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ASG NEWS

Correction

The "Preview of Antelope Survey, Part 3" given in the last Gnusletter (Vol. 8, No. 1) contained the following errors on page 2, column 3: "...the small number of very large conservation areas (>120,000 sq km)" should read >20,000 sq km; and the area of the Tai N P -N'Zo Faunal Reserve is not >4,5009 but >4,500 sq km.

Additions and Corrections to ASG Membership List

Because of a letter to Gren Lucas that went astray, the following people were never officially appointed to the ASG, and I failed to notice that their names were not on the membership list appended to the January, 1989 Gnusletter. Gren has assured me by telephone that their appointments will shortly be formalized.

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The following newly appointed members are welcomed to the ASG:

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Substitution

ASG member Piet Van der Walt is leaving Namibia's Directorate of Nature Conservation and Recreational Resorts to return to the National Parks Board of South Africa. His ASG replacement is Mr. H. J. Schrader, Chief Nature Conservation Researcher (same address).

ASG PARTICIPATION IN UPCOMING MEETINGS

The Species Survival Commission is holding its 64th Meeting in Rome (Department of Animal and Human Biology, University of Rome), on the 20—22 August, just before the Fifth International Theriological Congress (22—29 August). Specialist group chairmen are expected to make 10-minute presentations on the work of their groups, and to arrange meetings of their members who are in attendance. Unfortunately, neither the ASG Chairman nor Deputy Chairman is able to be present. Therefore the plea for ASG members who will be in attendance to notify me, carried in the last Gnusletter, is repeated here with redoubled urgency. Most important is someone to serve as Acting ASG Chair-

man, both to present a report (which we'll provide) and to arrange an ASG meeting.

Another event, of more than passing interest to the ASG, that will take place during the Theriological Congress is a one-day Symposium on the Status and Research Priorities for Conservation in the Sahara-Gobian Region. Convened by the USSR Committee for UNESCO/MAB and the IUCN, the symposium will (quoting from the announcement) "assess the current status of biodiversity in the region and...identify research priorities which will contribute to a more productive relationship between people and the biological resources of the desert environment. Particular attention will be given to the biosphere reserve approach as a mechanism for conserving wildlife as part of the development process."

Two of some 24 experts invited to contribute papers (to be published as a book) are ASG members: Mark Stanley Price will be asked to talk about rehabilitating desert ecosystems through reintroduction of ungulates, with particular reference to the Arabian oryx, and John Newby will discuss the new approaches to conserving desert ungulates being tried in Niger's Air-Tenere Region (more under Reintroductions).

To remind ASG members who will be attending the Rome meetings one more time: please seek out delegates from Asian and Mediterranean countries who can contribute information about antelopes to the final part of the Antelope Survey.

SURVEY OF MISCELLANEOUS AFRICAN ARTIODACTYLS

A number of African ungulates have remained unclaimed by the different ungulate specialist groups which, taxonomically speaking, should be responsible for them. At the urging of Simon Stuart, SSC Species Programme Officer, Rod East, the ASG's resident workaholic, has volunteered to take on the buffalo, giraffe, okapi, and water chevrotain. "I am happy," he wrote Simon (19 Apr. 89), "to organize and compile the survey of Hyemoschus, Syncerus, and the Giraffidae (as time permits!), which will make up part 5 of the 'Antelope' Survey."

Keith Eltringham, Chairman of the Hippo Specialist Group, and William Oliver, Chairman of the Pigs and Peccaries Specialist Group, have agreed to survey the hippo and African swine. All of these species will be included in a questionnaire, modeled on the ones used, respectively, for the Antelope Survey and Red Data Book, which will be circulated among the network of correspondents that Rod developed in the course of the Antelope Survey, plus others with special knowledge of these ungulate orphans.

"The information required for the 'miscellaneous' species is: for each country, an assessment of each species' current distribution, population, status (according to Red Data Book categories), threats to survival, occurrence within protected areas (including populations and trends if available), and additional conservation measures proposed (if relevant)" (East, in lit to Eltringham, 9 Apr. 89).

Karen Ross Greer, an ASG candidate whose article on sable in Kenya appears in the Regional Rundown, is planning a book on antelopes that will promote public interest in their conservation. She writes (in lit. to Estes, 9 Mar. 89) from Maun, Botswana, where she has settled with husband, Sande, and two-year-old daughter, Lena Rae:

"I have been developing an idea of doing a 'popular' coffee table book on antelopes. It seems that nothing like that has been done, and that antelopes are a neglected group of African animals. For instance, I was constantly surprised by the lack of basic knowledge or interest amongst the tourists we took out on game drives. Anyway, I want to do a PR job on antelopes! We are still waiting for final confirmation from publishers, but it should go ahead. If so, I would like to donate a small percentage of the royalties to antelope research and conservation work. What are your feelings on this?* There are too many antelopes to manage in a single book, so I plan to select a handful, based on beauty or rarity."

*Bullish [Ed.]

Jonathan Kingdon writes (in lit. to Estes, 6 Jan 89), that he has just finished a book on Centres of Endemism in Africa, "and apart from a visit to Ethiopia with Chris Hillman last year, I am a bit out of touch. I leave for Papua next month."

ANTELOPE NEWS

SPOORING DUIKERS

Responding to Glyn Davies's account of his forest antelope survey methods in the last *Gnusletter* (under Sierra Leone, p. 8), newly appointed ASG member Andrew Plumptre writes (in lit. to Estes,1 Mar. 89), "Working in the forest of the Parc National des Volcans," trying to census the bushbuck and black-fronted duiker, I can readily appreciate his problems.

"The technique that I am using is the pellet count, as I feel that this, although very labor intensive, gives the best results. (This can however be too difficult to do where you have a lot of similar species in the same area — I have had duiker producing dung very similar to bushbuck!)

