

The winter birds of Ladakh

D. P. MALLON

This paper reports on the birds seen in the central part of the Transhimalayan district of Ladakh, north-west India, during four consecutive winters, 1980-1984, and includes additional records from the literature. Fieldwork was based in the Indus and Zaskar valleys and their tributaries, and four areas were visited each winter in order to obtain some evenness in coverage. All species recorded during the months of December, January and February are included in the winter list; 84, representing approximately 30% of the total number of species recorded for Ladakh, are listed and discussed. Of these, 50 are considered to have regular winter status, and the remainder are irregular winter species, occasional stragglers from migrant populations or vagrants. There are few reports on the winter avifauna of the Tibetan region as a whole, and considerable scope exists for further research.

The Transhimalayan district of Ladakh, north-west India, has close ecological affinities with the Tibetan region and it was included in the Outer Plateau zone of Tibet by Vaurie (1972). Its avifauna has been relatively well studied, though most reports to date deal with the summer months and migration periods and the only winter information was provided for 1981-1982 by the University of Southampton expedition (Williams and Delany 1985, 1986).

Ladakh has an arid, high-altitude environment and the area as a whole is extremely rugged and mountainous. Settlements are concentrated along the main river valleys (Nubra-Shyok, Indus, Suru, Zaskar), each of which contains small areas of low-lying, open, level ground. The eastern part of Ladakh contains several lakes and forms the western extremity of the Chang Thang, the northern plateau of Tibet.

METHODS AND STUDY AREA

As part of a general ecological survey of Ladakh (Mallon 1983, 1984, in press, Osborne *et al.* 1983, Mallon and Nurbu in press), I collected records of birds on six visits to the district between 1980 and 1986. This report is based on data obtained during the winters 1980-1981, 1981-1982, 1982-1983 and 1983-1984. I define 'winter' as the months of December, January and February.

The areas covered during the winter lay in central Ladakh between the Indus valley and the northern side of the main Himalayan range. No winter visits were made to the Suru valley, or to the eastern plateau and Nubra-Shyok valleys, both these latter being closed to visitors. It was impossible to revisit the whole of the area each year and the coverage was inevitably subject to some bias. Leh, the base for each expedition, was well covered, while the Zaskar plain (between the villages of Padum, Sani and Karsha) was visited only once. To ensure some even coverage, the following areas were

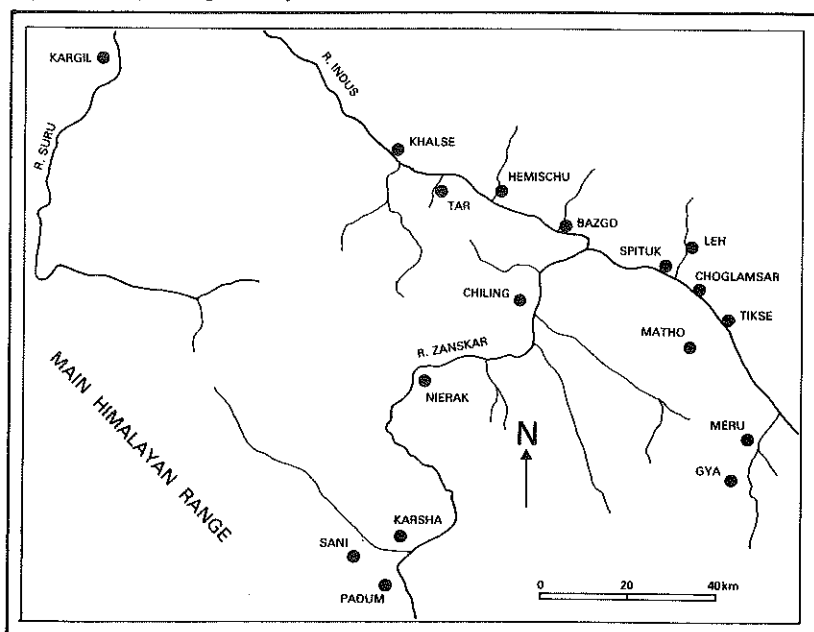
investigated each year: Leh and its environs; the floor of the Indus valley from Tikse to Spituk; the villages and side-valleys of the lower Indus between Bazgo and Khalse. The Zanskar river gorge from the Indus confluence to Nierak was followed in three winters (once continuing to Padum), and in one winter to a point several kilometres beyond the Markha valley. Sites are mapped in the Figure.

