THE STATUS, POPULATION STRUCTURE, AND BREEDING DATES OF THE AFRICAN LAMMERGEIER *Gypaetus barbatus meridionalis*

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Abstract

The African Lammergeier (*Gypaetus barbatus meridionalis*), occurring in mountainous country from Yemen south through Ethiopia and East Africa to Lesotho and adjacent parts of South Africa, is listed as threatened in the ICBP *Red Book* (Fisher, Simon, and Vincent 1969). The authors state that the African Lammergeier is common only in the northern and southern parts of its range but is locally abundant only in Ethiopia. They imply that the nominate North African race *G.b. barbatus* is less threatened. This paper attempts to clarify the status and some other facts about the African Lammergeier and to demonstrate that the race is not at present threatened because of its abundance in Ethiopia.

Methods

Between 1963 and 1975 the number of Lammergeiers seen in Ethiopia (and whether they were immature or adult) was recorded and summarized in my field notebooks and diaries. One can usually determine whether a Lammergeier is adult or immature at 400-500 m with the naked eye in good light and at up to 4-5 km with x12 binoculars. The conspicuous white heads of adults show up clearly. In 1975 it also became clear that the immatures could be subdivided into different age groups, described later; but since this was not done between 1965 and 1974, no adequate quantitative data on the various age groups are available for those years. Of 527 Lammergeiers recorded in Ethiopia, however, only 49, 9.3 percent, could not be identified as adult or immature. Most of them were seen at very long range or against the sky as I traveled fast in a car. Samples from mountain areas include fewer unidentified individuals (15/234 or 6.4 percent) because in these areas I was usually on foot or muleback and could take longer to identify distant individuals.

Of the counts I made in towns where I spent several days, only the highest thorough count has been included, since observation shows that the same individuals visit the same areas daily. A good count in any town can usually be made between 0900 and 1000 h, when Lammergeiers are searching for food but have not yet soared to great height. Different individuals can be recognized by molt or minor plumage differences. In mountain areas, when several days were spent at one camp, I avoided counting birds in the same area twice. Although there is still some risk of double-counting, errors have thus been minimized.

Data from Ethiopia were compared with a small sample from Spain for 1955 and one from Lesotho for 1973, giving a comparative sighting rate per day as a crude index of relative abundance. These have been supplemented from published data, numerous personal observations in East Africa, correspondence with other observers, and the East African Natural History Society's and the South African Ornithological Society's nest record card schemes.

Status and Numbers

Good recent data from Yemen are lacking. Nothing is recorded in Meinertzhagen (1954) regarding this area. It seems likely that the Lammergeier may still be fairly common in mountainous parts of Yemen, since land-use methods have probably altered little, and accordingly there is no obvious reason why the status of the Lammergeier should have changed. In the rest of the race's range numbers are assessed as follows:

1. *Ethiopia:* Common, locally abundant (more than 10 seen daily in preferred habitat). Most numerous around towns and villages, but also numerous in high mountains in northwest Ethiopia, e.g. Semien Mountains. Daily sightings varied from none to a maximum of 23 in one day at Gondar in 1965. In 150 days on which Lammergeiers could have been seen, 527 were recorded, an average of 3.5/day overall. The average sighting rate in towns and inhabited areas, 4.4/day, is higher than in thinly inhabited or uninhabited mountain areas, 2.8/day. However, the latter figure is biased by a long expedition through the Bale and Arussi mountains in southeast Ethiopia in 1966, where in a total of 54 recorded days only 87 were seen, an average of 1.6/day. The species is much less common there than in the Semien Mountains, where in 24 days 134 were seen, 5.6/day, an even higher average rate than in towns and villages in the same general region. The overall sighting rate of 3.5/day may be compared with 10 in 15 days in Spain, 1955, 0.66/day; and 8, perhaps 10, in 10 days in Lesotho in 1973, 0.8-1.0/day.

There is thus no question that the Lammergeier is relatively common in Ethiopia, perhaps more so than anywhere else in the world except Tibet (Schaefer 1938). Total numbers cannot be estimated on present available evidence. However, it occurs over about three-fourths of the main Ethiopian highland massifs that total about 475,000 km^2 but is absent or scarce in the forested southwest. Normally it is common only above 1800 m in elevation but occasionally occurs lower (in the deserts of the Awash Valley down to 300 m), though it is not known to breed at these lower elevations. Four known nesting sites range from about 2500-3700 m, but it also probably nests below 2000 m.