"I do not favor the visual counting of small antelopes by walking transects as these animals often freeze in vegetation and can be missed easily. (I have to admit that you feel pretty stupid walking past a duiker in an open meadow and missing it, only for it to be flushed by someone else!) I certainly would not use this technique in the Parc des Volcans, which has a dense understory vegetation , some of which can hide a buffalo at 10 feet.

"Drives probably are the best quick method; however, I would suggest that several drives are done over the same area if censusing small antelopes. ... As I said at the beginning, if dung can be differentiated between species, (shape is usually used although some studies have included pH), then the pellet count is the best technique. Duiker can be awkward in that their pellet groups may be very clumped if they use certain areas as latrines (often on territorial borders in the case of the black-fronted *[Cephalophus nigrifrons]);* however, if enough areas are searched, a good estimate can be obtained.

"There is one major snag with this technique, though, and that is that some idea of the number of pellet groups produced per day is required to correct the counts to animal numbers. This is where I feel zoos could easily do a study on captive antelopes, preferably varying the fiber content of the diet and observing the number of defecations per day at these

different fiber levels. This was recently done for some duiker (see *Af. Wildl. J.*, end of 1988), giving figures of between 3 and 5 per day. These animals mainly had a diet of fruit, which probably explains the low numbers, as most deer and antelope figures I know of are around 17-24 per day. Can anyone look at this in herbage fed duiker?

"Finally, as regards the antelope species found in this park, I think that only the above two species are to be found now. Yellow-backed duiker used to be here (according to Spinage); however, a good chunk of the Rwandan side of the park was cut in the early seventies, removing most of the lowland forest which may have been their main habitat. It is possible that yellow-backs can be found in the Nyungwe forest in the south of Rwanda. All specimens/skulls found dead in the forest there are being collected for identification."

JENTINK'S DUIKER

Glyn Davies has gathered more evidence of the occurrence of the elusive *Cephalophus jentinki* in Sierra Leone. In a letter to Rod East (17 Dec. 1988), he writes, "On the subject of Jentink's duiker once again, I have spent more time looking at the species' distribution. I have interviewed more hunters around Gola and am now prepared to give credence to earlier reports—animals were killed up to one year ago, and there is a distinct Mende name for Jentink's duiker. So they are sparsely distributed there. An animal dealer, Dr. Sitter, says he has seen skins and horns in the Loma Mountains area; in the Tingi Hills area; and near Gola East. He is knowledgeable...[and] his old reports should be given 'may still occur' status. Interestingly, he exported a pair to the States about 10 years ago—a Don Hunt of International Animal Exchange should know where they are."

WILSON'S DUIKER RESEARCH

Vivian Wilson, pursuing his Pan-African Decade of Duiker Research, has sent reports of his recent field work in Sierra Leone and Tanzania.

He also gathered evidence on the occurrence of Jentink's duiker in a different part of Sierra Leone. On a 10-day visit last December, Vivian and his son, Barry, were able to confirm that Jentink's duiker still exists in the western Area Forest Reserve on the Freetown Peninsula, together with the bay *(C. dorsalis)*, black *(C. niger)*, Maxwell's *(C. maxwelli)*, and yellow-backed duikers *(C. sylvicultor)*. It is also possible that zebra and other duikers occur there, as up to nine duikers occur in Sierra Leone.

"For such a small area, this is quite incredible," says Wilson, "and consequently the area should be properly protected." He recommends upgrading the Western Area Forest Reserve into a national park. . "To have a population of Jentink's and possibly other rare duikers so close to Freetown could be of considerable benefit to the country. ...Together with the beautiful white beaches, warm sea,...cool evergreen forests and the friendly people, the Western Area Forest Reserve could well become an important 'Wilderness Area National Park' where walking trails, could be a very popular attraction and of great economic importance to Sierra Leone."

The Wilsons intend to return to Sierra Leone at the end of the year to conduct a detailed survey. "With so many rare species in the Western Area Forest Reserve, and the fact that much hunting takes place in this non-hunting area, rapid action is...essential if the rare species and the forests in which they are found are to be saved."

Tanzania Visit Following a nine-day visit to Tanzania last October, to meet officials of the Game Department, National Parks, Serengeti Wildlife Research Institute, and professors at the University of Dar es Salaam, Wilson is now set to make a three-month preliminary survey of Tanzania's duikers.

In his report on the visit, he writes, "Tanzania is an extremely important country as far as the duikers are concerned. In the southern part of the country the Natal red duiker *(Cephalophus natalensis)* occurs, Harvey's red duiker *(C. harveyi)* [occurs] in the north and central areas, Ader's red duiker *(C. adersi)* on Zanzibar Island and even possibly on the mainland coast. The very rare and important Abbot's duiker *(C. spadix)*, unique to Tanzania, occurs in various isolated evergreen forests, and Weyn's duiker *(C. weynsi)* supposedly occurs in the west. The common duiker *(Sylvicapra grimmia)* and blue duiker *(C. monticola)* also occur in the country but are more common than the others and occur in a number of localities."

To whet his appetite for the coming field work, Viv saw tracks and droppings that appeared to be Abbott's duiker on Kilimanjaro, and examined and photographed a captive specimen in the Tanzania Wildlife Corporation's holding pens.

