds from Arunachal Pradesh, for example, are known only from the type specimens. These, discovered and described by S. Dillon Ripley, are the Mishmi Wren [*Spelaeorinis badeigularis*] which was found in wet subtropical forest on Dreyi a 560 m [5140 ft], and the Enigmatic Shortwing [*Brachypteryx cryptica*] found at 40 mi. camp east of Miao near the Noa Dihing River [see Ripley 1982:331 and 447].

Although field biologists recently discovered three new species of mammals in wet, hilly country in Laos-Vietnam [conditions approximating some of the GA], it is unlikely that large undescribed mammals occur here. Much of North Myanmar [Burma] was rather well surveyed by collectors and scientists in earlier days and unusual large mammals would likely have come to their attention. However, should a species of limited range live only in SE Tibet [and not cross over into Myanmar (Burma) or India], it is within the realm of possibility that it remains undescribed.

12) There is a remarkable chance for conservation in the GA and this will effect the entire GREAT region.

The possibilities of using a balanced approach to the use of natural resources in the GA is excellent. An important factor here is that despite increasing human populations - using improved technology and communications - it is not too late to implement conservation practices in the GA. Much of the original plant cover here still stands and many species still live within these boundaries.

A further important factor is that governing authorities are now aware that preventing environmental degradation is - in the long run - a sound development policy. Following balanced conservation practices here will help preserve splendid parts of the living natural heritage of China, India and Myanmar [Burma] and will also benefit people living in the flood plains far beyond the borders of the GA.

The latter point can hardly be overemphasized. A total of one fifth of the world's human population lives downstream in the drainage basins of these rivers and these one billion people depend, in part, on waters that pass through the GA for irrigation, energy, food, transport, and sanitation systems. Moreover, policies instituted in the GA will affect gigantic downstream development projects such as the Yangtse Three Gorges project and the Mekong Basin Initiative.

Sound implementation of conservation principles in the GA would thus allow the rivers to continue to be a beneficial financial resource. Improper planning and development here, conversely, would quite clearly pose grave dangers to the fast-growing economies of downstream countries.

THE GA COMPARED WITH OTHER REGION OF SPECIAL BIOLOGICAL INTEREST

Considering the remarkable topography and species composition of the GA, and the outstanding opportunities for conservation here, how does the GA compare with other regions of the world?

TROPICAL RAIN FOREST AREAS

While all of the world's regions are of special biological and conservation interest, some regions with high biological activity and severe environmental pressure need critical attention. Of these, the tropical rain forests of the Amazon Basin [with a land area of 7 050 000 km² (2 721 000 mi²)], the Zaire [Congo] basin [with a land area of 3 700 000 km² (1 428 000 mi²)], and the tropical islands of the Indo-Pacific region [Indonesia, alone has some 13,000 islands] come to mind immediately. These areas harbor an untold wealth of species, with many [or even most] of the invertebrates as yet unclassified.

In examining territory at tropical latitudes, it becomes evident that considerable rain forest habitat still stands [although disappearing at a horrendous rate] so that implementing balanced economic development, including establishing large reserves and national parks, is urgently needed and is receiving some international attention.

MOUNTAIN SUBTROPICS

However, if one looks at mountainous regions rising out of or near the tropics, one is stunned to see that the subtropical forests in many countries have already suffered total destruction. For centuries, humans at tropical latitudes have been attracted to live and cultivate at subtropical levels and this has led, in consequence, to a partial or total change of the surrounding vegetation.

In Nepal, for example, people first organized subtropical-elevation villages over a thousand years ago. At these elevations, the population lived in cool surroundings and above the deadly malarial belt of the *Tarai* lowlands. Thus it is not surprising that today one finds virtually all substantial stands of Nepal's eastern subtropical forest [characterized by *Schima* and *Castanopsis*] wiped out. Similarly, in Venezuela "the cordilleras in the north with their excellent climate, have been well populated for hundreds of years and consequently their forests and other habitats have either disappeared or are being destroyed or modified" [Meyer de Schauensee and Phelps 1978:xiv]. At tropical latitudes, mountain subtropical forests - and their associated species - are clearly in desperate trouble. For this reason, the subtropical element of the GA is especially important.

Considering the GA, one might ask why this region is included in a discussion of mountain regions rising in or near the tropics. Actually, the GA rises north of the geographical tropics [i.e. north of Tropic of Cancer] but the immense mountain barriers to the north block the southward movement of Arctic air and thus the southern edge of the GA is very much tropical with many tropical species easily ascending the eastern Himalayas to about 915 meters [3,000 feet].

MOUNTAIN WARM TEMPERATE

Forests of the Warm Temperate Zone are often termed "cloud forests". Human settlement is frequently limited under these conditions as continuous cloud cover here often prevents crops from ripening. Thus these forest stands - and species dependent on mossy conditions - are often well represented. Certainly, in the case of the GA, some of the Warm Temperate Forests are excellent.

COLD TEMPERATE AND ABOVE

Vegetation of the higher altitudes, including the frequently coniferous Cold Temperate Forests - and on up to regions above the tree line - are often subject to more human attention than the Warm Temperate Forests. This is especially true in the drier aspects of these elevations where villages take root and

forests are utilized in many ways [i.e. for building materials, firewood, and for grazing]. Above the tree line, the vegetation is most often used for grazing and, in some areas, for the production of medicinal materials. In the GA, however, with its limited human population, the plant resources of these elevations often remain more or less intact.

A BRIEF LOOK AT SOME TROPICAL MOUNTAIN AREAS WITH OUTSTANDING BIODIVERSITY:

It is difficult to compare and contrast the variety and richness of the natural history of the GA with other tropical or near-tropical mountain regions. Each part of the world is remarkably special and each has its own complement of unique species, conditions and needs. Moreover, speciation varies so much from place to place that comparisons are inadequate at best.

In one geographical area, for example, a specific group of plants [or animals] may show a remarkable presence, but in this same terrain these outstanding features may not carry over to other groups of plants or animals. In Madagascar for instance, the plant world is sensational [c. 7,300 vascular species of which fully 84% are endemic. Landgren 1990:3]. The bird fauna, though, consists of only 256 species [201 resident and 52% of these endemic] in a land area of 587,000 km² and is, by most measures, seriously depauperate.

To have a truly workable set of comparative measures, one needs to examine all aspects of the natural world. However, in many regions it is only the most conspicuous or useful plants or animals that have been reasonably well documented. Of these, showy plants, butterflies, birds and large mammals are the best known.

Of animals, birds are perhaps the best recorded for they are relatively conspicuous and easy to find [and collect]. Thus birds can be used for at least one comparative measure but numbers - or lack thereof - may not reflect the urgency of needed conservation measures.

A SUMMARY

The GA

Area: 259 740 m² [100 000 mi²]

Altitudes: 305 m to 7756 m. [1,000 to 25,446']

Bird Statistics: 808 species; only 16 are strictly endemic or near-endemic.

Habitats: tropical to mountain herbaceous mountain tundra and aeolean; wet jungles to dry desert.

Conservation Status and notes: Conservation potential excellent with several reserves established or proposed.

BORNEO

Area: 747 050 [292 220]

Altitudes: sea level to 4,098 m [13,445'].

Bird Statistics: 358 species with 10% endemic

Habitats: Tropical rain forest and limited regions of mountain forest. With only a few square kilometers above 3355 m [11,000'], only two bird species frequently seen at this height!

