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A. J. Gaston, 30 Dufferin Road, Ottawa, Canada K1M 2A8.

The migration of raptors south of Annapurna, Nepal, autumn 1985

FRANK E. DE RODER

Raptor migration was observed over Khare, south of Annapurna, Nepal, from 20 October up to and including 7 November 1985. Nearly 9,000 raptors of some 30 species were counted, with Steppe Eagle *Aquila rapax nipalensis* being the most numerous species.

Birds of prey have recently been found to use the Himalayas as an east-west pathway in autumn. This phenomenon was first described by Fleming (1982), who made observations in October and November 1975 in the Kathmandu Valley, and also at Dampus south of Annapurna where at least 490 raptors were seen from 3 to 5 November 1976.

In 1984 between 26 and 28 October I was accompanied by Rob Bijlsma, Steen Christensen and Mogens Henriksen in the area between Birethante and Naudanda south of Annapurna, where we observed 1,047 raptors of 15 species migrating to the south-west (Bijlsma *in prep.*). In 1985 I decided to return to the area to observe the migration of raptors for a longer period. I was accompanied by Gerard Verschoor throughout the study and by Rob Lensink for the period 20–25 October. We found a suitable observation point near Khare, and this paper describes the migration of raptors over Khare from 20 October up to and including 7 November 1985.

LOCALITY AND WEATHER

The Annapurna massif lies near the northern border between Nepal and Tibet and includes 11 high peaks of 7,000–8,000 m (Figure 1). It is bounded at the west and the east by two large rivers, respectively the Kali Gandaki and Marsyandi, whereas the southern side is drained by the Modi Khola, Seti Khola and Madi Khola (Figure 2). Between the high peaks and the lowlands there is an enormous variety of hills and mountains. At altitudes below 2,000 m most of the land is used for agriculture and between 2,000 and 3,000 m there are oak/rhododendron forests.

Khare (1,646 m) is a very small village (c. 50 houses) along the trail from Naudanda to Birethante. From a ridge south of the village there is an excellent view towards Pokhara. The small villages near Naudanda are all situated on top of a mountain ridge which has an east-west direction. On the north and south side of the ridge there are rivers which feed Phewa Tal, the lake near Pokhara.

During the observation period the wind blew very consistently from the south to south-east, force 1–3 (Beaufort). The daily temperatures fluctuated between 13 and 23°C. The visibility was usually very good, except over 27–29

October when it was misty with low cloud near Naudanda much of the time. Normally it was mainly sunny in the mornings and after 14h00 clouds formed at an altitude of 2,200–2,500 m.

METHODS

From 20 October up to and including 7 November we spent 135 hours on 18 days watching raptor migration near Khare. We watched from a small hill about 3 km east of Khare on the first two days of the observation period.

Figure 1. Nepal with mountains above 4,000 m.

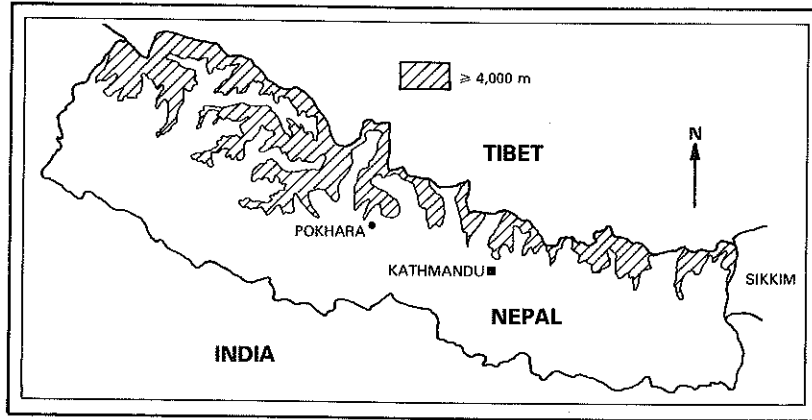
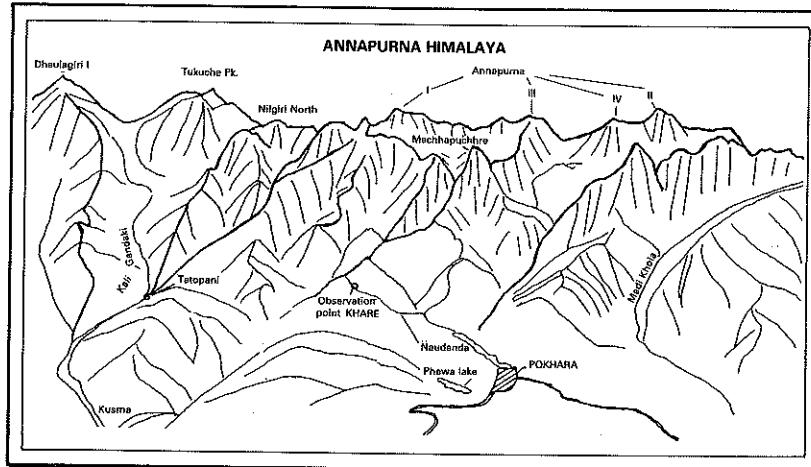