FOREST SITATUNGA

Responding to the discussion in the last two Gnusletters about the habitat preferences of bushbuck, sitatunga and the common or bush duiker, Mike Fay has sent a copy of a letter he wrote Peter Grubb (4 Feb. 89) regarding his experience with the first two species in the Central African Republic. Mike agrees with Harald Roth (*Gnusletter* 9(1):6) that the bushbuck is not found in primary continuous forest, as Peter suggested (*Gnuslet.* 7(3):4). Regarding the sitatunga, he writes:

"...This species is a habitat specialist. As far as I can tell, they are certainly most abundant in forest areas. They are invariably found in swamp forest or in permanently saturated soil areas. They occur quite commonly in the Southwest of the CAR in open clearings in the forest, mostly inhabited by species in the Cyperaceae. The sitatunga, of course, occurs outside of the main forest block but is always tied to permanently saturated soils. I have never seen it in our area in the upland forest, [but] always near the habitat to which it is adapted.

Grimm's duiker. This species is common in the CAR in sudano, sudano-guinean and guinean savannas. It is best adapted to the more densely wooded savannas and is quite common on the edge of gallery forests. I have never seen it inside a large gallery forest."

SCIMITAR-HORNED ORYX

It is possible that a few *Oryx dammah* still survive in northern Burkina Faso. ASG member Albert Heringa writes (in lit. to Estes, 12 Mar 89), "Very recently I was contacted by a young German cooperant

who worked three years in the Sahelien province of Soum in Northern Burkina. During private and professional field work he established a very good knowledge of the region, including a part of the Malian 'Gourma' on the other side of the border. His name is Manfred Graf. Among the many things he mentioned were two oryx he had seen in the rainy season (June-Sept.) of 1986. He saw them from a rather small distance near a waterhole, so he is very positive...

"He has also a lot of information from local chiefs and...hunters about the presence of oryx, gazelles and other antelopes, as well as ostriches, turtles, and many birds. He is rather convinced that oryx still exist in the region. I informed Rod East (for the survey) and Gland about it, hoping there will be some way to enable this man to verify and check his information and make conservation proposals. I thought his work perhaps worth mentioning in *Gnusletter*."

Adding the scimitar-horned oryx and addax to the U. S. Endangered List

In the last Gnusletter (p. 7), I asked for comments on my proposal to petition the U. S. Fish and Wildlife Service to place the scimitar-horned oryx and addax on the List of Endangered and Threatened Wildlife. Two responses have been received.

Bertrand des Clers, President of the International Foundation for Conservation of Game and Chairman of the Ethnozoology Specialist Group, writes (31 Mar. 89), "Just a word of warning which might not be relevant: the scimitar-horned oryx has been introduced into the U. S. already a number of years ago and has now attained population levels, notably in Texas, where it can be legally hunted as a trophy and is thus ensured of long-term conservation and development. I hope that the listing by the U. S. Fish and Wildlife Service of this species on the Endangered List would not...jeopardize the U. S. conservation success in this matter."

Dale Tuttle, Species Coordinator for Scimitar-horned Oryx of the American Association of Zoological Parks and Aquariums (and newly appointed to the ASG), writes (17 Feb. 89), "I read with interest your proposal to make [a] formal recommendation that the addax and scimtar-horned oryx be added to the U. S. List of Endangered and Threatened Wildlife. I want you to know that you have the full support of the AAZPA Species Survival Program for the scimitar-horned oryx. I made a formal proposal to them in 1985 for the scimitar, but was denied due to lack of support data. Perhaps now through the extensive work of those in the field (John Newby and others) the necessary support data can be provided. In my opinion, the listing would be most helpful in the fund-raising efforts toward the newly proposed multi-species reintroduction program in Niger. I will be attempting to raise a goodly amount of the funding here in the States. If I can be of help in any way, please call on me."

Having heard no other objections, and with this encouragement, I propose to go ahead. How soon the petition can be presented depends on how long it takes to collect the necessary documentation, in the form of reports, articles, and letters about the status of these two species.

CONSERVATION STATUS OF THE BONGO

In the last Gnusletter (8[1]:8), Marvin Jones questioned whether it is justified to refer to the bongo *(Tragelaphus [Boocercus] eurycerus)* as endangered. In response to his comments, Rod East has prepared the following summary of the ASG's assessment of this species' status, using the standard Antelope Survey criteria for assessing status.

Number of countries in which the bongo occurs: 14 (see below). There is a gap in this species' distribution between West Africa (Guinea to Benin) and Central Africa (southern Cameroon to eastern Zaire). Isolated populations occur in montane forests of Kenya (it may also have occurred in Uganda until recently).

Total population: Unknown, but it occurs widely in moderate numbers. It is locally common in some parts of its range, e. g., Liberia (Sapo NP), southeastern Cameroon (Sangha River), southwestern and southeastern CAR, parts of northern and central Zaire, and the southwestern Sudan, where Chris Hillman estimated a population of ca. 2000 in an area of 4500-5000 sq km. In some of these areas, e. g., CAR and Sudan, hunting pressure is reduced by the belief of local people that eating bongo meat causes leprosy.

Populations in conservation areas It occurs in at least 25 protected areas within its overall range. Large populations are known or suspected to occur in areas such as Sapo NP (Liberia), Tai NP (Ivory Coast), Maiko and Salonga NPs (Zaire), and the proposed Dzanga-Sangha Reserve (CAR). The isolated Kenyan population occurs in national parks and forest reserves on the Aberdares and Mount Kenya, and in the South West Mau Nature Reserve. The Aberdares population has been estimated to exceed 500, but sightings at tourist lodges in the Aberdares NP have declined in recent years. G. R. Cunningham-van Someren (in lit. to R. East, 9.6.88) reported that a party which visited the South West Mau Reserve in March, 1988 observed plentiful evidence of bongo.

Overall Status Satisfactory (not threatened).

Country by country assessments of the bongo's status:

Country	Status*
Guinea	R
Sierra Leone	En
Liberia	I
Ivory Coast	V
Ghana	En
Togo	En
Benin	En/Ex
Cameroon	S
CAR	S
Gabon	I
Congo	I
Zaire	S
Sudan	R
Kenya	R

*Ex, extinct; En, endangered; R, rare; V, vulnerable; I, indeterminate (i. e., endangered, rare, or vulnerable): S, satisfactory (not threatened).