Conservation Status and notes: Several lowland reserves in Sarawak, Sabah and Kalimantan are critical for the preservation of the unique flora and fauna that includes the highly endangered Orangutan and Sumatran Rhinoceros. Lowland reserves often clash with logging interests and the latter have, very recently, nearly totally devastated Sabah's lowland Dipterocarp forests. In Kalimantan, raging fires have added to the toll. However, parks in the Crocker Range and on Mt. Kinabalu protect subtropical and warm temperate species. Mt Kinabalu is an incredible reservoir of biological species with over one thousand species of orchids alone recorded from this one park [some reports run as high at 1400 species of orchids!]. Bird life in Mt. Kinabalu park is exciting but in no way matches the magnificent flora. Today, in many areas cultivations occur right to the edge of the park, allowing for little or no buffer.

SUMATRA

Area: 524 100 [202 300]

Altitudes: sea level to 3,805 m [12,484']

Habitats: lowland forests to mountain forests; substantial cleared areas.

Bird Statistics: 397 species with 06% endemic

Conservation Status and Notes: Several large parks in Sumatra include Kerinci-Seblat Reserve and Gunung Leuser National [the latter covers some 8000 square kilometers and is the largest park of island Asia]. Gunung Leuser, with altitudes up to 3,500 meters, affords excellent protection for a fine assemblage of plants and animals including the Orangutan, Tapir, Sumatran Rhinoceros and Sumatran Tiger. The World Wildlife Fund is active here. In addition to the parks mentioned, much of the north-western and southwestern edges of Sumatra still remain remarkably wild.

JAVA

Area: 134 045 m [51 740]

Altitudes: sea level to 3676 m [12,060']

Bird Statistics: 289 with 10% endemic

Habitats: mostly cultivations and human habitations but considerable mountain forests on a number of volcanoes.

Conservation Status and Notes: With over 100 million people living on Java, it is remarkable that any natural cover remains. However, there are some fine - although small - forest reserves on mid-level mountain slopes. And Ujung Kulon national park, at the western tip of Java, is superb - and protects one of the last populations of Java Rhinoceros. Similarly, seven reserves [mostly small] preserve species of eastern Java.

SULAWESI

Area: 189 040 [72 970]

Altitudes: sea level to over 3050 m [10,000']

Habitats: cultivations, lowland forest, mountain forest

Bird Statistics: 242 with 33% endemic

Conservation Status and Notes: This amazing island, lying between Asia and New Guinea-Australia, has a high rate of endemism. Some 90% of Sulawesi 59 mammal species are endemic, and of these, the Babirusa [*Babyrousa babyrussa*] and the Anoa [*Bubalus depressicornis*] are unusually interesting. Large reserves, including Lore Lindu and Morowali have been established and are being assisted by The Nature Conservancy.

NEW GUINEA

Area: main island land mass is 808 510 [312 085]

Altitudes: sea level to Mt Jaya at 5,030 m.[16,502'].

Bird Statistics: 725 recorded for New Guinea plus outlying islands

Habitats: tropical to mountain herbaceous tundra and permanent snow; wet jungles to seasonally dry grasslands.

Conservation Status and notes: J.L. Gressitt, entomologist and explorer of many of New Guinea's least known mountain regions, expressed his wonder [see Beiehler, et al 1986:12] at the richness of Papuan natural history in his 1982 publication [page 3]: "New Guinea is a fantastic island, unique and fascinating. It is an area of incredible varieties of geomorphology, biota, peoples, languages, history, traditions and cultures. Diversity is its prime characteristic, whatever the subject of interest. To an ecologist, and to all biologists, it is a happy hunting ground of endless surprises and unanswered questions. To a conservationist it is like a dream come true, a "flash-back" of a few centuries, as well as a challenge for the future."

Compared to many tropical regions, New Guinea is blessed by having a small human population and most of its native lowland and mountain vegetation intact [inner highland valleys excepted]. This happy condition many not last, however. Development in various forms threatens New Guinea's natural resources [Beehler, et al 1986:35]. Some tracts are now being logged with little effective control or regard for the future. Should it occur, the destruction of the New Guinea forests would be a tragedy of our times.

MADAGASCAR

Area: 587 000 km² [226 739 mi²]

Altitudes: sea level to c 3000 m [9840']

Habitats: eastern lowland evergreen up through montane rainforest and high altitude montane forest; also tapia forest, bushlands and shrublands and deciduous thickets; mangroves.

Bird Statistics: 256 species [201 resident and 52% endemic]

Conservation Status and Notes: Madagascar has an incredibly rich endemic flora [fully 6000 species or 84%]. The primitive primates, the lemurs, are all endemic. In comparison, of 201 resident bird species only 52 % are endemic. As habitat destruction [often associated with fires] is rampant on Madagascar and as little habitat remains [especially of the wet forest types], conservation here is at as critical a stage as anywhere on earth.

KILIMANJARO-MT KENYA [Tanzania and Kenya]

Altitudes: sea level to 5889 m [19,321'].

Habitats: Dry coastal forests; upland savanna plateau; cold temperate forests around bases of mountains; alpine.

Bird Statistics: 1,033 species in Kenya alone.

Conservation Status and Notes: These are regions with incomparable numbers of large mammals, the majority living at - but not limited to - subtropical elevations. Birds are also very well represented and most of the resident species are endemic to Africa. With wild petunias, gladiolas and red-hot-pokers, plants are also special but the assemblage is not as unusual as that of Madagascar. Conservation in Tanzania and Kenya is a well recognized national policy - and an economic asset. Large areas are in preserves and national parks and the region will do well - despite the near demise of the rhinos - if

vigilance is maintained. However, all conservation of natural resources depends, ultimately, on human population pressures, human foresight, and human determination and thus the preservation of species is always problematical. With the rapid increase of the human populations of Tanzania and Kenya, conservation may be in for a rough time.

RUWENZORI AND THE VIRUNGAS [Uganda, Rwanda and Zaire]

Area: Uganda is 93, 981 mi sq; the Ruwenzori range covers some 1200 mi sq [60 miles by 20 miles at the widest]. The Virungas [also called the Mufumbiros] covers about 300 mi sq of highland country in Zaire, Uganda and Rwanda.

Altitudes: in Uganda, mostly around 4000 feet [but down to 2000 feet in the Nile Valley]; the highest point is in the Ruwenzoris at 5,173 m [16,794'].

Habitats: Lakes, Nile valley woodlands, tropical woodlands, grassland savanna, subtropical, warm temperate and cold temperate vegetation in the mountains. Mountain habitats include: upland elephant grass savanna at the mountain bases up about [6500'] ; then forest with bracken ferns, followed by bamboo, alpine meadow, and permanent snow above 4,328 m [14,200'] in the Ruwenzoris.

Bird Statistics: no current figures located.

Conservation Status and Notes: The Ruwenzoris or "Mountains of the Moon" and the Virungas [Mufumbiros] harbor a number of unique plants [outstanding Senecios and Lobelias], mammals [including the Mountain Gorilla of the Virungas] and birds. Preservation of these mountain habitats has - so far - been partly due to the inclement weather of the region. The Ruwenzoris, for example, are apparently cloud covered for some 360 days a year]. Even so, human settlements and cultivations have reached the very edge of some national park boundaries [thus leaving no buffer zones] and conservation has reached a critical stage. Pressure on the habitat has been augmented by past political conflict in Uganda and the current fighting in Rwanda. While massive illegal hunting of large mammals in national parks of Uganda [and now in Rwanda] leaves little cheer, if the habitat remains intact one can hope that the mammal populations will rebound once the poaching-hunting stops.

VENEZUELA

Area: 352,141 mi sq.

Altitudes: sea level to Pico Bolivar at 5007 m [16,427']

Habitats: about 90% of Venezuela is in the tropical zone.

Bird Statistics: 1296 species [this is a total of 44% of all S. American birds].