The lowest point in the study area was the floor of the Indus valley at an altitude of 3,000m. Most records were obtained between 3,000 and 3,600m and only a few over 4,000m. Several days in 1981–1982 were spent with the University of Southampton party, one of whom, Simon Delany, also undertook the journey to Padum with me that winter. A few visits were made with Chering Nurbu, the Leh Forest Ranger; otherwise field visits were made by myself alone or with local porters.

CLIMATE

According to figures given by Kachroo *et al.* (1977) based on records over 1941–1960, mean temperatures in Leh are: December, maximum 1.6°C, minimum -11.1°C; January, maximum -2.8°C, minimum -14°C;

Figure. Ladakh, showing the study area.



February, maximum 0.8°C, minimum -11.8°C. Zanskar proper has a harsher climate, though there are no records: temperatures down to -27°C were recorded there in 1981–1982 and -32°C in the Zanskar gorge in 1982–1983.

Snow cover is heaviest in Zanskar, lying on the northern side of the main Himalayan range, and decreases north-eastwards. The Zanskar plain around Padum at an altitude of 3,600m is covered throughout the winter with snow, while in Leh, 3,550m, snow rarely lasts for more than a few days at a time. The eastern plateau area, seen from the air, shows wide tracts of snow-free country. Naturally, variations occur from year to year. The winter of 1982–1983 was much colder than usual, and temperatures of -20°C and below were recorded several times in Leh, while snow cover was more extensive and longer-lasting than usual.

HABITATS

A small amount of open water occurs in winter, in the form of unfrozen stretches along the Indus and Zanskar rivers and most mountain streams. The pool at the village of Sani in Zanskar is fed by warm springs and never freezes. On the hill slopes strong solar radiation results in clear patches appearing soon after snowfall and these are exploited by bird species favouring open ground. Trees and bushes occur naturally in most valleys of Ladakh, but have long been cut out in most places for fuel and timber and now survive only where remote from human habitation. However, trees and bushes are cultivated at all villages, forming dense stands in some places (especially the Markha valley), and there are extensive Forest Department plantations. The main tree species found are willow *Salix*, poplar *Populus* and *Myricaria*, apricot *Prunus armeniaca* and other fruit trees. A few stands of Black Juniper *Juniperus indica* and even fewer of Himalayan Birch *Betula utilis* occur in mountain areas. Of great importance is the presence of large quantities of the bush *Hippophae rhamnoides*, both wild and cultivated, which provides food and shelter for many species.

All birds remaining in winter are forced by severe conditions to make some movements to lower elevations. A few hardy species remain as high in the mountains as conditions permit, while others concentrate in valley bottoms and around villages. The richest variety of winter habitats occurs along the floor of the Indus valley between Tikse and Spituk, with its combination of village fields, open ground, extensive plantations and open water, as well as Shey marsh.

SYSTEMATIC LIST

Eighty-four species are treated below. Any definition of a winter species is bound to be arbitrary, so for the sake of completeness all species recorded

during the months of December, January and February are listed, even though some of them are almost certainly late autumn or early spring passage migrants. Also included are three Tibetan species which, although not seen in the three winter months, are not known to migrate outside the region and are presumed to occur in winter.

The systematic list follows Holmes (1986) in using the order of species in Vaurie (1972), the most useful reference work. A code following the scientific name gives the species's status in Ladakh. Some of these are provisional and may be refined on further study; they should be regarded as a general guide rather than a definitive statement. The number following the status code refers to the number of winters during this study that the species was recorded. The codes used are: R = Resident; PR = Presumed Resident; W = Winter visitor; w = winter straggler from summer or migrant populations; S = Summer visitor; M = Migrant; V = Vagrant; ? = status uncertain. Many species are given two or three codes, e.g. (RW) shows a resident species with additional winter birds arriving from outside.

GREAT CORMORANT *Phalacrocorax carbo* (Mw) (1) A single bird seen at Tikse on 2 December 1981 by the Southampton University party must have been a late passage migrant.

GREAT BITTERN *Botaurus stellaris* (V) (1) One was seen at Tikse on 14 November 1981 and one, probably the same bird, at Shey on 31 December 1981 and 8 January 1982. This bird spent the winter there (Williams and Delany 1985). This is the only record for Ladakh.

RUDDY SHELDUCK *Tadorna ferruginea* (Sw) (2) Two were seen on the pool at Sani, Zaskar, 4–7 February 1982, and two at Choglamsar on 4 February 1981. According to local people, some duck had been present on Sani pool all winter.

MALLARD *Anas platyrhynchos* (MW) (4) Some remain each winter. Recorded along the Indus, the lower Zaskar and on Sani pool. Usually in parties of 1–3 birds, but a flock of 14 was seen on the Indus three times in 1980–1981.