Figure 2. Annapurna himalaya and position of observation point.



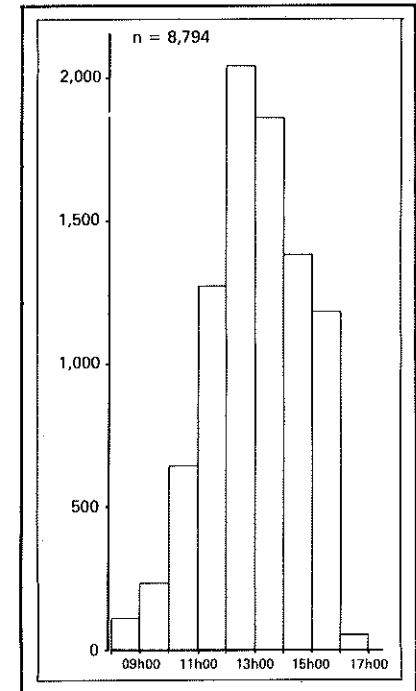
Later we used a higher ridge just south of Khare where the viewing conditions were much better.

Most of the time two observers were present, but during the first five days there were three. We used 10×40 and 8×30 binoculars. Identification of the raptors was possible with the use of the raptor identification section in Inskipp and Inskipp (1985) and Fleming *et al.* (1979).

Usually observations started at 08h00 local time. Nearly all the raptors passed in the period 10h00–16h00 except some local vultures, kites, sparrowhawks and falcons which were seen before 10h00. Hardly any raptors were seen after 16h30 (Figure 3). Before 09h00 many eagles were roosting in the forests along the hills north of the Yamdi Khola north-east of Khare.

All observers looked in an easterly direction: one spotted the birds in the Yamdi Khola valley north of Naudanda, one in the Marse Khola and over Phewa Tal south of Naudanda (see Figure 2). As the air warmed up at about 10h00 the eagles started circling with heavy wing-flaps. With considerable difficulty they gained height and as the air became warmer, flapping changed to soaring. Between 10h00–11h00 several thermals developed. Most raptors spent a great deal of time soaring, especially during the morning. After

Figure 3. Raptor migration according to the time of day.



reaching the top of thermals they glided down in a westerly direction. Most of the soaring birds were first spotted north of Naudanda near Dampus. They glided from Dampus in a south-westerly direction over the ridge near Naudanda, then circled again and glided in a westerly direction, thus crossing the observation point (Figure 4). In the afternoon, as clouds formed at an altitude of 2,200–2,500m, the birds found it more difficult to soar and they then flew past flapping more and more, especially north of the Yamdi Khola valley. After 16h00 many eagles were seen near the oak/rhododendron forests looking for a resting place.

SYSTEMATIC LIST

The daily totals of all raptor species seen during the observation period are listed in Table 1.

Nearly 9,000 raptors of some 30 species were counted (Figure 5). Most of the raptors passed between 50 and 500m above the observers and could be identified easily.