Notes: Endemic birds in Venezuela number 46 [or 04%] and this shows that many south American birds are widespread and that Venezuela shares biological habitats with neighboring countries.

COLOMBIA

Area: 1,000 000 km² +

Altitudes: sea level to 5,750 m

Habitats: Tropical Zone [sea level to 1400 m -1600 m], Subtropical Zone [1400 m - 1600 m to 2300 m - 2600 m], Temperate Zone [2300 m - 2600 m to 3100 m - 3400 m] Páramo Zone [3100 m - 3400 m] to snow line.

Bird Statistics: 1695 species including 147 long range migrants from North America.

Conservation Status and Notes: The sensational number of bird species here reflects the richness of birdlife in the Neotropics and the wide variety of habitats available in Colombia. Except perhaps for Peru, Colombia has more species of birds than any other country in the world. While

deforestation and habitat change are common place in Colombia [especially in the northern and intermontane regions], extensive forests still remain in large parts of the Pacific slope, the eastern slope of the Eastern Andes, and the lowlands east of the Andes. Colombia has established thirty-four national parks largely administered by The Instituto Nacional de los Recursos Naturales Renovables y del Ambiente [statistics for Colombia from and Brown 1986].

References:

Beehler, Bruce M., Thane K Pratt and Dale A. Zimmerman. 1986. *Birds of New Guinea*. Princeton New Jersey.

Scott, Robert and H. B. Thomas. 1935. *Uganda*. Oxford, London.

Cutting, Suydam 1940. *The Fire Ox and Other Years*. Scribner's Sons, New York.

Hilty, Steven L. and William L. Brown. 1986. *A Guide to the Birds of Colombia*. Princeton, New Jersey.

Langrand, Oliver. 1990. *Guide to the Birds of Madagascar*. Yale, New Haven. Ludlow, Frank and N.B. Kinnear. 1944. *The birds of South-eastern Tibet*. *Ibis* 1944:43-86, 176-208, 348-389.

----- . 1951. *The Birds of Kongbo and Pome*, South-east Tibet. *Ibis* 1951:547-578.

Lyte, Charles. 1989. Frank Kingdon-Ward, *The Last of the Great Plant Hunters*. John Murray, London.

MacKinnon, John, and Karen Phillipps. 1993. *Birds of Borneo, Sumatra, Java, and Bali: The Greater Sunda Islands*. Oxford.

Meyer de Schauensee, Rodolphe, William H. Phelps, Jr., and Guy Tudor. 1978. Princeton, New Jersey.

Ripley, S. Dillon. 1981. "Observations on the Biogeography of the Tibetan Plateau and Adjacent Himalayan Range as Represented by Birds." In *Geological and Ecological Studies of Qinghai-Xizang Plateau*, Vol 2. Science Press, Beijing.

----- . 1982. *A Synopsis of the Birds of India and Pakistan*, second edition. Bombay Natural History Society, Bombay.

Rushforth, Kieth D. 1987. *Conifers*. Facts on File, New York.

Smythies, Bertram E. Smythies. 1953. *The Birds of Burma*, second edition. Oliver and Boyd, London.

- Vaurie, Charles. 1972. *Tibet and Its Birds*. Witherby, London.
- Ward, F. Kingdon. 1913. *Land of the Blue Poppy*. Edward Arnold, London.
- Ward, F. Kingdon. 1926. *The Riddle of the Tsangpo Gorges*. Edward Arnold, London.
- Williams, J.G., and N. Arlott. 1985. *A Field Guide to the Birds of East Africa*. Collins, London.
- Zheng, Zuoxin, Li Dehao, Wang Zuxiang, Wang Ziyu, Jiang Zhihua, Lu Taichun. 1983. *The Avifauna of Xizang*. Academia Sinica, Beijing.

APPENDIX A

SUGGESTED BOUNDARIES OF GREAT:

On the south the suggested boundaries of the GA includes the southern slopes of the eastern Himalayas east of the Subansiri River. The southern edge skirts east around the Assam plains and then south to the Ledo Road where, following this road, it then crosses into Burma [thus retaining the Tirap and Khamtis areas with the conservation area]. In Burma, the boundary continues south along the Ledo Road to Myitkyina, and then east - northeast crossing into Yunnan near Lushi and then northeast to Lijiang [Dayan]. From Lijiang it runs east to the Yangtse River.

Now the line runs north along the Yangtse to the northern tip of the "great bend" and then moves northwest to Batang. From Batang, the line runs west - northwest, crossing parts of southeastern Chamdo Prefecture to meet with the northeastern boundary of Linzhi Prefecture. The suggested GA boundary then continues west along this Prefecture limit to the Mila Pass [east of Lhasa] where it turns south to Gyatse on the Tsangpo. From here the line runs south - southeast crossing the main Himalayan spine to pass down the Subansiri to the edge of the Assam plains.

APPENDIX B

BIOLOGICAL ZONES OF THE GREAT

The GA features a variety of biological zones. Of these, the following occur on the southern-most slopes of the region:

Tropical

In eastern Himalayas of Nepal, Sikkim and Bhutan, many tropical species range up to about 905 m [3,000']. As the western parts of the GA are slightly colder than the latter area, plant communities with primarily tropical affinities likely ascend in the GA to somewhat below 3,000 feet.

Subtropical

The subtropical level in the GA runs from about 853 m [2,800'] to about 1830 m [6,000'].

Warm Temperate Zone

Above the subtropical zone and up to 2135 m [9000'], one moves into a zone with frequent Rhododendron, Quercus and Lauraceae. Non-flowering plants, especially ferns and mosses proliferate. This region also may be called "cloud forest".

Cold Temperate Zone

On these outer [wetter] slopes of the Himalayas and the GA, one finds the emergence of conifers starting at about 2135 m [9000']. These, along with various species of Rhododendrons, maples and mountain ash, continue up to the tree line which is variously between about 3810 m to 4267 m [12,500' to 14,000'].

Mountain [Himalayan] Bush Zone

From the tree line to about 5029 m [16,500'] one often finds extensive carpets of bushes that including rhododendrons mixed with willows, junipers and loniceras.

Herbaceous Mountain Tundra

Plants above 5029 m [16,500'] are usually non-woody [herbaceous] and feature a number of compositae, sedum and aconitums. These range up to about 5486 m [18,000'].

Aeolian [Wind] Zone

Little life occurs above about 5486 m [18,000'] but the animals that do live here largely depend for food on the debris blown up to them by the daily winds.

In the northern and more "interior" reaches of the GA, this altitude pattern breaks down as the conditions tend to dry and conifers, for example, appear at lower altitudes.

HYPOTHETICAL BIRD LIST FOR GREAT TAKEN FROM:

Personal Notes

Chen, Tso-Hsin. 1976. *Birds of China*. Academia Sinica. [especially note column 10 in list from p 971 to p 1070].

Ripley, S. Dillon. 1982. *A Synopsis of the Birds of India and Pakistan*, second edition. Bombay Natural History Society.

Smythies, Bertram E. 1953. *Birds of Burma*, second edition. Oliver and Boyd. (especially note lists for North-East Burma [column 4] and Upper Chindwin [column 3] from p 568 to p 617 [also see endpaper map]).

With additional reference to

Zhen, Zuoxin, et al. 1983. *The Avifauna of Xizang*. Academia Sinica.

Meyer de Schauensee, Rudolphe. 1984. *The Birds of China*. Smithsonian.

King, B., M. Woodcock and E. Dickinson. 1975. *A Field Guide to the Birds of South-East Asia*. Collins.