COMMON TEAL *Anas crecca* (Mw) (1) Five were seen on the lower Zaskar river on 24 February 1981 and three there on 27 February 1981. The dates would indicate that they were early spring migrants.

EURASIAN WIGEON *Anas penelope* (Mw) (1) One was seen on the Indus at Spituk on 19 February 1981.

NORTHERN PINTAIL *Anas acuta* (Mw) (2) Three were seen at Choglamsar on 19 February 1981, one on the lower Zaskar on 24 February 1981 and two on the Indus near Khalse on 24 February 1983.

COMMON POCHARD *Aythya ferina* (Mw) (1) A single bird was present on Sani pool, 4–7 February 1982.

COMMON MERGANSER *Mergus merganser* (R) (1) Some of the breeding population winter. Seen in small parties (1–4) along the Indus and Zaskar rivers and on Sani pool. Also recorded from localities in Tibet in December and January (Vaurie 1972).

NORTHERN GOSHAWK *Accipiter gentilis* (W/?) (3) Regular in winter in small numbers. Seen in the Indus valley plantations, around villages and occasionally in mountain valleys.

NORTHERN SPARROWHAWK *Accipiter nisus* (W/?) (3) There were three winter sightings, in January 1982, February 1983 and January 1984, at villages in the Indus valley. Williams and Delany (1986) say the species wintered in small numbers, 1981–1982.

LONG-LEGGED BUZZARD *Buteo rufinus* (MW) (3) Winters in very small numbers. One or two birds were present in the Indus valley between Tikse and Spituk in each of three winters.

GOLDEN EAGLE *Aquila chrysaetos* (R) (4) Widespread throughout the area. Recorded in winter from many localities in the mountains, but not seen along the floor of the Indus valley and unusual close to houses. One was seen attempting unsuccessfully to catch members of a flock of finches in flight.

LAMMERGEIER *Gypaetus barbatus* (R) (4) Widespread. Recorded throughout the study area, from the environs of villages to remote mountain valleys. Usually below 4,500m at this season, but occasionally soaring higher.

HIMALAYAN GRIFFON *Gyps himalayensis* (R) (4) Widespread. Winter distribution as for the Lammergeier, though not seen together except at carcasses. Usually seen in pairs.

SAKER FALCON *Falco cherrug* (MW) (3) Passage migrant and winter visitor in very small numbers. Recorded around plantations and at villages along the Indus valley.

PEREGRINE FALCON *Falco peregrinus* (V) (1) A single bird was observed on a rocky ridge at 3,800m near Tharu in the Indus valley on 5 January 1984.

MERLIN *Falco columbarius* (MW) (3) Migrant and winter visitor in very small numbers. Recorded in the Indus valley between Tikse and Spituk.

HIMALAYAN SNOWCOCK *Tetraogallus himalayensis* (R) (4) Found widely over most of Ladakh, though not common. Some movement to lower altitudes is apparent in winter, but the species does not descend to the open floors of the main valleys, and was not seen to approach fields or settlements.

TIBETAN SNOWCOCK *Tetraogallus tibetanus* (PR) Recorded only from eastern Ladakh. No long-range migration by this species has been noted, so it is presumed to be resident there. A party of 20 was seen in Phoyul valley, near Meru, in November 1981, feeding along the valley bed at 3,800m and

approximately 500m away from a party of *T. himalayensis*.

CHUKAR *Alectoris chukar* (R) (4) Common and widespread. In winter frequents stony hillsides and valleys, descending regularly in parties of up to 20 to feed in village fields. Occasionally seen feeding on berries in *Hippophae* bushes.

TIBETAN PARTRIDGE *Perdix hodgsoniae* (R) Not seen. Recorded only in the eastern plateau area of Ladakh. Ali and Ripley (1968–1974) say it is resident there.

WATER RAIL *Rallus aquaticus* (V) (1) A single bird was observed on 8 February 1984 at Shey marsh.

COMMON COOT *Fulica atra* (Mw) (1) A single bird was observed on 8 January 1982 at Shey marsh. This species is a regular passage migrant.

NORTHERN LAPWING *Vanellus vanellus* (Mw) (1) A single bird was seen on 18 December 1981 at Shey marsh. It may have been a straggler from the autumn passage: 40 were observed at this locality on 21 November 1981, 13 on 27 November and eight on 28 November.

COMMON GREENSHANK *Tringa nebularia* (Mw) (1) A single bird was seen on 4 February 1981 at Shey marsh.