The bongo is clearly not an endangered species and will not become one as long as the forest and forest-savanna mosaic zones of countries such as Zaire, CAR and Cameroon retain substantial populations. Nevertheless, its status is now precarious in West Africa, because of destruc-

tion of its forest habitats and illegal hunting. If unchecked, these factors could also undermine its status in the central African part of its range. Effective protection and management of areas with substantial populations, such as Sapo and Tai NPs, the proposed Dzanga-Sangha Reserve and others, will be essential to ensure this species' long-term survival.

CAPTIVE BREEDING

HIROLA IN CZECHOSLOVAKIA

Jan Smielowski of the Zoology Department, Academy of Agriculture, Poznan, Poland, who works on captive breeding of antelopes (see *Gnusletter* 8(1):7-8), has sent Rod East a copy of his paper on captive breeding of hirola or Hunters's antelopes *(Damaliscus hunteri)*, which was published in *Zool. Garten* N. F. 57:234-240 (1987). The only European stock of the hirola was maintained at the Dvur Kralove Zoo (Czechoslovakia) from 1971-81, originating from a group of two males and five females caught in the Garissa District of Kenya. Stress was an initial problem and the antelopes took a full year to acclimatize and adapt to their new environment. These adaptation difficulties were ascribed to the fact that all of the imported individuals were near-adults. Two females died within five months of their arrival at the zoo, but the other five imported animals survived for up to 10 years, 3 months.

During the 11 years 1971-81, 19 hirolas were born at Dvur Kralove Zoo, in the sex ratio of 1:1.7. The calves were born between April and November with 80% of the births falling between June and October. Fifteen of the births resulted from matings of the three surviving females imported from Kenya with one of the imported males . Four births resulted from matings of females born at the zoo with the other imported male. Juvenile mortality was 32%. The survival of 11 zoo-born individuals (above 3 months) which were kept at Dvur Kralove averaged 2 years 11 months. The longest-lived zoo-born individual was a female which survived for 6 years 5 months. Males and females reached sexual maturity in their second year. Pregnancy periods from 210 to 295 days were recorded, but these data are dubious because of the difficulty of recording all copulations in the group system of breeding among hirolas. Smielowski considers that the correct length of pregnancy was 227-242 days. The decline of Dvur Kralove's hirola stock started in 1979. The animals suffered from acidosis and tympanie in 1979, and twice from tuberculosis in 1980. In 1981, mycobacteriosis finally destroyed the hirola breeding group.

Does anyone know of another captive breeding group of this species?

REINTRODUCTIONS

ARABIAN ORYX IN SAUDI ARABIA

J. F. Asmodé, of the National Wildlife Research Center, a department of the National Commission for Wild Life Conservation and Development, has sent in reports about the reintroduction of *Oryx leucoryx* to the Mahazet Assed Protected Area, 150 km east of Taif. The 2650 sq km reserve is protected by a 220 km chain-link fence.

Mahazet Assed is a plateau consisting of gravel and sandy plains and a few very small jebels [hills], where in the recent past Saudi Arabia's three species of gazelles and an important population of Houbara bustard used to range. "Unfortunately," it says in the NWRC 1988 Annual Report, "...it was easy to hunt with vehicles in this area, and these four species became extinct locally."

To find out if the Mahazet Assed could again support these animals and other vanished species like the oryx and ostrich, vegetation studies were undertaken in 1987, with particular attention to known good fodder plants for the oryx and gazelles. The results showed that the grazing was still good, with a sizeable presence of *Pannicum turgidum* and *Eleucine compressa*, two preferred fodder grasses, and a large number of trees (notably *Acacia tortilis* and *A. ehrenbergians)* to provide shelter and food during the summer. One of the advantages of this site for the oryx reintroduction was the varied landscape, including areas of dense cover where, in case of fighting, dominated animals could hide from aggressors.

To acclimatize the oryxes to their new environment and to one another before releasing them in the reserve, a 2.5 sq km pre-release enclosure was established, with two 25 ha enclosures 1 km apart connected to a 200 ha main enclosure.

On November 30, 1988, nine Arabian oryx (5.4) were airlifted from the San Diego Zoo to Saudi Arabia. These animals were descendents of the nine founders of the World Herd, five of which were captured in 1962 during Operation Oryx, and four of which came from the late King Saud Bin Abdulaziz's collection in Riyadh. Eight other oryx (4.4) were captured in the Shaumari Wildlife Reserve in Jordan, and were due to be flown to Mahazet Assed last March. Hopefully by next fall, when conditions will be good following the summer drought, the oryx will have formed a cohesive herd and can be turned loose in the reserve.

The reintroduction of the Arabian oryx is the first attempt in Saudi Arabia to reestablish an extinct species. The American animals were offered as part of the AAZPA Species Survival Program; they were gathered in the San Diego Wild Animal Park from different American zoos by Jim Dolan. Other oryx from the American World Herd have been bred in Saudi Arabia and are held at the late King Khaled's farm at Thumamah near Riyadh (see below under Saudi Arabia in Regional Rundown), and at the National Wildlife Research Center near Taif. The latter herd numbered 59 head (26.33) in September 1988; however, the Saudi Arabian animals have been subject to severe outbreaks of tuberculosis. As current efforts to produce individuals completely free of the disease succeed, more home-grown oryx will be released into the reserve.

Other research and breeding programs being pursued at the National Wildlife Research Center and at the King Khalid Wildlife Research Center are aimed at reintroducing the three gazelles, the Nubian ibex *(Capra ibex nubiana)*, as well as native birds, fishes, and plants.