LIST OF SPECIES

- Podiceps cristatus*, Great Crested Grebe
P. ruficollis, Little Grebe
- Pelecanus philippensis*, Gray or Spot-billed Pelican
- Phalacrocorax carbo*, Large Cormorant
P. niger, Little Cormorant
Anhinga rufa, Darter or Snake Bird
- Ardea imperialis*, Great White-bellied Heron
A. cinerea, Gray Heron
A. purpurea, Purple Heron
Butorides striatus, Little Green Heron
Ardeola grayii, Indian Pond Heron
Bubulcus ibis, Cattle Egret
Egretta alba, Great Egret
E. intermedia, Intermediate Egret
E. garzetta, Little Egret
Nycticorax nycticorax, Black-crowned Night Heron
Ixobrychus cinnamomeus, Chestnut Bittern
Dupetor flavicollis, Black Bittern
Botaurus stellaris, Eurasian Bittern
- Anastomus oscitans*, Asian Openbill Stork
Ciconia episcopus, White-necked Stork
C. nigra, Black Stork
Xenorhynchus asiaticus, Black-necked Stork
Leptoptilos dubius, Greater Adjutant
L. javanicus, Lesser Adjutant
- Pseudibis papillosa*, Black Ibis
Plegadis falcinellus, Glossy Ibis
- Anser anser*, Greylag Goose
A. indicus, Bar-headed Goose
A. albifrons, White-fronted Goose
A. fabalis, Bean Goose
- Dendrocygna javanica*, Lesser Whistling Teal or Tree Duck
Tadorna ferruginea, Ruddy Shelduck
T. tadorna, Common Shelduck
Anas acuta, Pintail
A. crecca, Common Teal
A. gibberifrons, Gray Teal
A. poecilorhyncha, Spotbill Duck
A. platyrhynchos, Mallard
- A. strepera*, Gadwall
A. falcata, Falcated Teal
A. penelope, Eurasian Wigeon
A. querquedula, Garganey
A. clypeata, Shoveller
Netta rufina, Red-crested Pochard
Aythya ferina, Common Pochard
A. nyroca, White-eyed Pochard
A. baeri, Baer's Pochard
A. fuligula, Tufted Duck
A. marila, Scaup
Carina scutulata, White-winged Wood Duck
Nettapus coromandelianus, Cotton Teal
Sarkidiomis melanotos, Comb Duck
Mergus merganser, Common Merganser
M. albellus, Smew
- Elanus caeruleus*, Black-winged Kite
Aviceda leuphotes, Indian Black-crested Baza
Pernis ptilorhynchus, Honey Kite
Milvus migrans, Black Kite
Haliastur indus, Brahminy Kite
Accipiter gentilis, Goshawk
A. soloensis, Chinese Goshawk
A. badius, Shikra
A. trivirgatus, Crested Goshawk
A. nisus, Eurasian Sparrowhawk
A. virgatus, Besra Sparrowhawk
Buteo rufinus, Long-legged Buteo
B. hemilasius, Upland Buteo
B. buteo, Eurasian Buteo
Butastur teesa, White-eyed Hawk
B. liventer, Rufous-winged Hawk
Spizaetus nipalensis, Mountain Hawk-Eagle
S. cirrhatu limnaeetus, Changeable Hawk-Eagle
Lophotriorchis kienerii, Rufous-bellied Hawk-Eagle
Aquila chrysaetos, Golden Eagle
A. heliaca, Imperial Eagle
A. nipalensis, Steppe Eagle
A. clanga, Greater Spotted Eagle
A. pomarina, Lesser Spotted Eagle
Ictinaetus malayensis, Black Eagle
Haliaeetus leucorhynchus, Pallas's Fishing Eagle
Ichthyophaga ichthyaetus, Gray-headed Fishing Eagle
I. nana, Himalayan Grey-headed Fishing Eagle
Torgos calvus, Indian Black Vulture
Aegypius monachus, Cinereous Vulture
G. himalayensis, Himalayan Griffon

Chrysolophus amherstiae, Lady Amherst Pheasant
Pavo muticus, Green Peafowl

Turnix suscitator, Common Bustard Quail

Grus grus, Common Crane
Grus nigricollis, Black-necked Crane
G. antigone, Sarus Crane
Anthropoides virgo, Demoiselle Crane

Rallus aquaticus, Water Rail
R. striatus, Blue-breasted Banded Rail
Rallina euizonoides, Banded Crake
Amauromis [Porzana] fuscus, Ruddy Crake
A. bicolor, Elwes's Crake
A. akool, Brown Crake
A. phoenicurus, White-breasted Waterhen
Gallinula cinerea, Water Cock
Gallinula chloropus, Common Moorhen
Porphyrio porphyrio, Purple Moorhen
Fulica atra, Coot

Heliomithidae personata, Masked Finfoot

Eupodotis bengalensis, Bengal Florican

Hydrophasianus chirurgus, Pheasant-tailed Jacana
Metopidius indicus, Bronze-winged Jacana

Vanellus vanellus, Eurasian Lapwing
V. cinereus, Gray-headed Lapwing
V. indicus, Red-wattled Lapwing
V. spinosus, Spur-winged Lapwing
Pluvialis dominica, Eastern Golden Plover
Charadrius dubius, Little Ringed Plover
C. placidus, Long-billed Ringed Plover
C. mongolus, Lesser Sand Plover

Numenius phaeopus, Whimbrel
N. arquata, Curlew
Tringa erythropus, Spotted Redshank
T. totanus, Common Redshank
T. stagnatilis, Marsh Sandpiper
T. nebularia, Greenshank
T. ochropus, Green Sandpiper
T. glareola, Wood Sandpiper
T. hypoleucos, Common Sandpiper
Capella solitaria, Solitary Snipe

G. indicus, Indian Long-billed Vulture
G. bengalensis, Indian White-backed Vulture
Gypaetus barbatus, Lammergeier
Circus cyaneus, Northern Harrier
C. melanoleucos, Pied Harrier
C. aeruginosus, Marsh Harrier
Spilornis cheela, Crested Serpent Eagle
Pandion haliaetus, Osprey

Microhierax caerulescens, Red-thighed Falconet
Falco cherrug, Cherrug Falcon
F. peregrinus, Peregrine Falcon
F. severus, Oriental Hobby
F. vespertinus, Red-legged Falcon
F. naumanni, Lesser Kestrel
F. tinnunculus, Kestrel

Bonasia sewerzowi, Svertzov's Grouse

Tetraophasis szechenyii, Szechenyi's Pheasant-Grouse
Lerwa lerwa, Snow Partridge
Tetraogallus tibetanus, Tibetan Snow Cock
Francolinus francolinus, Black Francolin
F. pintadeanus, Chinese Francolin
Perdix hodgsoniae, Tibetan Partridge
Coturnix coturnix, Common Quail
C. coromandelica, Black-breasted Quail
C. chinensis, Blue-breasted Quail
Perdicula manipurensis, Manipur Bush Quail
Arborophila torqueola, Common Hill Partridge
A. rufogularis, Rufous-throated Hill Partridge
A. atrogularis, White-cheeked Hill Partridge
A. mandellii, Red-breasted Hill Partridge
A. chloropus, Green-legged Hill Partridge
Bambusicola fytchii, Bamboo Partridge
Ithaginis cruentus, Blood Pheasant
Tragopan blythii, Blyth's Tragopan
T. temminckii, Temminck's Tragopan
Lophophorus impejanus, Impeyan Pheasant
L. sclateri, Sclater's Monal
Crossoptilon crossoptilon, White Eared Pheasant
C. harmani, Harman's [Elwes's] Eared Pheasant
Lophura leucomelana, Kalij Pheasant
L. nycthemera, Silver Pheasant
Gallus gallus, Red Junglefowl
Polyplectron bicalcaratum, Peacock-Pheasant
Symycterus humiae, Mrs. Hume's Pheasant
Phasianus colchicus, Common [Ring-necked] Pheasant