GREEN SANDPIPER *Tringa ochropus* (MW) (4) Winters in small numbers. Frequents open-water margins in the Indus valley. Also recorded in north-east Tibet in January (Vaurie 1972).

COMMON SANDPIPER *Actitis hypoleucos* (Mw) (1) A single bird was seen at Shey marsh on 3 December 1981. It was not seen there on subsequent visits and was probably a late passage bird.

SOLITARY SNIPE *Gallinago solitaria* (R) (4) Winters in small numbers. Usually found along open stretches of hill streams, 3,400–3,700m. Occasionally also on the floor of the Indus valley around Shey marsh.

IBISBILL *Ibidorhyncha struthersii* (R) (4) Winters in small numbers. Frequents shingle banks along the Indus, and one bird was observed at Sani pool on 5 February 1982. Some of the summer population may move to lower altitudes in winter.

TIBETAN SANDGROUSE *Syrrhaptes tibetanus* (R) Recorded at Leh in December (Vaurie 1972) and a party was seen near Tikse in January 1982 by C. Denby (University of Southampton Ornithological Project 1981–2, Preliminary Report). This species normally occurs only in eastern Ladakh and these records may represent local movements during severe weather. Outside winter, a party of 11 was seen at Gya on 17 and 18 November 1981 feeding in village fields (see Plate).

SNOW PIGEON *Columba leuconota* (R) (3) Winters in very small numbers. Records from three winters of one or two birds feeding in fields with flocks of

other *Columba* spp. The Snow Pigeon is generally scarce in the Indus valley and mountains of central Ladakh throughout the year. It appears to be commoner in the Suru valley (Holmes 1986).

ROCK PIGEON *Columba livia* (R) (4) Common around villages, where large feeding flocks gather. It was not seen in Zaskar in winter and is unusual in the mountains. Often in mixed flocks with the next species.

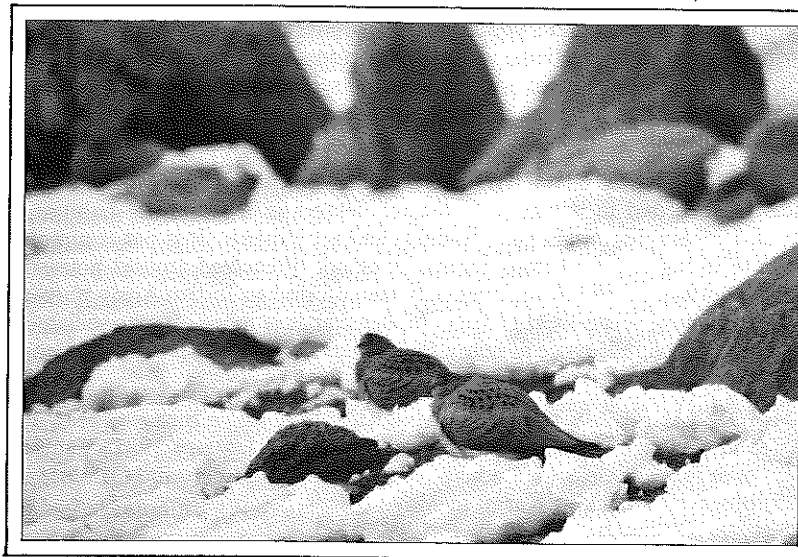
HILL PIGEON *Columba rupestris* (R) (4) Common resident. In winter seen in small parties and large flocks around settlements, often feeding in fields. Also seen in mountain valleys away from habitation and recorded in Zaskar in winter.

LAUGHING DOVE *Streptopelia senegalensis* (W) (3) Winter records were of two birds seen in Leh seven times between 2 December 1981 and 10 January 1982, two at Bazgo on 23 February 1983, and one in a plantation at Shey on 3 January 1984.

TIBETAN (LONG-BILLED) LARK *Melanocorypha maxima* (PR) Not seen. Recorded in Ladakh only in the eastern plateau area (Ali and Ripley 1968–1974). There are no reports of long-distance migration and it is presumably resident there.

HORNED LARK *Eremophila alpestris* (R) (4) Winters in large numbers. Found on open ground in valley bottoms, on hill slopes and fields. Avoids

Plate. Tibetan Sandgrouse *Syrrhaptes tibetanus* at Gya, Ladakh. (Photo: D. P. Mallon)



precipitous, rocky areas and was not recorded in Zanskar, possibly because of the heavy snow cover. Occurs in both small parties and large flocks. One flock of over 300 birds was seen near Tikse on 3 December 1981. It is possible that the winter population contains some birds from nearby parts of the Tibetan plateau.