CRESTED HONEY BUZZARD *Pernis ptilorhynchus* A fairly common resident and passage migrant in Nepal (Inskipp and Inskipp 1985). As only two were noted, on 25 October and 5 November, it is likely that the major migration period is earlier (September–October).

Figure 4. Direction of raptor migration.

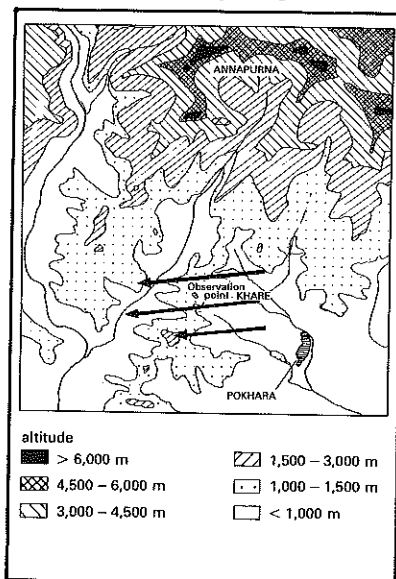
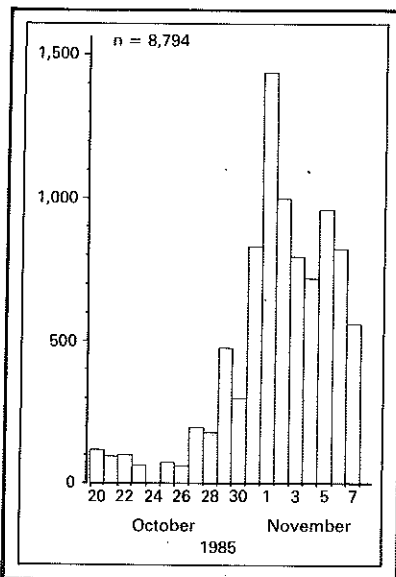


Figure 5. Total raptor migration per day.



BLACK KITE *Milvus migrans* Recorded between 20 October and 6 November. Of the birds which were aged, 23% were adults and 77% juveniles. A small proportion of the birds counted were probably resident. Autumn migration has been observed in the Kali Gandaki valley, where 254 Black Kites were seen between 14 September and 1 October 1973 (Thiollay 1979).

EGYPTIAN VULTURE *Neophron percnopterus* A total of 74 birds was seen, 61% of these adults, 36% immatures and 3% juveniles. Most of the birds counted were apparently resident while 11% were seen migrating in a westerly direction.

HEN HARRIER *Circus cyaneus* Small numbers of migrants were noted throughout the observation period. The highest daily total was ten on 6 November. The age and sex composition of the 66 birds was: 19 adult males and 47 females/juveniles. Most birds appeared between 08h00–12h00, flying low over the valleys.

PALLID HARRIER *Circus macrourus* Only two birds, both females, were positively identified as Pallid Harriers, on 22 October. Their very slim appearance, extremely buoyant flight, well-marked head pattern and narrow white patch on the uppertail coverts made identification possible.

Table 1. Raptor migration at Khare, central Nepal – migration east-west.

species	October										November							total				
	20	21	22	23	25	26	27	28	29	30	31	1	2	3	4	5	6		7			
Crested Honey Buzzard																						
Black Kite																						
Egyptian Vulture																						
*Lammergeier																						
*Oriental White-backed Vulture																						
*Himalayan Griffon																						
*Red-headed Vulture																						
Hen Harrier																						
Pallid Harrier																						
Montagu's Harrier																						
Harrier sp.																						
*Northern Goshawk																						
Betra																						
Northern Sparrowhawk																						
*Crested Goshawk																						
Shikra																						
Sparrowhawk sp.																						
Common Buzzard																						
Long-legged Buzzard																						
Buzzard sp.																						
*Black Eagle																						
Steppe Eagle																						
Imperial Eagle																						
*Golden Eagle																						
Eagle sp.																						
*Bonelli's Eagle																						
*Mountain Hawk-Eagle																						
Lesser Kestrel																						
*Common Kestrel																						
Amur Falcon																						
Saker Falcon																						
Laggar/Saker Falcon																						
Peregrine Falcon																						
Barbary Falcon																						

123 99 99 63 77 64 197 177 475 300 832 1,444 997 792 718 956 822 559 8,794
 *resident species for which the figures represent hourly maxima.
 On 24 October raptor migration was not counted.