No thorough surveys have been possible to establish the home range of a pair. In one area, two known nest sites are approximately 3.5 km apart, suggesting a range per pair of 12-15 km^2. However, Lammergeiers nesting relatively close together along cliffs in gorges probably travel many miles daily over flat plateaus lacking any nesting sites, so that average home ranges in practice would probably be much larger. Assuming however that the home range per adult pair averages 100 km^2 (a density certainly exceeded locally), there could then be about 4750 pairs in Ethiopia, and since 22.6 percent of the population is immature, perhaps 11-12,000 birds altogether. If this estimate is even approximately correct, the African Lammergeier is not a threatened race.

2. *East Africa:* In Kenya the African Lammergeier is widespread but uncommon or rare in high mountain ranges and on isolated peaks. Recorded from Mt. Marsabit (North, pers. comm.); Mt. Kulal, more than 3 birds (P. Saw, in litt.); Matthews and Ndotos ranges, certainly 4-6 pairs, and Muruanisigar, Turkana (G. H. H. Brown, in litt.); Ololokwi (Ol Donyo Sabachi) north of Archer's Post (unpub. data and North, pers. comm.); north of Kapenguria in western Pokot District (T. Barnley, in litt.); Cherangani Hills, more than 1 pair; Mt. Elgon, at least 2 pairs; Mt. Kenya, possibly 5

pairs; Ngobit (unpub. data and R. Hook, pers. comm.); along the Rift Valley from near Naivasha to near Ngong (North 1944, and unpub. data); Ol Donyo Orok and east of Chyulu Hills (Van Someren 1939); and even at Maungu, at only 800-900 m (Hopson, pers. comm.). These records suggest that although the species is much rarer in Kenya than in Ethiopia or even Lesotho, the Kenya population may be about 20-30 pairs.

In Tanzania it is recorded from Mt. Longido, Kilimanjaro, Mawenzi, and Mt. Meru, perhaps 10 pairs (G. H. H. Brown, and unpub. data); the Crater Highlands, at least 5 pairs (unpub. data, and Fuggles-Couchman and Elliott 1946). Its most southerly outpost is probably Mt. Hanang (Fuggles-Couchman 1953). There may be another 20-25 pairs in the mountains of northern Tanzania.

In Uganda it occurs on Mount Elgon; in northern Acholi; Karamoja (Mt. Moroto and probably Mt. Kadam); Ruwenzori; but not on Nyamlagira; in Zaire (Pitman, in litt., quoting Haddow, Bere, and personal records). There must be at least 5, possibly 10 pairs in Uganda. The total East African population therefore is probably at least 50-60 pairs. Although rare, it is apparently not threatened, as the population appears stable.

3. *Southern Africa:* There is a complete gap in the range from Mt. Hanang in northern Tanzania to the Orange Free State, Natal, and Lesotho. In Lesotho Rudebeck (1961) found Lammergeiers quite common, and there it has recently been studied in detail at the nest (Guy and Tomlinson, in prep.). At least one breeding pair is known in the Golden Gate National Park in the Orange Free State (Newman 1969); and it occurs along the Drakensberg escarpment; in Natal in Giants Castle Game Reserve; and almost certainly in east Griqualand, northern Cape Province, since I saw one within 1.5 km of the border between east Griqualand and Lesotho in November 1973.

In Lesotho, in 10 days spent in suitable areas, I saw certainly 8, probably 10 different individuals, of which 7-9 were adults and 1 an immature. Rudebeck (1961) saw 21 including 17 identified adults and 2 immatures. My own sightings, averaging 0.8-1.0/day (without making any special effort to find the birds), are about a quarter of the average sighting rate in Ethiopia, indicating that the Lammergeier is much less common in Lesotho than in Ethiopia. However, my average sighting rate per day is apparently at least as high as Rudebeck's, suggesting no marked recent decrease. It is also about the same as the average sighting rate per day of the Golden Eagle *Aquila chrysaetos* in northwest Sutherland in 1967, in an area surveyed in detail on foot, where the known density of Golden Eagles is one pair per 4600 ha (11,400 acres) (Brown 1967). Even supposing that a pair of Lesotho Lammergeiers requires about three times the range of a pair of Golden Eagles (150 km^2), there could still be about 100 pairs in 15,000 km^2 of mountainous Lesotho suited to Lammergeiers. The total southern African population may thus be about 120 pairs, rather than the 20-25 pairs sometimes casually mentioned for South Africa as a whole.