ROSY PIPIT *Anthus roseatus* (Sw) (1) Apparently a winter straggler. Four were seen at Shey marsh on 3 December 1981 and six at the same locality on 8 January 1982.

GREY WAGTAIL *Motacilla cinerea* (Sw) (4) A few birds stay on for the winter. Seen along streams at 3,500–3,600m along the Indus valley. Recorded each year in Leh.

WHITE WAGTAIL *Motacilla alba* (SMw) (3) A common summer visitor and passage migrant. In winter it was seen four times between Shey and Spituk and twice in Leh.

COMMON STARLING *Sturnus vulgaris* (Mw) (2) Two were seen at Choglamsar on 2 December 1981 and one at Choglamsar on 15 January 1983. It is regular on passage.

BLACK-BILLED MAGPIE *Pica pica* (R) (4) A common resident in all villages along the Indus valley and its tributaries east to Meru and Gya, also in the Markha valley, Chiling and the area south-west of Khalse. Not yet recorded from Zanskar, but two were observed in Nierak, halfway up the Zanskar gorge on 31 January 1984, and not far from the northernmost villages of Zanskar, so it could spread there soon.

RED-BILLED CHOUGH *Pyrrhonorax pyrrhonorax* (R) (4) Common resident. In winter it frequents settlements, valley bottoms and the lower hills up to 3,750m. Often feeds in fields and gardens and seen daily in Leh. Rarely seen in remote mountain areas at this season. Seen in pairs and flocks up to a maximum of 300.

YELLOW-BILLED CHOUGH *Pyrrhonorax graculus* (R) (4) Common resident. Recorded in winter over the whole area in a variety of habitats: cliffs and gorges, mountain valleys, fields and settlements. It is not common along the Indus valley plantations and does not often feed around houses, though a flock of up to 100 was regularly seen around an Indian Army transit camp at Phyang, south-west of Leh. In Zanskar it is more often associated with villages. Overall, twice as many *P. graculus* as *P. pyrrhonorax* were seen. The two species were not observed in mixed flocks.

COMMON JACKDAW *Corvus monedula* (V) (1) A single bird was seen at 3,600m at a village in the Hemischu valley on 2–3 January 1982. Vaurie (1972) gave three records for Ladakh, in spring and summer, and Osmaston (1925) observed a flock at Kargil in May.

CARRION CROW *Corvus corone* (R) (4) Common resident in the villages of

the Indus valley, but less widespread than the Black-billed Magpie. Seen feeding in pairs and small parties in fields. A winter roost in Leh regularly contained up to 250 birds.

COMMON RAVEN *Corvus corax* (R) (4) Widespread resident. Found in winter singly or in pairs throughout the area, in the mountains, remote valleys and around villages. Seen on most days in Leh.

WHITE-THROATED DIPPER *Cinclus cinclus* (R) (4) Winters in small numbers. Mostly found by hill streams at 3,500–3,700m, but also on occasion by the Indus and Zanskar rivers.

BROWN DIPPER *Cinclus pallasi* (R) (4) Regular in winter and commoner than the last species (seen in the ratio 3:1). Recorded equally along hill streams and the major rivers. Seen in the Indus valley area, all along the Zanskar gorge and in Zanskar.

NORTHERN WREN *Troglodytes troglodytes* (R) (4) Small numbers were seen each winter around villages (scrub, terrace walls) in the Indus valley.

ALPINE ACCENTOR *Prunella collaris* (W) (2) One was observed in the Matho valley (3,850m) on 9 January 1982, two in the lower Zanskar valley on 13 February 1982 and one at Tikse on 20 February 1983. The first three birds were in rocky habitats and the last was feeding on the monastery roof with three other *Prunella* spp. Williams and Delany (1986) reported this species at Tikse in mid-winter 1981–1982.

ROBIN ACCENTOR *Prunella rubeculoides* (RW) (4) Very common in winter, recorded throughout Ladakh and Zanskar. Moves down in autumn from its breeding areas to villages and scrub patches in the valleys. Frequently seen feeding in gardens and in Zanskar closely associated with houses. Unusual in the mountains at this time. There appears to be an influx of winter birds from outside Ladakh.

BROWN ACCENTOR *Prunella fulvescens* (R) (4) An altitudinal migrant, with additional birds from outside Ladakh. Very common in winter throughout the Indus valley and central mountain areas, but was not seen in the Zanskar plain. Affects trees and bushes in remote mountain areas, villages and valley bottoms. Much less often seen around houses than the Robin Accentor. Very common in the Indus valley plantations (Williams and Delany 1986). In total, approximately equal numbers of Brown and Robin Accentors were seen over the four winters.