MONTAGU'S HARRIER *Circus pygargus* On 21 and 26 October single females were noted flying in a south-westerly direction.

BESRA *Accipiter virgatus* Noted in small numbers throughout the observation period, hunting small passerines in the valleys and migrating west.

NORTHERN SPARROWHAWK *Accipiter nisus* On 26 and 28 October respectively one and two birds moved west, flying low over the valley.

SHIKRA *Accipiter badius* Only three observations of single birds on 22 and 29 October and 1 November. The one on 22 October moved west, while the others were apparently resident.

Accipiter sp. A total of 15 birds could not be specifically identified because they flew very low in the valleys and were only seen briefly.

COMMON BUZZARD *Buteo buteo* A small, very pale Buzzard migrating to the west on 23 October was identified as *B. b. japonicus*. Small numbers of *B. b. refectus* occurred almost daily.

STEPPE EAGLE *Aquila rapax nipalensis* By far the most numerous species migrating over Khare. The first Steppe Eagles were seen on 20 October but during the first five observation days numbers were very low, probably because of bad weather (a hurricane) in early October. Numbers increased from 27 October onwards with a maximum of almost 1,400 birds on 1 November (Figure 6). About 90% passed between 10h00–16h00 and the strongest passage was between 12h00–14h00 (Figure 7). A total of 3,381 birds (43%) were aged, of which 28% were juveniles, 28% immatures and 44% adults (Figure 8). If the observations during the first four days are omitted (extremely low numbers – see Table 1), then the number of juveniles increased during the observation period, whereas the number of immatures decreased slowly and the number of adults remained more or less stable. The age composition of migrating Steppe Eagles in Nepal is different from the age composition of migrating Steppe Eagles in Egypt (Bijlsma 1981). In Egypt the migration started with juveniles, and by the second half of October adults formed almost 80% of the migrating birds. The flock size of migrating Steppe Eagles is given in Figure 9: 58% migrated in small flocks of 1–5 birds, 30% in flocks of 5–20 and 12% in larger flocks.

IMPERIAL EAGLE *Aquila heliaca* A total of nine birds was recorded between 20 October and 5 November. The age composition was three adults, three immatures and three juveniles. It is possible that there were some Imperial Eagles among the unidentified eagles.

Aquila sp. Only five eagles were unidentified, all during the beginning of the observation period when only very few eagles occurred. Later there was

always 'reference material' in the air which made identification easier.

LESSER KESTREL *Falco naumanni* A total of 77 Lesser Kestrels was counted: 56% of these were during the first five days of observation. The age and sex composition was 46% males and 54% females/juveniles.

AMUR FALCON *Falco amurensis* A total of 138 birds was recorded, 96% of them in October. The age composition ($n=120$) was 3% males, 9% females and 88% immatures. Often small flocks of 5–10 birds were seen. Most birds

Figure 6. Migration of Steppe Eagles in autumn 1985.

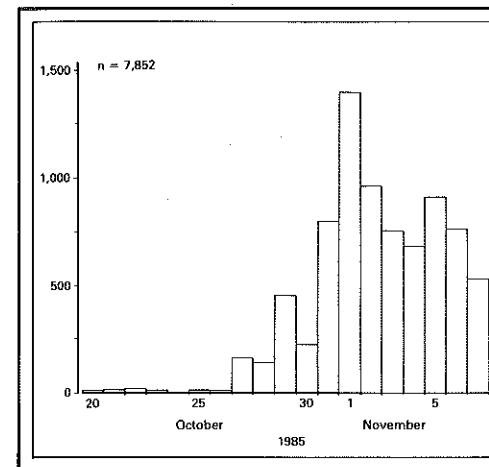


Figure 7. Number of Steppe Eagles according to the time of day.