REGIONAL RUNDOWN

ZAIRE

John and Terese Hart have written an article on their work in the Ituri Forest, which is supported by Wildlife Conservation International, especially for the *Gnusletter*. In a covering letter (9 Mar. 89), they say, "We've been feeling a bit guilty all this time, sitting in Zaire in the middle of the Ituri Forest, and never sending off a word on what is happening in 'our neck of the woods.' The January issue of *Gnusletter* was enough to inspire us to sit down at the computer."

"We've been off of antelopes lately, but not too far, as we are now beginning the fourth year of our radio-telemetry study of the okapi. We hope to be back to duikers with a comparative study of all six species (plus chevrotain) on mixed forest and monodominant forest study areas.

"We are especially excited about developments at Epulu, in particular the efforts to establish a national park in the Central Ituri Forest."

[N. B. Hopefully the Harts' example will inspire other ASG members and *Gnusletter* readers to follow suit. Ed.]

Current Status of Antelopes in the Ituri Forest of Zaire

Eastern Zaire contains some of the largest and biologically richest areas of primary rain forest remaining in Central Africa. Despite their large area, however, these forests and their fauna are faced by a number of imminent threats. Although human population density is low over most of the forest (average 0.5 to 2 inhabitants/sq km), the region is bordered by some of the most densely settled areas of Zaire. Large logging concessions have already been allocated along the major roads, and the forest is increasingly viewed as a settlement frontier. Many of the mammal species, in particular the ungulates, are being hunted, sometimes with devastating results, even in remote regions.

Our purpose is to present an overview of the current status of antelope species in the Ituri Forest of Zaire (see map), emphasizing the impact of hunting on their populations, and the prospects for their conservation. Our observations span the last 16 years, form 1973 through the present, during which time our focus has included studies of the ecology and economy of local hunters, and research on the feeding ecology of the duikers.

Closed mature forests covers over 80% of the Ituri forest region. Overall, these forests are floristically diverse (we have collected 350 to 400 species of trees and lianes); however, this diversity is not uniformly distributed. Large areas of upland mixed forest co-occur with adjacent stands that are dominated by single species of Caesalpineaceous trees (T. Hart et al. 1989). Swamp forests comprise a small percentage of the area. Recent secondary forests and cultivation are mainly concentrated near the roads, as is most current settlement and forest cutting. Natural clearings are rare. These occur as small openings on dry rocky outcrops, and in swampy pans ("edo"). Grassland is only found at the forest-savanna boundary.

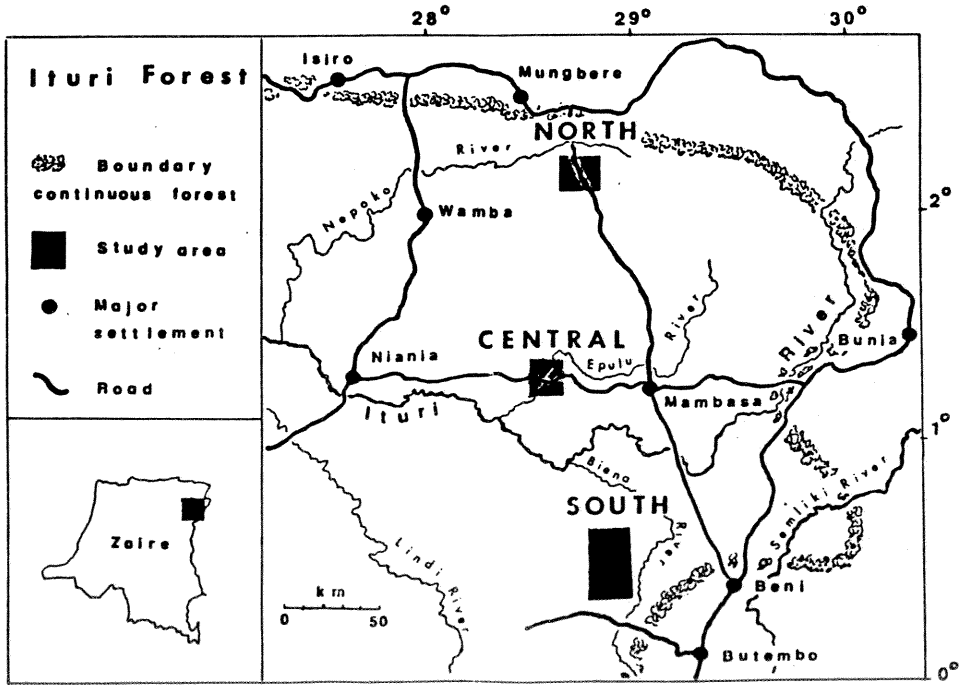
Species Accounts

Ten species of antelopes occur in the Ituri Forest (see Table 1). The local form of *Cephalophus callipygus* has no dark patch on the back and appears to belong to the subspecies (or species, depending on which authority is followed) *weynsi*. Following Meester and Setzer (1971), this species was identified as *C. natalensis* in an earlier publication (Hart, 1978). The Ituri form of the blue duiker *(C. monticola)* appears to differ from other populations. The females do not have horns, a condition which separates them from populations of the same species further west in Gabon.

Three species, *Tragelaphus spekii, T. euryceros* and *Neotragus batesi*, are primarily folivorous. The two tragelaphines are rare in the forest interior, and localized to more open habitats. The bongo is significantly more abundant further north toward the forest margins (Maika-Penge Reserve near Isiro).

The pygmy antelope *(N. batesi)* is also associated with forest openings, but because of its small size it is able to use smaller habitat patches such as treefall gaps. Hence it is relatively more widespread. This is also the one species which regularly occurs in active gardens near settlements. We have never recorded the bushbuck (T. scriptus) in the central or southern Ituri Forest. It does not occur in the forest interior, although it is common at the forest-savanna ecotone.