Thus, the total population of *G.b. meridionalis* might be about 12,000 birds in Africa, with an unknown, but probably large, population in Yemen. Most of the African birds live in Ethiopia, with small groups totaling not more than 200 pairs in East and South Africa. Even in East and South Africa the small populations appear stable and are not obviously threatened or declining (Brown 1977, Kemp & Kemp 1977). Although the African Lammergeier is thus not apparently threatened with extinction in any part of its range, it should nevertheless receive complete protection as a magnificent and completely harmless bird.

Population Structure

Between 1965 and 1975, inclusive, I have recorded 527 Lammergeiers in Ethiopia, probably about 80 percent of those seen. After 1965 almost all have been recorded. Of the 478 identified individuals 370 (77.4 percent) were adults, and 108 (22.6 percent) were immatures. Forty-nine (9.3 percent of the total) could not be identified. These figures compare with 31 percent immatures in the Bateleur *Terathopius ecaudatus* (Brown and Cade 1972) and 16-24 percent in the African Fish Eagle *Haliaeetus vocifer* (Brown and Cade 1972, Brown and Hopcraft 1973). The proportion of immatures in the Ethiopian population appears much higher than in Lesotho (3/27 or 11 percent) (my figures and Rudebeck 1961); and in the small sample from Spain (1/10 or 10 percent) in 1955.

In Ethiopia high mountain areas with sparse or moderately dense populations of peasant farmers and graziers are mainly occupied by adult Lammergeiers, whereas immatures and subadults tend to congregate around village and town rubbish dumps. Table 1 shows that in 84 days spent in mountains, I saw 188 adults (85.8 percent of identified birds) and 31 immatures (14.2 percent). In towns and predominantly inhabited areas on the plateau 182 adults (70.4 percent) and 77 immatures (29.6 percent) were seen in 66 days. Counts made only in mountains or around towns and villages would thus give a misleading picture of the population structure.

The Ethiopian Lammergeier appears nearly twice as common in and near towns and villages as in mountain areas, but the mountain sample is biased by the results of one long expedition in Bale and Arussi, in which only 83, including 62 adults and 13 immatures, were seen in 52 days. In Bale and Arussi, in 54 days (some results stolen in 1973) 87 Lammergeiers were seen, averaging 1.6/day, whereas in four trips to Semien, totaling 24 days, 134 were seen, or 5.6/day. The proportion of immatures seen in the Bale Mountains, 13/78 or 16.67 percent, is also higher than in Semien, 13/128 or 10.16 percent. This might be because in Semien large towns and villages are closer to the main mountain massif than in Bale so that immatures could more easily move there. However, it seems likely that, as in some other large birds of prey (e.g., Gargett 1975), immature Lammergeiers are unable to remain in the breeding ranges and must subsist in areas not occupied by breeding adults. In Ethiopia, the fact that immatures can readily find scraps of meat, skin, and bones around any village rubbish dump or slaughterhouse may improve survival and help to explain the apparently higher proportion of immatures in the Ethiopian than in the Lesotho or Spanish populations.

No detailed description of the molt from first immature to adult plumage in the Lammergeier seems to be available, while the visible plumage characters are complicated by the known cosmetic habits of the birds. However, according to Glutz von Blotzheim et al. (1971), the Lammergeier assumes adult plumage in about 5 years. The first immature plumage has the head blackish brown, and pale edges to the feathers of the back and wing coverts sometimes produce a pale patch on the upper back. In the later subadult plumages the pale edges disappear on the upper side, and pale or white feathers molt in on the breast and belly. The course of the plumage changes, presumably based on observation of captive birds, is, however, not described accurately.

In wild Ethiopian birds at least three phases of immature plumage are distinguishable:

1. Presumed juvenile; head and neck blackish brown, contrasting with a paler dull brown breast and belly; upper side dark brown with pale or whitish streaks some-

times coalescing; this probably would correspond to the first immature plumage as described by Glutz von Blotzheim et al. (1971).

2. Presumed immature; head and neck remain blackish brown, but the pale streaks disappear from the back and upper wing coverts, which are more uniform paler brown; breast and belly more rufous brown.

3. Subadult; in what is assumed to be an immediate subadult plumage approaching maturity, white feathers grow in on crown and cheeks; the head is now clearly separated from a still paler, more rufous, breast and belly by a dark chestnut neck-ring; sclerotic eye ring bright red, iris whitish, as in adult.