C. nemoricola, Wood Snipe
C. stenura, Pintail Snipe
C. megalia, Swinhoe's Snipe
C. gallinago, Fantail Snipe
C. minima, Jack Snipe
Scolopax rusticola, Eurasian Woodcock
Calidris minutus, Little Stint
C. temminckii, Temminck's Stint
Rostratula benghalensis, Painted Snipe

Himantopus himantopus, Black-winged Stilt
Recurvirostra avosetta, Avocet
Ibidorhyncha struthersii, Ibisbill

Burhinus oedicephalus, Eurasian Thick-knee
Esacus magnirostris, Great Thick-knee

Glareola pratincola, Collared Pratincole
G. lactea, Small Indian Pratincole

Larus argentatus, Herring Gull
L. ichthyaeetus, Great Black-headed Gull
L. brunnicephalus, Brown-headed Gull
L. ridibundus, Black-headed Gull
Sterna aurantia, Indian River Tern
S. hirundo, Common Tern
S. acuticauda, Black-bellied Tern

Treron apicauda, Pin-tailed Green Pigeon
T. sphenura, Wedge-tailed Green Pigeon
T. curvirostra, Thick-billed Green Pigeon
T. pompadora, Gray-fronted Green Pigeon
T. bicincta, Orange-breasted Green Pigeon
T. phoenicoptera, Yellow-footed Green Pigeon

Ducula aenea, Green Imperial Pigeon
D. badia, Gray Imperial Pigeon
Columba leuconota, Snow Pigeon
C. rupestris, Hill Pigeon
C. livia, Blue Rock Pigeon
C. hodgsonii, Speckled Wood Pigeon
C. pulchricollis, Ashy Wood Pigeon
C. punicea, Purple Wood Pigeon
Macropygia unchall, Bar-tailed Cuckoo-Dove
Streptopelia orientalis, Rufous Turtle Dove
S. decaocto, Indian Ring Dove
S. tranquebarica, Red Turtle Dove
S. chinensis, Spotted Dove

Chalcophaps indica, Emerald Dove

Psittacula eupatria, Alexandrine Parakeet
P. alexandri, Red-breasted Parakeet
P. derbiana, Lord Derby's Parakeet
P. finschi, Eastern Slaty-headed Parakeet

Clamator coromandus, Red-winged Crested Cuckoo
Cuculus sparveroides, Large Hawk-Cuckoo
C. varius, Common Hawk-Cuckoo
C. fugax, Hodgson's Hawk-Cuckoo
C. micropterus, Indian Cuckoo
C. canorus, Eurasian Cuckoo
C. saturatus, Himalayan Cuckoo
C. poliocephalus, Small Cuckoo
Cacomantis sonneratii, Bay-banded Cuckoo
C. merulinus, Indian Plaintive Cuckoo
Chalcites maculatus, Emerald Cuckoo
Sumiculus lugubris, Drongo Cuckoo
Eudynamis scolopacea, Koel
Rhopodytes tristis, Large Green-billed Malkoha
Centropus sinensis, Large Coucal
C. toulou, Lesser Coucal

Phodilus badius, Bay Owl

Otus spilocephalus, Spotted Scops Owl
O. scops, Northern Scops Owl
O. bakkamoena, Collared Scops Owl
Bubo bubo, Great Horned Owl
B. zeylonensis, Brown Fish Owl
B. flavipes, Tawny Fish Owl
Glaucidium brodiei, Collared Pigmy Owl
G. radiatum, Jungle Owlet
G. cuculoides, Barred Owlet
Ninox scutulata, Brown Hawk-Owl
Athene noctua, Northern Owllet
A. brama, Spotted Owlet
Strix leptogrammica, Brown Wood Owl
S. aluco, Tawny Wood Owl
S. uralensis, Ural Wood Owl
Asio flammeus, Short-eared Owl

Batrachostomus hodgsoni, Hodgson's Frogmouth

Eurostopodus macrotis, Great Eared Nightjar
Caprimulgus indicus, Jungle Nightjar
C. macrurus, Long-tailed Nightjar

C. asiaticus, Indian Nightjar
C. affinis, Franklin's Nightjar

Collocalia brevirostris, Indian Edible-nest Swiftlet
C. maxima, Indomalayan Swiftlet
Chaetura caudacuta, White-throated Needletail
C. cochinchinensis, White-vented Needletail
C. gigantea, Brown-throated Needletail
C. sylvatica, White-rumped Needletail
Apus melba, Alpine Swift
A. apus, Black Swift
A. pacificus, Large White-rumped Swift
A. affinis, Indian House Swift
Cypsiurus parvus, Palm Swift
Hemiprocne longipennis, Crested Tree Swift

Harpactes erythrocephalus, Red-headed Trogon
H. wardii, Ward's Trogon

Ceryle lugubris, Large Pied Kingfisher
C. rudis, Lesser Pied Kingfisher
Alcedo hercules, Blyth's Kingfisher
A. atthis, Eurasian Kingfisher
A. meninting, Blue-eared Kingfisher
Ceyx erithacus, Three-toed Kingfisher
Pelargopsis capensis, Stork-billed Kingfisher
Halcyon coromanda, Ruddy Kingfisher
H. smymensis, White-breasted Kingfisher
H. pileata, Black-capped Kingfisher

Merops leschenaulti, Chestnut-headed Bee-eater
M. philippinus, Blue-tailed Bee-eater
M. orientalis, Green Bee-eater
Nyctornis athertoni, Blue-bearded Bee-eater

Coracias benghalensis, Indian Roller
Eurystomus orientalis, Broadbilled Roller

Upupa epops, Hoopoe

Aceros nipalensis, Rufous-necked Hornbill
Rhyticeros undulatus, Wreathed Hornbill
R. plicatus, Blyth's Hornbill
Anthracoceros coronatus, Southern Pied Hornbill
Buceros bicornis, Great Pied Hornbill

Magalaima virens, Great Hill Barbet
M. lineata, Lineated Barbet

M. franklinii, Golden-throated Barbet
M. asiatica, Blue-throated Barbet
M. australis, Blue-eared Barbet
M. haemacephala, Crimson-breasted Barbet [Coppersmith]

Indicator xanthonotus, Yellow-rumped Honeyguide

Jynx torquilla, Wryneck
Picumnus innominatus, Speckled Piculet
Sasia ochracea, Rufous Piculet
Micropternus brachyurus, Rufous Woodpecker
Picus xanthopygaeus, Little Scaly-bellied Woodpecker
P. canus, Black-naped Woodpecker
P. flavinucha, Large Yellow-nape
P. chlorolophus, Small Yellow-nape
Dinopium benghalense, Lesser Goldenback
D. shorii, Three-toed Goldenback
Chrysocolaptes lucidus, Large Goldenback
Gecinulus grantia, Pale-headed Woodpecker
Mulleripicus pulverulentus, Great Slaty Woodpecker
Dryocopus javensis, White-bellied Woodpecker
D. martius, Great Black Woodpecker
Hypopicus hyperythrus, Rufous-bellied Woodpecker
Dendrocopos major, Red-crowned Pied Woodpecker
D. darjellensis, Darjeeling Pied Woodpecker
D. cathpharius, Crimson-breasted Pied Woodpecker
D. macei, Fulvous-breasted Pied Woodpecker
D. canicapillus, Gray-crowned Pigmy Woodpecker
Picoides tridactylus, Three-toed Woodpecker
Blythipicus pyrrhotis, Red-eared Bay Woodpecker