Frugivorous species, duikers and chevrotain, are the most abundant of the forest antelopes. Population estimates of this community ranged from under 20 to



almost 40 (average 25.1) animals per sq km. These estimates were derived from drive counts on [our] 600 sq km study area around Epulu in the central forest and are correlated with track and pellet group counts (Hart 1985; Koster & Hart 1988). The blue duiker, the most common species, accounted for an average of 59% of all flushes. Three upland "red duikers", C. *leucogaster, C. callipygus/weynsi*, and *C. dorsalis*, accounted for most of the remainder of flushes (31.3%). The yellow-backed duiker *(C. sylvicultor)* was relatively scarce, but wide ranging, based on the infrequency of flushes (average 2.8% of total), but the relative abundance of tracks. The chevrotain *(Hyemoschus aquaticus)* and black-fronted duiker *C. nigrifrons)* were only recorded in the proximity of riverine and swamp forests respectively, though they were sometimes common in these habitats.

In areas of comparable hunting history, both the density and local diversity of duikers were higher in mixed forests than in adjacent monodominant stands, especially those dominated by *Gilbertiodendron dewevrei* (Caesalpiniaceae). Tree and liane species diversity is significantly lower in monodominant forest than in mixed forests. Fruit resources thus are less predictable, and more vulnerable to periods of failure. As *G. dewevrei* forests dominate the western and southern Ituri, a firm understanding of the ecology of this forest type will be important to forest conservation and management in this region.

Duiker densities are reduced in large clearings and in recently farmed bush. Fruiting trees favored by duikers may be abundant in older secondary forest, however. Track counts conducted by David Wilkie (1987) in the northern Ituri Forest indicated that duiker densities may be higher in older secondary forests than in adjacent, mature, mixed forests. These observations suggest that cycles of shifting agriculture, accompanied by long fallows, may not be detrimental to forest antelope populations, provided they do not lead to large-scale clearing, permanent agriculture or to more intensive hunting.

Impact of Hunting

A game drive, using nets, is the primary mode of hunting forest antelopes over the southern, western, and central Ituri. Duikers and the chevrotain comprise the bulk of captures. Our earlier studies of the economy and ecology of local hunters on an 800 sq km study area in the southern Ituri Forest showed that even with traditional techniques and materials, hunters can have a devastating impact on duiker populations. The net hunt puts an especially heavy burden on the reproductive age classes. Of 383 female duikers sampled (about 50% of the total catch), 65.3% were adult, and 74% of these were gravid (J. Hart 1978).

We were able to document the transition of the local Mbuti pygmies from subsistence hunters to provisioners of wild meat to middlemen, who in turn sold the meat in markets beyond the forest borders. Hunting camps where traders were present hunted more days per week and longer on each hunt than did camps with no commercial traders. Even more significantly, commercial hunts ranged deeper into the forest for longer periods of time. Almost twice as much meat per hunt was taken at remote camps than at camps closer to settlements, where the Mbuti relied on local, subsistence-oriented exchange partners and where commercial traders were generally absent. This intensified hunting was correlated with apparent declines of duiker populations over the three-year study period.

The impact of hunting on duiker populations was further examined between 1981 and 1983 near the Institut Zairois pour la Conservation de la Nature (IZCN) okapi capture station at Epulu in the central Ituri Forest (J. Hart and Petrides 1987). Forest areas within 5 km of Epulu were hunted on an irregular but continuous basis during this period. Remote hunting camps, more than 10 km into the forest, were used only infrequently and for short periods of time. Commercial traders were not allowed in the camps.

Populations of [the three] upland red duikers...were lower, and had reduced adult/subadult sex ratios in the area of permanent settlement, relative to populations in the more remote forest. As adult female to calf ratios were similar at both remote and settled sites, the relative preponderance of younger animals in the more heavily hunted population areas could not be attributed to an increased, compensatory reproductive output. Rather, the data suggest that dispersal from unexploited populations may be critical in maintaining heavily hunted populations.

Our results indicate that proposals for the sustainable utilization of wild forest antelopes as a source of protein must be accompanied by safeguards to maintain reserves of relatively unexploited populations and the means for their dispersal into hunted areas. Given the year-long breeding season of forest duikers, the presence of less exploited populations adjacent to hunted areas may be more important than fixed hunting seasons in sustaining duiker populations.

Currently, the commercial meat trade continues essentially unregulated over most forest areas of eastern Zaire. Documentation of wild meat sales by students and faculty from the University of Kisangani (Bola 1986) and by the GTZ research team in Bukavu (von Richter 1988) indicate that tremendous quantities of wild meat, including larger numbers of duikers, continue to reach the urban markets of the region. The critical question is, how is this flow maintained? If the meat markets encompass ever increasing catchment areas, then the argument that forest antelope populations could serve as a source of protein for human populations in the region is based on false premises.

Potential for Conservation

Zaire has already established two lowland rain forest national parks, the Salong and the Maiko. A third, the Okapi National Park, has been proposed for the Central Ituri Forest through a cooperative project between the IZCN and WWF International, funded by a private Zairean company, Tabazaire (Project Director, Jefferson Hall). Despite a long history of hunting pressure, significant populations of all native antelope species remain throughout the entire Central Ituri Forest. The Okapi National Park proposal includes establishment of forest buffer zones open to subsistence hunting and other traditional activities adjacent to core protected areas. This system my permit sustained utilization of forest antelope popu-

lations by providing a source of animals for regenerating exploited populations in buffer zones. As this is an exciting and active area for conservation in Zaire, we will try to keep Gnusletter readers abreast of current developments.