Phases 1 and 2 look very similar from below; and as relatively few Lammergeiers can normally be viewed from above, they have been lumped in a small sample since 1974 when an attempt was made to separate age groups of immatures. Among 22 identified immatures, 20 were in phase 1 or 2 and only 2 in phase 3. This small sample suggests that only about 1 immature in 10 survives to adulthood. Certainly, very few individuals in the distinctive phase 3 are seen.

If Lammergeiers assume adult plumage in about 5 years, like the African Fish Eagle, and as suggested by Glutz von Blotzheim et al. (1971), then, on the basis of theoretical mortality rates of 50 percent in the first year and 20 percent per year thereafter (Brown and Cade 1972) and a breeding rate of 0.55 young/pair/annum (see below), adult Lammergeiers must live 13.7 years as adults and 18.7 years altogether to maintain a stable population. However, Lammergeiers might actually take longer to reach maturity, as suggested by recent molt studies of Griffon Vultures *Gyps* spp. by Houston (1975). Griffons apparently take at least 7 years to attain adult plumage, completing a primary wing molt in 3 years. He quotes Menzbier (1894) to the effect that Lammergeiers take 2 years to complete a body molt but only 1 to complete a wing molt; if so, they would perhaps mature more quickly than Griffons. If, however, their rate of assuming adult plumage is similar to that of Griffons and the Bateleur *Terathopius ecaudatus* (Brown and Cade 1972), then, again using the theoretical mortality rates for the Bateleur (50 percent in year 1 and 10 percent per annum thereafter), adults must live for 14.3 years as adults and 21 years altogether. Available figures for age-classes of immatures, which cannot in any case be correlated with good molt studies in captive birds, do not currently permit any better approximations.

Adult plumage is normally rather rich pale rufous below, but the coloration is caused by a powdering of iron oxide (see e.g., Jackson & Sclater 1938, Berthold 1967). Adults are sometimes seen with pure white undersides, and zoo captives usually become pure white. In the Crater Highlands, Tanzania, in October 1957, one of a pair seen in Olmoti Crater was pure white, the other rufous. At Makalle, Tigrai, Ethiopia, in September 1975, several adults were pure white below; but by late October all adults seen had become rufous. Thiollay (1968) saw many individuals with pure white undersides in Corsica in July and August and, in April 1966, a pair of which one was white, the other rufous. These observations suggest that the rufous color of breast and belly can easily be lost or washed off, though normally maintained by cosmetic activities. The fact that all adults at Makalle in September 1975 were pure white, just after an unusually heavy rainy season, suggests that in a prolonged period of wet weather the rufous color may be more easily lost than at other times.

Breeding Dates

Yemen: There are apparently no published records (Meinertzhagen 1954). Ethiopia:

six good egg-date records (1,C1; 1,C2) include four in October and two in November. Laying thus occurs at the end of the main rainy season in north and west Ethiopia, but the single November record for the Bale Mountains in the southeast is during a subsidiary rainfall peak.

In Kenya, R. Hook took an egg on May 8 (Meinertzhagen 1944), which may have been laid in April. A pair in the Njorowa Gorge at Naivasha has laid (in three definite records) once in January, once in April, and once in early May; other observers' reports suggest that this pair has laid about April-May, at the height of the rains; young are flying by November. In Uganda Pitman records an egg from north Acholi in January (East Africa Nat. His. Soc. nest record cards). There appear no certain egg dates from Tanzania, but immatures have been seen on Kilimanjaro and Mt. Meru (G. H. H. Brown, in litt.).

The few available records from East Africa and Ethiopia suggest that, in countries where the entire protracted breeding season (at least 180-200 days from nest building to independence of the young) can be completed in dry weather, egg laying occurs early in the dry season; but that in the intertropical convergence zone (where two three-month rainy and dry seasons alternately annually), the Lammergeier is as likely to lay in the rains.

Two recent Lesotho records are for May (Guy, pers. comm.). A pair photographed by Barnes and others near Mokhotlong in Lesotho laid in June (Barnes, pers. comm., Pearse 1974). Two South African nest record cards for eggs are in July and August, and one for young in September (South African Orn. Soc. Nest record card scheme). A pair was incubating in Golden Gate National Park on 21 June (Newman 1969) and had a chick in the same nest in September (Steyn 1970). These records all suggest peak laying in South Africa about June, in the depths of winter, and are compatible with records of midwinter laying, in January or even December, in southern Spain (Glutz von Blotzheim et al. 1971).