BLACK-THROATED ACCENTOR *Prunella atrogularis* (MW) (2) A single winter bird was seen at Tikse on 20 February 1983. Several were ringed there on autumn passage in 1977, 1980, 1981 and during winter 1981–1982 (Delany *et al.* 1982, University of Southampton Ornithological Project 1981–2, Preliminary Report).

STOLICZKA'S (WHITE-BROWED) TIT-WARBLE *Leptopoeile sophiae*

(R) (4) Regular in winter in small numbers. Recorded at many localities in valley-bottom scrub, especially in dense stands of *Hippophae rhamnoides*.

RED-THROATED FLYCATCHER *Ficedula parva* (Mw) (1) A single bird was observed in a Leh garden on seven days between 8 and 19 December 1981. Vaurie (1972) says the species is reported as breeding in Ladakh, as does Ripley (1982), but the locality he quotes, at 1,800m, is clearly not in Ladakh. Ali and Ripley (1968–1974) say that it has been recorded in Ladakh only as a passage migrant, which is most likely to be its status: there is very little insect life in Ladakh in winter and little chance of survival for potential wintering birds.

EVERSMANN'S REDSTART *Phoenicurus erythronotus* (V) (1) Two males were observed at 3,400m in the Hemischu valley on 6 February 1981 and one in the same locality five days later, the first records for Ladakh. It has been recorded in Baltistan, to the north-west (Vaurie 1972).

GÜLDENSTÄDT'S REDSTART *Phoenicurus erythrogaster* (RW) (4) Abundant in winter, the small summer population swollen by winter visitors. An altitudinal migrant, seen in the valley bottoms from late September on. It is invariably associated with bushes of *Hippophae rhamnoides* and can be found wherever the latter grows, in and around villages and in valley bottoms. The greatest concentrations occur along the floor of the Indus valley between Tikse and Spituk where dense stands of this bush are found. Daily counts in the area regularly exceeded 100, and 170 birds were counted one afternoon at Choglamsar; 3,489 were ringed or marked at Tikse in 1981–1982 (University of Southampton Ornithological Project 1981–2, Preliminary Report). Birds were also seen in remote mountain valleys where *Hippophae* grew, and in small numbers in Zaskar. Some remain at low altitudes until the end of April. Ludlow (1950) said that in winter the species 'swarms' in the parks and *Hippophae* thickets of Lhasa, Tibet.

RIVER CHAT *Thamnolaea leucocephala* (Sw) (1) A single bird was observed by a stream at a village in the Hemischu valley on 7 February 1981, the only winter record. It is a summer visitor in small numbers, recorded widely throughout the area.

DARK-THROATED THRUSH *Turdus ruficollis* (W) (4) The black-throated form is regular and not uncommon in winter in the plantations and scrub of the Indus valley, especially areas with *Hippophae*. Daily totals of 6–15 were seen. A single winter red-throated bird was seen at Shey on 2 December 1981.

DUSKY THRUSH *Turdus naumanni* (V) (1) Seen at Tikse in 1981–1982 (Williams and Delany 1986).

SONG THRUSH *Turdus philomelos* (V) (1) A single bird was present at Tikse from mid-November on, and was ringed later in the winter (Williams and Delany 1986).

BLUE WHISTLING THRUSH *Myophonus caeruleus* (Sw) (2) One was seen at Chiling on 28 February 1981 and one in Leh on 1 January and 13 February 1984. It occurs in summer in small numbers throughout the area.

LITTLE FORKTAIL *Enicurus scouleri* (V) (1) A single bird was observed by myself and Chering Nurbu by a stream at 3,400m in the Indus valley near Khalse on 14 January 1984. The only other record for Ladakh is of a pair in the Suru valley on 23 July 1977 (Williams and Delany 1979).

RUFIOUS-NAPED TIT *Parus rufonuchalis* (?) (1) Status uncertain. Two were seen and photographed on 28 January 1984 and one seen on 30 January 1984, in remote side-valleys along the Zaskar gorge. Both were at about 3,800m in patches of trees (one in juniper, the other in mixed willow and birch). It has not been recorded previously in Ladakh. Given that it does not normally undertake long-distance migrations, it may well be resident in these areas, perhaps a relict population from a time when Ladakh had more tree cover. According to Vaurie (1972) it is known in Baltistan and western Tibet, and Whistler (1925) said it was common in the juniper woods of Lahul, to the south-east of Ladakh.