Serilophus lunatus, Hodgson's Broadbill
Psarismomus dalhousiae, Long-tailed Broadbill

Pitta nipalensis, Blue-naped Pitta
P. oatesi, Rusty-naped Pitta
P. brachyura, Indian Pitta
P. sordida, Green-breasted Pitta
P. cyanea, Blue Pitta

M. assamica, Assam Bush Lark
Calandrella cinerea, Short-toed Lark
C. rufescens, Asian Short-toed Lark
Melanocorypha maxima, Long-billed Calandra Lark
Eremophila alpestris, Homed Lark
A. gulgula, Oriental Skylark

Riparia riparia, Collared Sand Martin

R. paludicola, Plain Sand Martin
Hirundo rupestris, Crag Martin
H. rustica, Barn Swallow
H. smithii, Wire-tailed Swallow
H. daurica, Striated or Red-rumped Swallow
H. striolata, Large Striated Swallow
Delichon urbica, Eurasian House Martin
D. nipalensis, Nepal House Martin
D. dasypus, Asian House Martin

Lanius collurio, Burmese Shrike
L. tephronotus, Gray-backed Shrike
L. schach, Long-tailed Shrike
L. cristatus, Brown Shrike
L. tigrinus, Tiger Shrike
L. sphenocercus, Chinese Gray Shrike

Oriolus chinensis, Black-naped Oriole.
O. tenuirostris, Slender-billed Oriole
O. xanthornus, Black-headed Oriole
O. traillii, Maroon Oriole

Dicrurus adsimilis, Black Drongo
D. leucophaeus, Ashy Drongo
D. annectans, Crow-billed Drongo
D. aeneus, Bronzed Drongo
D. remifer, Lesser Racquet-tailed Drongo
D. hottentottus, Hair-crested Drongo
D. paradiseus, Greater Racquet-tailed Drongo

Artamus fuscus, Ashy Wood-Swallow

Saroglossa spiloptera, Spot-winged Stare
Sturnus malabaricus, Gray-headed Starling
S. stuminus, Purple-backed Starling
S. vulgaris, Common Starling
S. contra, Pied Myna
S. nigrcollis, Black-collared Starling
S. burmanicus, Vinous-breasted Starling
S. cineraceus, White-cheeked Starling
Acridotheres tristis, Common Myna
A. javanicus, White-vented Myna
A. fuscus, Jungle Myna
A. ginginianus, Bank Myna
A. albocinctus, Collared Myna
Gracula religiosa, Talking Myna

Garrulus glandarius, Eurasian Jay

Kitta chinensis, Green Magpie
K. flavirostris, Yellow-billed Blue Magpie
K. erythrorhyncha, Red-billed Blue Magpie
Pica pica, Pied Magpie
Dendrocitta vagabunda, Rufous Tree Pie
D. frontalis, Black-browed Tree Pie
D. formosae, Himalayan or Gray Tree Pie
Podoces humilis, Hume's Ground Pecker [Ground Jay]
Nucifraga caryocatactes, Spotted Nutcracker
Pyrrhocorax graculus, Yellow-billed Chough
P. pyrrhocorax, Red-billed Chough
Corvus splendens, House Crow
C. macrorhynchos, Jungle Crow
C. corax, Raven

Bombycilla garrulus, Waxwing
B. japonica, Japanese Waxwing

Hemipus picatus, Pied Flycatcher-Shrike
Tephrodornis virgatus, Large Wood-Shrike
T. pondicerianus, Common Wood-Shrike

Coracina novaehollandiae, Large Cuckoo-Shrike
C. melaschistos, Dark-gray Cuckoo-Shrike
Pericrocotus flammeus, Scarlet Minivet
P. brevirostris, Short-billed Minivet
P. ethologus, Long-tailed Minivet
P. solaris, Yellow-throated Minivet
P. roseus, Rosy Minivet
P. cinnamomeus, Small Minivet
P. erythropygius, White-bellied Minivet

Aegithina tiphia, Common Iora
Chloropsis aurifrons, Gold-fronted Chloropsis
C. hardwickii, Orange-bellied Chloropsis
C. cochinchinensis, Gold-mantled [Blue-winged]
Irena puella, Fairy Bluebird

Spizixos canifrons, Crested Finch-billed Bulbul
Pycnonotus melanicterus, Black-crested Yellow Bulbul
P. jocosus, Red-Whiskered Bulbul
P. sinensis, Chinese Bulbul
P. aurigaster, Yellow-vented Bulbul
P. finlaysoni, Stripe-throated Bulbul
P. leucogenys, White-cheeked Bulbul
P. cafer, Red-vented Bulbul
P. striatus, Striated Green Bulbul
P. flavescens, Flavescent Bulbul

P. xanthorrhous, Brown-breasted Bulbul
P. blanfordi, Streak-eared Bulbul
Criniger flaveolus, White-throated Bulbul
C. [pallidus] ochraceus, Puff-throated [Ochraceus] Bulbul
Hysipetes viridescens, Blyth's Olive Bulbul
H. flavalus, Brown-eared Bulbul
H. madagascariensis, Black [Gray] Bulbul
H. thompsoni, White-headed Bulbul
H. propinquus, Gray-eyed Bulbul
H. mccllellandi, Rufous-bellied [Mountain] Bulbul

Pellorneum ruficeps, Spotted Babbler
P. palustre, Marsh Spotted Babbler
P. albiventer, Spot-throated Babbler
Trichastoma tickelli, Tickell's Babbler
T. abbotti, Abbott's Babbler
Pomatorhinus schisticeps, Slaty-headed Scimitar Babbler
P. ruficollis, Rufous-necked Scimitar Babbler
P. erythrogenys, Rusty-cheeked Scimitar Babbler
P. hypoleucos, Large Scimitar Babbler
P. ferruginosus, Coral-billed Scimitar Babbler
P. ochraceiceps, Red-billed Scimitar Babbler
Xiphirhynchus supercilii, Slender-billed Scimitar Babbler
Rimator malacoptilus, Long-billed Wren-Babbler
Napothera brevicaudata, Short-tailed Wren-Babbler
N. epilepidota, Small Wren-Babbler
Microura albiventer, Large Scaly-breasted Wren-Babbler
M. pusilla, Lesser Scaly-breasted Wren-Babbler
Spelaeornis caudatus, Tailed Wren-Babbler
S. badeigularis, Mishmi Wren-Babbler
S. chocolatinus, Streaked Long-tailed Wren-Babbler
S. troglodytoides, Bar-winged Wren-Babbler
S. formosus, Spotted Wren-Babbler
Sphenocichla humei, Wedge-billed Wren Babbler
Stachyris rufifrons, Red-fronted Babbler
S. ruficeps, Red-headed Babbler
S. chrysaea, Golden-headed Babbler
S. nigriceps, Black-throated Babbler
S. striolata, Spot-necked Babbler
S. oglei, Austin's Babbler
S. ambigua, Buff-chested Babbler
Macronous gularis, Yellow-breasted Babbler
Timalia pileata, Red-capped Babbler
Chrysomma sinensis, Yellow-eyed Babbler
C. [Maupinia] poecilotis, Rufous-tailed Moupinia
C. altirostre, Jerdon's Babbler
Conostoma aemodium, Great Parrotbill
Paradoxornis unicolor, Brown Parrotbill