Breeding Frequency and Success

The scanty data available on the subject of breeding frequency and success do not suggest that the Lammergeier is an unusually infrequent breeder or, consequently, unusually long-lived. One Ethiopian pair observed for four consecutive years bred in two years and in two other years frequented the usual breeding site and apparently had no alternate. Another pair bred in 1973, but not in 1974 or 1975. The Naivasha pair in Kenya were reputed to have reared young annually from 1964-69, but not in 1970, though they again bred successfully in 1971. They certainly succeeded in 1964, 1969, and 1971, but definitely did not breed in 1970. After 1972 they were much disturbed by rock-climbers and did not breed but may have succeeded again in 1975. Thus, in 7 pair years in Ethiopia young were reared in 3, 0.43/pair/annum; and in 4 years in Kenya one pair reared three young, 0.75/pair/annum. Combined, the breeding success of these three pairs is 0.55/pair/annum. This record is similar to that of a number of large eagles (e.g., Gargett 1970, Brown and Hopcraft 1973) and better than some large solitary vultures, e.g., the Lappet-faced Vulture *Torgos tracheliotus* (Pennycuick 1976), but is far lower than the breeding success of the strongly colonial Rüppell's Griffon (*Gyps rueppellii*) in Serengeti (Houston 1976) in which success per occupied nest approaches 100 percent. In this case, however, the number of non-breeding pairs could not be assessed. Taken in conjunction with the proportion of immatures in the total population, the rather inadequate data on breeding success do not suggest that the Lammergeier is exceptionally long-lived, but further data are needed.

In 1963 one Ethiopian egg was taken for electrophoretic analysis. In 1964 the same site was again used and had a downy chick; but Ethiopians threw burning brands into the nest and destroyed it. The site was never used again up to 1971, though the adults remained in the vicinity, suggesting that a catastrophe may inhibit breeding for several years.

Reasons for Abundance or Relative Scarcity

The Lammergeier is often apparently commensal with rather primitive pastoral cultures, where large populations of domestic stock are maintained under hard mountain-range conditions and consequently subject, with inadequate veterinary services or none at all, to high death rates. In Ethiopia, the Lammergeier is commensal with man, feeding on scraps of meat and carrion as well as bones, and, in Tibet, following the plough in spring to obtain grubs from the spread manure (Schaefer 1938). The Lammergeier disappears or becomes rare in areas where efficient stock-keeping and modern sanitation prevail, e.g., in Switzerland. Even in Ethiopia it is commoner in inhabited mountain ranges such as Semien than in the almost uninhabited Bale Mountains. In East Africa the Lammergeier must compete for bones with very much more powerful or numerous predators and scavengers such as the Griffon Vultures *Gyps rueppellii,* and *Gyps africanus*; spotted hyenas *Crocuta crocuta*; or jackals *Canis* spp. Lammergeiers cannot successfully contest prey with domestic dogs on rubbish dumps, or with *Gyps rueppellii* at a carcass.

The Ethiopian highlands support about 15 million cattle, at least 25 million sheep and goats, and 3 million equines, all with high death rates from disease, accident, or starvation. Here too the Lammergeier must compete with jackals and spotted hyenas for the available bone supply but, being diurnal, often has the first chance after larger flesh-eating vultures have stripped a carcass. Moreover, it is not wholly dependent on bones. Near villages and towns adults and immatures readily obtain their requirements from discarded scraps of meat, skin, and bone. An adult has been seen to walk clumsily three times in succession into a patch of dense bush to feed on the body of a dead gelada baboon *Theropithecus gelada,* in each case taking a cropload about 1 km away to a nest containing a large young bird and returning for more soon after regurgitating the food on the nest edge. However, Lammergeiers do undoubtedly feed on bones to a large extent and are often seen dropping them (Brown 1970). I have also seen the process in Spain in 1955, and there are several good records from India (e.g., Lowther 1947). Occasionally, they may also kill their own prey (Newman 1969).