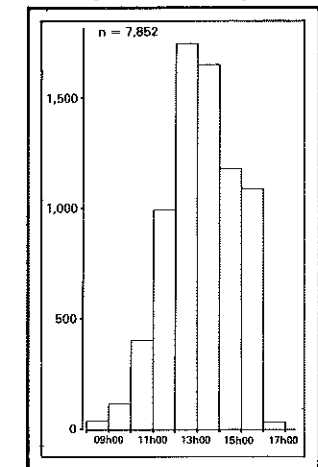


Figure 8. Age composition of Steppe Eagles in four-day periods.

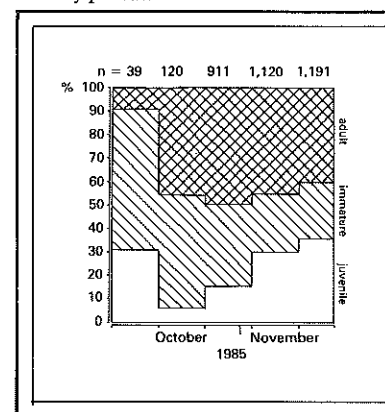
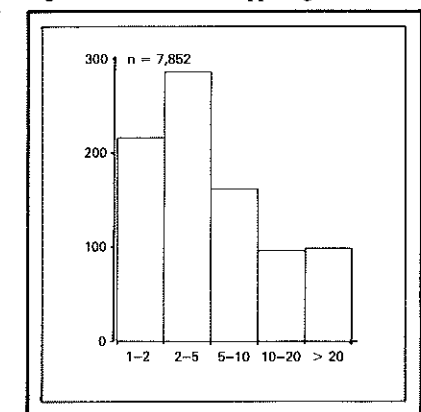


Figure 9. Flock size of Steppe Eagles.



(55%) appeared between 10h00–12h00. Near Phewa Tal, Pokhara flocks of 100–150 birds could be seen going to roost in October.

SAKER FALCON *Falco cherrug* On 20 and 25 October and 5 November single birds migrated in a westerly direction.

PEREGRINE FALCON *Falco peregrinus* Two records of single birds on 20 and 29 October; the first was identified as a female. Both birds migrated in a westerly direction.

BARBARY FALCON *Falco pelegrinoides* Two records of single birds, one on 29 October and one on 3 November, migrating in a westerly direction.

DISCUSSION

The large number of migrating raptors south of Annapurna was not completely surprising. In 1984 we saw some evidence of migration at Naudanda whilst walking to Jomosom, and Fleming (1982) described the migration of *Aquila* eagles at Dampus not far from Naudanda and Khare. In 1976 he counted 717 eagles at Dampus between 2–7 November. He estimated an average migration intensity of 200 birds per hour over a seven-and-a-half-hour period (giving a total of 1,500 eagles per day) and postulated that the migration period covered 30 days. If correct these estimates suggest that an annual total of 45,000 individuals is involved.

In my opinion this number is an overestimate. During our observation period we counted 7,852 Steppe Eagles (Figure 6). If the first seven days of the observation period (involving less than one per cent of the Steppe Eagles) are omitted, an average of about 650 eagles passed per day. As the migration of Steppe Eagles was still continuing at the end of November in Kathmandu Valley it is likely that the migration period is longer than 30 days. As no studies have been carried out in the last three weeks of November it is not possible to estimate the total number of birds involved annually but, even assuming the passage continues throughout this period at the high rate of 650 per day, it is unlikely that the total exceeds 20,000. If the passage tails off later in the period the total number may be between 10,000 and 20,000.

First of all I am very grateful to my fellow traveller Gerard Verschoor who spent almost 18 days with me on top of a hill watching eagles. He made boring hours without migration bearable. Special thanks also go to Rob Lensink who joined us during the first six days of the observation period and who motivated us to continue. We found a good home and learned to understand the Nepalese way of life better in Baba's Lodge (Welcome for Cold Drinks) in Khare. We learned a lot from the very kind inhabitants: Bolli, Tsuk, Laxmi, Ama, Radjoe, Massina, Tuke and Maiita. Rob Bijlsma and Carol and Tim Inskipp kindly commented on the first draft and corrected the English.

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