GREAT TIT *Parus major* (R) (4) Regular in winter in villages and plantations along the Indus valley, but not seen in the villages of Zaskar.

WALLCREEPER *Tichodroma muraria* (R) (4) Seen in small numbers in Leh, villages and rocky valleys (up to 4,000m in January).

BAR-TAILED TREECREEPER *Certhia himalayana* (V) (1) A single bird was seen in Leh by Chering Nurbu on 10 February 1981 and by me on 13 February. There are two previous records for Ladakh, in April and November (Vaurie 1972).

HOUSE SPARROW *Passer domesticus* (R) (4) Regular in winter but apparently in smaller numbers than during the summer. Found in villages and plantations in small groups and large flocks. In Zaskar, only one bird was seen, the summer population having apparently moved to lower elevations.

SPANISH SPARROW *Passer hispaniolensis* (V) (1) A few recorded at Tikse in late winter 1981–1982 (Williams and Delany 1986) are the only records for Ladakh.

ADAMS'S (BLACKISH-WINGED) SNOWFINCH *Montifringilla adamsi* (R) (4) A common altitudinal migrant, regularly seen in winter. Seen on snow-free ground on hill slopes, in valley bottoms, in open parts of the Indus valley and around villages. In Zaskar it is common around houses. Several flocks containing over 100 birds were observed.

BLANFORD'S (PLAIN-BACKED) SNOWFINCH *Montifringilla blanfordi* (?) Not seen in winter. Three birds were seen and photographed at Gya on 18 November 1981 around village fields, and Vaurie (1972) gives four records

from eastern Ladakh, in summer and autumn. No long-range migration has been noted, and this species probably also winters in eastern Ladakh.

RED-FRONTED SERIN *Serinus pusillus* (R) (4) Quite common in winter. Small parties were recorded widely around villages, on open ground and in mountain valleys.

EURASIAN GOLDFINCH *Carduelis carduelis* (Sw) (1) Two were seen in Leh on 10 January 1983 and one there on 14 January. These seem to be the only records for the Indus valley area at any time of year. It is fairly common in summer in the Suru valley and in Zanskar, but none was seen in the latter area in winter.

TWITE *Acanthis flavirostris* (R) (4) A few flocks, the largest containing 85 birds, were seen each winter at Leh, Shey and other villages.

PLAIN MOUNTAIN FINCH *Leucosticte nemoricola* (?) (1) Common in summer throughout the area, but only recorded during one winter, 1983–1984, when flocks of 60 and 100 birds were seen in fields in the lower Indus valley, and a flock of 30 at Nierak. It is unclear whether the species was overlooked in other winters or normally leaves the area.

BRANDT'S MOUNTAIN FINCH *Leucosticte brandti* (R) (4) Seen in small numbers in mountain valleys, on open stony ground and along field margins, but more often found away from villages than most other passerine species. Occasionally descends to the Indus valley floor in severe weather.

MONGOLIAN FINCH *Bucanetes mongolicus* (W) (3) Seen on stony ground, in rocky valleys and, rarely, at village margins, and observed at various points in the Indus valley, Markha valley and Zanskar gorge. Seen in pairs and large flocks: over 150 were observed feeding on a bare slope at the summit of a pass (4,200m) on 16 January 1984. Said to be quite common at Tikse in early summer (Williams and Delany 1986).

COMMON ROSEFINCH *Carpodacus erythrinus* (Sw) (1) A winter straggler. Four seen at Sabu near Leh on 29 January 1981, and two at Tikse on 20 February 1981. It is an abundant summer visitor to the whole of Zanskar and Ladakh.

STREAKED ROSEFINCH *Carpodacus rubicilloides* (RW) (4) An altitudinal migrant, common in winter around villages and in plantations and thickets in river valleys. Numerous between Tikse and Spituk, but not seen at this season in mountain valleys or in Zanskar. Williams and Delany (1986) say that some of the wintering birds come from the Tibetan plateau, which is highly likely in view of the small summer population in the study area.

GREAT ROSEFINCH *Carpodacus rubicilla* (RW) (4) An altitudinal migrant, more widespread but fewer in number than *C. rubicilloides*. Recorded at many localities in the Indus valley, Zanskar gorge and villages of the Zanskar plain. Much more a mountain bird than the last species,

occurring in rocky valleys, remote mountain areas and on bare stony slopes, as well as at village margins and in trees and scrub in valley bottoms. It is a rather uncommon and local breeding bird and the winter population appears to be increased by birds from outside Ladakh.