In Ethiopia, religious beliefs forbidding good Christians and Muslims to eat animals not correctly slaughtered probably contribute to the abundance of food available to Lammergeiers and other scavenging birds. Probably similar beliefs would apply in Yemen. In Lesotho, on the other hand, no such religious taboos prevent hungry herdboys from eating an animal which has died; this could be a contributory factor in the relative rarity of the Lammergeier in Lesotho compared to Ethiopia, though conditions are otherwise rather similar (Guy, pers. comm.). However, the difference could also be due to less favorable climatic conditions, notably a severe winter. Even in East Africa Lammergeiers seem commoner in mountain ranges inhabited by pastoralists such as the Maasai than in uninhabited massifs; but they are so uncommon that their members cannot be assessed quantitatively.

Scavenging and carrion-eating birds commensal with man are considerably more abundant in Ethiopia than in East Africa. In counts summarized for thinly inhabited

East African grasslands (Brown 1970) scavengers and carrion-eating raptors made up 55.7 percent by numbers and 75.7 percent by biomass among 32 species of birds of prey; vultures (excluding very rare Lammergeiers) comprise 59.4 percent of the biomass. In densely inhabited Ethiopian highlands and lowlands scavengers and carrion-eaters generally make up more than 80 percent by number and more than 90 percent of the biomass, though roadside counts tend to become biased when the roads pass through frequent villages where such birds congregate. For instance in 6 days, 5-10 May 1970, between Addis Ababa and Dessie in northern Ethiopia, of 462 individuals of 16 species of birds of prey, 387 (83.8 percent) were scavengers or carrion-eaters, equivalent to 93.2 percent of the biomass. They included 18 Lammergeiers seen on 5 days (one spent in lowlands with no Lammergeiers), representative of the general average sighting rate, 3.6/day. Lammergeiers made up 4.65 percent by number of scavengers, 7.0 percent of the whole biomass, and 7.52 percent of the scavenger biomass. About 15 percent of an average sheep consists of bones so that, allowing for some competition with other bone eaters and the fact that Lammergeiers do not eat all bones, such figures are not incompatible with the available bone supply. The major part of any carcass is made up of soft flesh and intestines, eaten by the large vultures.

The large numbers of scavenging and carrion-eating birds commensal with man have also been noted by Galushin (1971) in New Delhi, and a similar predominance of scavengers and carrion eaters has been recorded in a variety of biotopes in South America (Reichholf 1974). The usefulness of such scavenging birds as sanitary squads in the tropics has recently been stressed by Pomeroy (1975).

The main threat to the continued abundance of the African Lammergeier is not direct persecution, from which it suffers little in either Ethiopia or East Africa (though it is to some extent persecuted in Lesotho); nor is it, as suggested by Fisher, Simon, and Vincent (1969), indiscriminate poisoning, which seems to have little serious effect even in South Africa. Rather, it may in time be threatened by improvements in stock-keeping methods, disease control, better sanitation, and consequent reduction in the present readily available supply of food in its range. Such a situation is still remote in its main stronghold, Ethiopia.

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Table 1. Lammergeier counts: Ethiopia, 1965-75.

Year/Month	Predominantly densely populated areas with towns/villages					Predominantly mountain areas without towns/villages				
	Days obs.	Adults	Imms.	Unid.	Total	Days obs.	Adults	Imms.	Unid.	Total
1961	10	39	15	7	61	9	24	3	3	30
1966 January to April	2	2	1	0	3	52	62	13	8	83
1966 May	4	8	6	0	14	2	4	1	0	5
1969	1	1	–	–	1	–	–	–	–	–
1970 June	6	16	8	0	24	–	–	–	–	–
1971 June	2	5	2	1	8	4	29	4	3	36
October to December	2	6	1	2	9	7	28	3	0	31
1974 January to March	4	29	15	9	53	4	34	3	0	37
September	4	17	11	7	35	–	–	–	–	–
October and November	25	47	14	8	69	2	3	0	1	4
1975 September to November	6	12	4	–	16	4	4	4	0	8
Total	66	182	77	34	293	84	188	31	15	234
Percent		70.4	29.6				85.8	14.2		
Spain, 1955							15	9	1	10
Lesotho 1973						10	7(9)	1	8(10)	

Total days observation		150	
Adults	Identified	370 = 77.4%	
Immatures		108 = 22.6%	
Unidentified		49 = 9.3% (of total)	
Total		527	
Identified		478	

Nos. seen/day: Overall 3.5: In towns, etc. 4.4: In mountains 2.8
In Bale Mts.: 87 in 54 days = 1.6/day
In Semien Mts.: 134 in 24 days = 5.6/day

(Most town sightings and inhabited areas in North and West rather than South and East Ethiopia)