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GABON

Sally Lahm, a doctoral candidate from New York University, has been studying the effects of human activity on local wildlife in northeastern Gabon since December, 1987. She has written a letter describing her field work and interests (in lit. to Estes, undated, received Apr 89).

"I worked for 13 years in the care and management of ungulates, carnivores and primates in some of the major zoological parks in the United States, the last being the San Diego Wild Animal Park. My speciality has been ungulates. For my master's degree, I obtained a one-year leave of absence in 1983 to study the ecology of the mandrill at the same research station where I am now based [the Institute de Recherche en Écologie Tropicale]..

"As an anthropologist, my interests lie in human and animal ecology. I am strongly conservation-oriented. For this reason and because I do not wish to be known as a primatologist, I chose a research topic which combines conservation and observation of all large mammals. Most sightings are of duikers and primates. Basically, I have established a series of transects near several villages and in more remote areas for the purpose of repeated surveys. I also collect data on hunting practices, trapping, crop raiding by animals, weights and measurements of game taken, etc. I also travel along local rivers to assess commercial hunting pressure for the local market in Makokou. In this respect, night hunting is particularly devastating for ungulates.

"My subject of study is difficult, complicated and fascinating."

WEST AND CENTRAL AFRICAN IUCN PROJECTS

Gérard Sournia, IUCN Regional Delegate in West Africa, stationed in Dakar, Senegal, has written Rod East (3 Mar 89) about IUCN's activities in several countries of the region.

MALI IUCN is opening an office in Bamakou, preparatory to developing a major program for this country, in which the fauna will play an important role.

GUINEA BISSAU An IUCN office will also be opened here in 1989. "Quite soon we shall have information about the fauna...of this country, which has remained unknown up until now. I'll keep you informed."

CHAD IUCN is going to launch a program and may open an office in 1989 in the capital. Oudai-Rimé — Ouadi-Achim Reserve (discussed in Gnusletters 7(2), 7(3), and 8(1)) is on the list of IUCN's concerns. France, says Sournia, "is going to manifest its interest [in this reserve] by financing a first mission of evaluation. We are hoping that J. Newby's responsibilities will permit him to participate."

SUDAN

Darrell Plowes, a professional photographer specializing in African wildlife and an agricultural consultant (formerly a Provincial Agricultural Director in Zimbabwe), has written WWF International (23 Jan 89) to express his concern over the lack of any active international efforts to promote wildlife conservation in Sudan. Simon Stuart circulated a copy of the letter to a number of SSC specialist group chairmen with known interests in Sudan's animals.

Plowes, who gives his address as P. O. Box 119, American Embassy, Khartoum, APO New York, NY 09668-2200, has become very worried over the wildlife situation in Sudan (see January and May, 1988 Gnusletters), and would like to be able to do something to help during the two years he plans to continue living in this country. After listing a dozen or more ways in which wildlife conservation could

Table 1. Antelopes of the Ituri Forest, Zaire

Species	Habitat	Relative Abundance
Hyemoschus aquaticus	upland forest near larger streams	locally common
Cephalophus monticola	upland forest	common
C. nigrifrons	swamp forest	uncommon, local
C. leucogaster	upland forest	uncommon, widespread
C. callipygus/weynsi	upland forest	locally common
C. dorsalis	upland forest	common
C sylvicultor	upland forest	uncommon, widespread
Neotragus batesi	treefall gaps, gardens	locally common
Tragelaphus spekii	open, riverine	rare and local
T. euryceros	openings, ? nomadic	rare and irregular

be made more effective and popular in Sudan, Plowes discusses the need for wildlife surveys and support of these and other conservation projects by international organizations.

"I feel that one of the important things would be for some surveys to be undertaken of various endangered species such as Nubian ibex, Barbary sheep, Nubian ass, addax, etc. Do we even know what is at risk, where they still occur and in what numbers, etc.? This would entail the provision of two vehicles..., plus operating funds for a year or two. The Wildlife Research section here, as well as Wildlife Forces HQ, have I believe, only one operational vehicle each, and virtually no funds whatever for any use of these.

Dr. David Jones [Zoological Society of London] had said during his visit here, that there was a reluctance by major funding agencies to provide funds for any except a handful of countries in Africa, due to the difficulty of controlling how this [funding] gets used. My view is that even if some does get misappropriated, at least some will be used for the intended purpose — the balance should be regarded as helping to make up the appalling shortfall in salaries that wildlife staff receive. To provide nothing means that nothing is being done by the international community for the wildlife of these other countries. Funding provides leverage, and in a country as desperately poor as Sudan, this is important. As far as I know, there are no funds being provided and no projects being undertaken by any organization, so I presume that Sudan is on the blacklist.

"I would welcome a visit here by yourselves, IUCN, or any other body to discuss the situation and needs, and to introduce you to some of the persons and relevant organizations, to see what could perhaps be done."

SOMALIA

In his letter of 6 January, 1989 (see under ASG News), Jonathan Kingdon writes, "I did get some indirect but interesting news on antelopes in Somalia from a Sheik in Qatar who has made several visits there and has acquired a beautiful beira *[Dorcatragus megalotis*; rare antelopes kept in Qatar were reported in *Gnusletter* 6(2):15]. Both the beira and dibatag *[Ammodorcas clarkei]* are said to be fairly abundant within the areas shown by Simonetta [see *Antelopes: Global Survey and Regional Action Plans*, Part 1, Chap 6] and they seem able to hold their own in spite of very heavy stocking rates. The endemic gazelles are said to be worst off."