PINE BUNTING *Emberiza leucocephala* (W) (3) Between one and five birds were recorded in each of three winters at four villages in the Indus valley and at Chiling. One bird was feeding in a garden, the others were in *Hippophae* bushes. Williams and Delany (1986) said that small numbers roosted in the Tikse plantation from November on.

YELLOWHAMMER *Emberiza citrinella* (V) (1) A single bird was seen at Tikse in December 1981 (Williams and Delany 1986).

REED BUNTING *Emberiza schoeniclus* (V) (1) Occurred very occasionally at Tikse in 1981–1982 (Williams and Delany 1986).

DISCUSSION

Around 275 bird species have been recorded in Ladakh to date, and the 84 listed here represent 30.5% of that total. Of these 84, 46 were seen in three or four winters and, plus four presumed residents (Tibetan Snowcock, Tibetan Partridge, Tibetan Sandgrouse, Tibetan Lark), are regarded as regular in winter, making a total of 50 regular winter species. Seventeen species were represented by a single bird seen over four winters: eight of these are vagrants, eight are regular passage migrants, and one is a summer visitor. The remaining 17 species were recorded in one or two winters and more than one individual was seen. Some of these are also likely to be vagrants (e.g. Eversmann's Redstart), some are irregular winter visitors and stragglers, and several may turn out to be regular winterers (e.g. Alpine Accentor, Black-throated Accentor, Rufous-naped Tit, Blanford's Snowfinch).

Detailed analysis of the winter avifauna is complicated by lack of accurate census data on individual species and the difficulty in separating summer, winter and migrant populations. However, the 50 regular wintering species may be further broken down as follows. Nine species are migrants and winter visitors (Mallard, Long-legged Buzzard, Saker Falcon, Merlin, Green Sandpiper, Laughing Dove, Dark-throated Thrush, Mongolian Finch, Pine Bunting). Two species are migrants and summer visitors to the study area, of which a few birds overwinter (Grey Wagtail, White Wagtail). Three species (Common Merganser, Solitary Snipe, Stoliczka's Tit-Warbler) are reported as breeding or probably breeding in Ladakh by Ali and Ripley (1968–1974). They were not observed in the study area during the summer, and winter individuals are probably altitudinal migrants from nearby parts of the Tibetan plateau, but some may originate from non-local sources. Five species are summer breeders augmented by large numbers of winter visitors (Robin Accentor, Brown Accentor, Guldenstädt's Redstart, Streaked

Rosefinch, Great Rosefinch). Twenty-five are resident species with no apparent changes in population from summer to winter, and the four presumed residents are assumed to have stable winter populations. The precise status of two species (Northern Goshawk, Northern Sparrowhawk) is unclear: both are commoner in winter, but records from the summer months suggest that one or both may breed in Ladakh.

Most wintering species arrive by late September–early October, and some are present until the end of April–beginning of May, with considerable overlap in each case with summer visitors. However, spring migration begins by the end of February and is well under way during March, and many winter birds begin to leave at this time.

The majority of wintering birds are concentrated in a narrow altitudinal band in the main river valleys and around villages where fields and trees provide food and shelter. In remote mountain areas the only species seen regularly and widely in winter are Golden Eagle, Lammergeier, Himalayan Griffon, Himalayan Snowcock, Yellow-billed Chough, Brandt's Mountain Finch, Mongolian Finch and Great Rosefinch, with Brown Accentor, G\u00fcldenst\u00e4dt's Redstart and Stoliczka's Tit-Warbler in scrub patches and the two dipper species on open streams. Hill Pigeon, Horned Lark, Adams's Snowfinch and Red-fronted Serin are occasionally seen in such areas.

Few comparisons with other areas can readily be made. Ludlow (1950) reported on a three-year stay in Lhasa and included comments on several species that wintered there. Lhasa, like Ladakh, lies in the Outer Plateau zone, but evidently has a milder climate.

There is plenty of scope for further work in Ladakh: a single observer may well have overlooked some species in such a large area, and other vagrants and winter stragglers will no doubt turn up, while more research could clarify the status of some species recorded so far. An obvious line of enquiry would be a survey of the winter avifauna of the Suru valley in western Ladakh, which would usefully complement the report by Holmes (1986), and ornithological investigations of the eastern plateau and Nubra-Shyok valleys would be of great interest, if these areas were ever opened to visitors.

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D. P. Mallon, 98 Wilbraham Road, Manchester M14 7DR, U.K.