P. fulvifrons, Fulvous-fronted Parrotbill
P. nipalensis, Nepal Parrotbill
P. atrosuperciliaris, Lesser Red-headed Parrotbill
P. ruficeps, Greater Red-headed Parrotbill
P. gularis, Gray-headed Parrotbill
P. guttaticollis [flavivestris] Spot-breasted Parrotbill
Turdoides earlei, Striated Babbler
T. longirostris, Slender-billed Babbler
T. striatus, Jungle Babbler
Babax lanceolatus, Chinese Babax
B. waddelli, Giant Tibetan Babax
B. koslowi, Koslow's Babax
Garrulax albogularis, White-throated Laughing-Thrush
G. moniligerus, Greater Necklaced Laughing-Thrush
G. pectoralis, Lesser Necklaced Laughing-Thrush
G. striatus, Striated Laughing-Thrush
G. leucolophus, White-crested Laughing-Thrush
G. nuchalis, Chestnut-backed Laughing-Thrush
G. delesserti, Rufous-vented Laughing-Thrush
G. rufogularis, Rufous-chinned Laughing-Thrush
G. maximus, Giant Laughing-Thrush
G. ocellatus, White-spotted Laughing-Thrush
G. caeruleus, Gray-sided Laughing-Thrush
G. ruficollis, Rufous-necked Laughing-Thrush
G. merulinus, Spot-breasted Laughing-Thrush
G. sannio, White-browed Laughing-Thrush
G. linaetus, Streaked Laughing-Thrush
G. austeni, Brown-capped Laughing-Thrush
G. squamatus, Blue-winged Laughing-Thrush
G. subunicolor, Plain-colored Laughing-Thrush
G. henrici, Prince Henry's Laughing-Thrush
G. affinis, Black-faced Laughing-Thrush
G. erythrocephalus, Red-headed Laughing-Thrush
G. phoeniceus, Crimson-winged Laughing-Thrush
G. ellioti Elliot's Laughing-Thrush
G. formosus, Red-winged Laughing Thrush
G. milnei, Red-tailed Laughing-Thrush
Liocichla [ripponi] phoenicea, Red-faced Leiocichla
Leiothrix argentauris, Silver-eared Mesia
L. lutea, Red-billed Leiothrix
Myzornis pyrrhura, Fire-tailed Myzornis
Cutia nipalensis, Nepal Cutia
Pteruthius rufiventer, Rufous-bellied Shrike-Babbler
P. flaviscapis, Red-winged Shrike-Babbler
P. xanthochloris, Green Shrike-Babbler
P. melanotis, Chestnut-throated Shrike-Babbler
P. aenobarbus, Chestnut-fronted Shrike-Babbler
Gampsorhynchus rufulus, White-headed Shrike-Babbler

Actinodura egertoni, Spectacled Barwing
A. nipalensis, Hoary Barwing
A. waldeni, Streak-throated Barwing
A. souliei, Streaked Barwing
Minla ignotincta, Red-tailed Minla
M. strigula, Chestnut-tailed Minla
M. cyanouroptera, Blue-winged Minla
Yuhina castaniceps, Chestnut-headed Yuhina
Y. bakeri, White-cheeked Yuhina
Y. flavicollis, Yellow-naped Yuhina
Y. gularis, Stripe-throated Yuhina
Y. occipitalis, Rufous-vented Yuhina
Y. nigrimenta, Black-chinned Yuhina
Y. zantholeuca, White-bellied Yuhina
Y. diademata, White-collared Yuhina
Alcippe chrysotis, Golden Fulvetta
A. cinerea, Dusky-green Fulvetta
A. castaneiceps, Chestnut-headed Fulvetta
A. vinipectus, White-browed Fulvetta
A. cinereiceps, Brown-headed Fulvetta
A. rufogularis, Red-throated Fulvetta
A. brunnea, Rufous-headed Fulvetta
A. poiocephala, Quaker Babbler
A. nipalensis, Nepal Babbler
A. morrisonia, Gray-cheeked Fulvetta
A. straticollis, Chinese Fulvetta
A. ruficapilla, Spectacled Fulvetta [check]
Heterophasia annectens, Chestnut-backed Sibia
H. capistrata, Black-capped Sibia
H. gracilis, Gray Sibia
H. pulchella, Beautiful Sibia
H. picaoides, Long-tailed Sibia
H. melanoleuca, Black-headed Sibia

Muscicapa sibirica, Sooty Flycatcher
M. muttui, Brown-breasted Flycatcher
M. ferruginea, Ferruginous Flycatcher
M. parva, Red-breasted Flycatcher
M. strophiiata, Orange-gorgetted Flycatcher
M. monileger, White-gorgetted Flycatcher
M. hyperythra, Red-breasted Blue Flycatcher
M. hodgsonii, Rusty-breasted Blue Flycatcher
M. westermanni, Little Pied Flycatcher
M. superciliaris, White-browed Blue Flycatcher
M. leucomelanura, Slaty Blue Flycatcher
M. sapphira, Sapphire-headed Flycatcher
M. grandis, Large Niltava
M. macgrigoriae, Small Niltava

M. sundara, Rufous-bellied Niltava
M. vivida, Rufous-bellied Blue Flycatcher
M. concreta, White-tailed Blue Flycatcher
M. poliogenys, Brook's Flycatcher
M. unicolor, Pale Blue Flycatcher
M. rubeculoides, Blue-throated Flycatcher
M. banyumas, Large-billed Blue Flycatcher
M. tickelliae, Tickell's Blue Flycatcher
M. thalassina, Verditer Flycatcher
Muscicapella hodgsoni, Pigmy Blue Flycatcher
Culicicapa ceylonensis, Gray-headed Flycatcher
Rhipidura hypoxantha, Yellow-bellied Fantail
R. aureola, White-browed Fantail
R. albicollis, White-throated Fantail
Terpsiphone paradisi, Indian Paradise Flycatcher
Monarcha azurea, Black-naped Flycatcher

Tesia cyaniventer, Dull Slaty-bellied Ground Warbler
T. olivacea, Slaty-bellied Ground Warbler
T. castaneo-coronata, Chestnut-headed Ground Warbler
Cettia pallidipes, Pale-footed Bush Warbler
C. fortipes, Strong-footed Bush Warbler
C. major, Large Bush Warbler
C. flavolivaceus, Aberrant Bush Warbler
C. acanthizoides, Verreaux's Bush Warbler
C. brunnifrons, Rufous-capped Bush Warbler
Bradypterus thoracicus, Spotted Bush Warbler
B. tacsanowskii, Chinese Bush Warbler
B. luteoventris, Brown Bush Warbler
Cisticola exilis, Golden Cisticola
C. juncidis, Zitting Cisticola
Prinia rufescens, Rufescent Prinia
P. hodgsoni, Hodgson's Prinia
P. subflava, Plain Prinia
P. socialis, Ashy Prinia
P. flaviventris, Yellow-bellied Prinia
P. criniger, Brown Hill Prinia
P. atrogularis, Black-throated Hill Prinia
Orthotomus sutorius, Common Tailor Bird
O. atrogularis, Black-necked Tailor Bird
O. cucullatus, Golden-headed Tailor Bird
Locustella lanceolata, Streaked Grasshopper Warbler
Megalurus palustris, Striated Marsh Warbler
Phragmaticola aedon, Thick-billed Warbler
Acrocephalus arundinaceus, Eurasian Great Reed Warbler
A. agricola, Paddyfield Warbler
Phylloscopus affinis, Tickell's Leaf Warbler
P. subaffinis, Buff-throated Leaf Warbler

P. fuligiventer, Smoky Leaf Warbler
P. fuscatus, Dusky Leaf Warbler
P. armandi, Yellow-streaked Warbler
P. pulcher, Orange-barred Leaf Warbler
P. inornatus, Plain [Yellow-browed] Leaf Warbler
P. schwarzi, Radde's Leaf Warbler
P. proregulus, Yellow-rumped Leaf Warbler
P. maculipennis, Gray-faced Leaf Warbler
P. magnirostris, Large-billed Leaf Warbler
P. trochiloides, Dull Green Leaf Warbler
P. reguloides, Blyth's Crowned Leaf Warbler
P. davisoni, White-tailed Leaf Warbler
P. cantator, Black-browed Leaf Warbler
Seicercus affinis, Allied Warbler
S. burkii, Yellow-eyed Warbler
S. xanthoschistos, Gray-headed Warbler
S. poliogenys, Gray-cheeked Warbler
S. castaniceps, Chestnut-headed Warbler
Abroscopus superciliaris, Yellow-bellied Warbler
A. schisticeps, Black-faced Warbler
A. albogularis, White-throated Warbler
A. hodgsoni, Broad-billed Warbler
Regulus regulus, Goldcrest
Leptopoecile elegans, Crested Tit-Warbler
L. sophiae, Tibetan Tit-Warbler

Brachypteryx stellata, Gould's Shortwing
B. leucophrys, Lesser Shortwing
B. hyperythra, Rusty-bellied Shortwing
B. montana, White-browed Shortwing
B. cryptica, Enigmatic Shortwing
Erithacus calliope, Siberian Rubythroat
E. svecicus, Bluethroat
E. pectoralis, Himalayan Rubythroat
E. brunneus, Indian Blue Chat
E. pectardens, Firethroat
E. cyane, Siberian Blue Robin
E. cyanurus, Orange-flanked Bush Robin
E. chrysaeus, Golden Bush Robin
E. indicus, White-browed Bush Robin
E. hyperythrus, Rufous-bellied Bush Robin
Coposychus saularis, Dayal Robin [Maggie Robin]
C. malabaricus, Shama
Phoenicurus ochruros, Black Redstart
P. hodgsoni, Hodgson's Redstart
P. frontalis, Blue-fronted Redstart
P. schisticeps, White-throated Redstart
P. aureus, Daurian Redstart

P. erythrogaster, Guldenstadt's Redstart
Rhyacornis fuliginosus, Plumbeous Redstart
Hodgsonius phoenicuroides, White-bellied Redstart
Cinclidium leucurum, White-tailed Robin
C. frontale, Blue-fronted Robin
Grandala coelicolor, Himalayan Grandala
Enicurus scouleri, Little Forktail
E. immaculatus, Black-backed Forktail
E. schistaceus, Slaty-backed Forktail
E. leschenaulti, Leschenault's Forktail
E. maculatus, Spotted Forktail
Cochoa purpurea, Purple Cochoa
Saxicola torquata, Stone Chat
S. leucura, White-tailed Bush Chat
S. caprata, Pied Bush Chat
S. jerdoni, Jerdon's Bush Chat
S. ferrea, Dark-gray Bush Chat
Chaimarromis leucocephalus, White-capped River Chat
Monticola rufiventris, Rufous-bellied Rock Thrush
M. cinclorhynchus, Blue-headed Rock Thrush
M. solitarius, Blue Rock Thrush
Myiophoneus caeruleus, Blue Whistling Thrush
Zoothera wardii, Pied Ground Thrush
Z. citrina, Orange-headed Ground Thrush
Z. mollissima, Plain-backed Mountain Thrush
Z. dixonii, Long-tailed Mountain Thrush
Z. dauma, Speckled Mountain Thrush
Z. monticola, Large Long-billed Ground Thrush
Z. marginata, Lesser Long-billed Ground Thrush
Turdus dissimilis, Black-breasted Thrush
T. albocinctus, White-collared Blackbird
T. boulboul, Gray-winged Blackbird
T. merula, Eurasian Blackbird
T. rubrocanus, Gray-headed Thrush
T. kessleri, Kessler's Thrush
T. obscurus, Dark Thrush
T. ruficollis, Red-throated/Black-throated Thrush
T. naumanni, Dusky Thrush
T. maupinensis, Chinese Song Thrush

Troglodytes troglodytes, Winter Wren

Cinclus cinclus, White-breasted Dipper
C. pallasii, Brown Dipper

Prunella collaris, Alpine Accentor
P. himalayana, Altai Accentor
P. rubeculoides, Robin Accentor

P. strophciata, Rufous-breasted Accentor
P. fulvescens, Brown Accentor
P. immaculata, Maroon-backed Accentor

Melanochlora sultanea, Sultan Tit
Parus major, Gray [Great] Tit
P. monticolus, Green-backed Tit
P. palustris, Marsh Tit
P. ater, Coal Tit
P. rubidiventris, Rufous-bellied Black Tit
P. dichrous, Brown Crested Tit
P. spilonotus, Black-spotted Yellow Tit
P. modestus, Yellow-browed Tit
P. montanus, Willow Tit
P. superciliosus, White-browed Tit
Cephalopyrus flammiceps, Firecapped Tit
Aegithalos concinnus, Red-headed Tit
A. iouschistos, Rufous-fronted Tit

Sitta europaea, Eurasian Nuthatch
S. castanea, Chestnut-bellied Nuthatch
S. leucopsis, White-cheeked Nuthatch
S. himalayensis, White-tailed Nuthatch
S. formosa, Beautiful Nuthatch
S. frontalis, Velvet-fronted Nuthatch
S. magna, Giant Nuthatch
S. yunnanensis, Yunnan Nuthatch
Trichodroma muraria, Wall Creeper

Certhia familiaris, Northern Tree Creeper
C. himalayana, Bar-tailed Tree Creeper
C. discolor, Sikkim Tree Creeper
C. nipalensis, Nepal Tree Creeper

Anthus hodgsoni, Hodgson's Tree Pipit
A. novaeseelandiae, Paddyfield Pipit
A. godlewskii, Blyth's Pipit
A. cervinus, Red-throated Pipit
A. roseatus, Vineous-breasted Pipit
A. sylvanus, Upland Pipit
A. spinoletta, Water Pipit
Motacilla indica, Forest Wagtail
M. flava, Yellow Wagtail
M. citreola, Yellow-headed Wagtail
M. caspica, Gray Wagtail
M. alba, Pied Wagtail

Dicaeum chrysorrheum, Yellow-vented Flowerpecker

D. melanoxanthum, Yellow-bellied Flowerpecker
D. trigonostigma, Orange-bellied Flowerpecker
D. erythrorhynchos, Tickell's Flowerpecker
D. concolor, Plain-colored Flowerpecker
D. cruentatum, Scarlet-backed Flowerpecker
D. ignipectus, Fire-breasted Flowerpecker

Anthreptes singalensis, Rubycheek
Hypogramma hypogrammicum, Purple-naped Sunbird
Nectarinia asiatica, Purple Sunbird
Aethopyga gouldiae, Mrs Gould's Sunbird
A. nipalensis, Nepal Sunbird
A. saturata, Black-breasted Sunbird
A. siparaja, Crimson or Scarlet Sunbird
A. ignicauda, Fire-tailed Sunbird
Arachnothera longirostris, Little Spiderhunter
A. magna, Streaked Spiderhunter

Zosterops palpebrosa, Oriental White-eye

Passer domesticus, House Sparrow
P. montanus, Tree Sparrow
P. rutilans, Cinnamon Tree Sparrow
P. flaveolus, Pegu House Sparrow
Montifringilla adamsi, Tibet Snow Finch
M. taczanowskii, Mandelli's Snow Finch
M. ruficollis, Red-necked Snow Finch
M. blanfordi, Blandford's Snow Finch
Ploceus philippinus, Baya Weaver
P. manyar, Streaked Weaver
Estrilda amandava, Red Munia
Lonchura malabarica, White-throated Munia
L. striata, White-rumped Munia
L. punctulata, Spotted Mu