UGANDA

Update on the conservation status of antelope populations in game reserves

Keith Eltringham recently provided Rod East with the results of surveys of Ugandan game reserves conducted in 1982/83 (see Tables 2 & 3). Eltringham comments on the results (in lit. to East, 20 Jan 89), "These should not be taken at their face value but treated more as indices of wildlife numbers. We did not have the opportunity of ground/air comparisons to produce correction factors and the level of sampling was certainly too low, but with the low density of game, it would have been prohibitively uneconomic to have increased the sampling effort to a more acceptable level. The conclusion from the surveys is that most reserves had most species present but in very low numbers."

Rod points out that this information is a very useful supplement to the chapter on Uganda's antelopes in Part 1 of the Antelope Survey and Regional Action Plans. His comments follow.

"It confirms, for example, the importance of Lake Mburo NP (this former game reserve was given national park status in 1983) for protecting a representative example of the fauna of the Ankole district of southwestern Uganda (Kingdon 1985), including the country's major population of impala (Table 2). This new national park was reported to have been seriously affected by the encroachment of cattle and settlement in the mid-1980's (IUCN/UNEP 1987).* The estimate of about 5000 Uganda kob *(Kobus kob thomasi)* in the Toro/Semliki Game Reserve (Table 3) suggests that this population may have held its own since 1978, when numbers were estimated to be 2500 (reduced by overhunting from an estimated 18-20,000 in the late 1960s).

Table 2. Population estimates of ungulates in Ugandan game reserves, 1982. Results from systematic aerial transect counts

	WESTERN RESERVES				
	Kaiso/Tonya	Kigezi	Kyambura	Lake Mburo	Toro/ Semliki
	209 km^2	619 km^2	285 km^2	859 km^2	1159 km^2
Buffalo	7			41	
Bushbuck	16		14	15	
Duiker	117			46	20
Eland				185	
Hippo				144	
Impala				6230	
Reedbuck				15	
Topi		8		25	
Uganda kob	66	222	2130		5070
Waterbuck			168	41	34
Warthog			121	56	
Zebra				821	

Sightings in other reserves (numbers seen, not estimated totals):
Katonga Reserve - 1 reedbuck, 15 zebra
Kibale Forest Corridor - 1 buffalo, 7 kob

"The population estimates for the eastern reserves (Table 3) reveal the persistence of significant wildlife populations. The chapter on Uganda in Part 1 described the fauna of the Bokora, Matheniko, and Pian-Upe (listed as "Kadam-Debasien") game reserves but did not include the Karamoja reserves. These reserves and adjacent controlled hunting areas form a continuous chain, extending northwards from Pian-Upe Game Reserve in eastern Uganda to Kidepo Valley NP on the Sudan border in the northeast of the country. The Bokora Corridor Game Reserve, which links Pian-Upe and Katheniko Game Reserves, is flanked by four controlled hunting areas which cover >20,000 sq km and are contiguous with four other controlled hunting areas and Kidepo Valley NP (IUCN/UNEP 1987). Table 3 shows that although wildlife was sparse in 1983, the Pian-Upe — Bokora — Matheniko and Karamoja reserves still supported nationally important populations of antelopes such as eland, lesser kudu, reedbucks, (both bohor and mountain reedbucks occur), hartebeest, topi, Grant';s gazelle, and other species. Both the white-eared kob *(K. k. leucotis)* and the lelwel hartebeest *(Alcelaphus buselaphus lelwel)* extend much further southwards within this reserve system than indicated in the Uganda chapter in Part 1. Eland, topi, and zebra move southwards into the Pian-Upe reserve to breed, and migrate northwards in the wet season to the Matheniko reserve (IUCN/UNEP 1987).

"The Pian-Upe — Bokora — Matheniko reserve complex lies largely within the Somalia-Masai Regional Center of Endemism (MacKinnon and MacKinnon 1986). Assessment of the biological importance of each of these reserves separately suggested that they were not of major international importance for the conservation of antelope communities (see Chapter 13 in Part 1). However, a reassessment using the additional information from Keith Eltringham (Table 3) and treating the entire complex as a unit suggests that this system of reserves in eastern Uganda contains an internationally important example of the Somalia-Masai unit's antelopes. Unfortunately, levels of protection in these reserves are nil-low (MacKinnon and MacKinnon 1986), and they have suffered from illegal hunting and settlement, livestock grazing, drought, and political unrest (IUCN/UNEP 1987).

Table 3. Population estimates of ungulates in Ugandan game reserves, 1983. Results from systematic aerial transect counts.
*Grant's gazelle **White-eared kob

	EASTERN RESERVES				
Species	Bokora Corridor 3400 km^2	North Karamoja 3700 km^2	South Karamoja 2275km^2	Mathenik o 1688 km^2	Pian-Upe 2275 km^2
Bushbuck				13	
Dik-dik	44	55	69		
Duiker	117		418	13	
Eland	1103				
Gazelle*	853	85		413	
Giraffe	88				88
Hartebeest	500	1927	452		248
Lesser kudu		364	730		
Kob**	235	55			88
Oribi	44		104		73
Oryx	73			90	
Reedbuck	265	1453			336
Roan					205
Topi	29				600
Warthog				13	
Waterbuck					15
Zebra					643

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*What national park? The serious encroachment and settlement in Mburo noted in the IUCN/UNEP publication was the thin edge of the wedge. Jonathan Kingdon writes (in lit. to Estes, 6 Jan 89), "In Uganda, degazetting of most of the recently declared Mburo National Park effectively condemns the roan and eland and possibly the impala, klipspringer, zebra and sitatunga to a decline and probably long-term local extinction. I enclose my optimistic original article on this park [Kingdon 1985 in above refs.]. A sad outcome."

KENYA

Karen Ross Greer, (see under ASG News) recently visited the Shimba Hills National Reserve, where she did her doctoral research nearly a decade ago. As her report on this visit (in lit. to Estes, 9 Mar 89) makes clear, the status of the sable *(Hippotragus niger roosevelti)* has improved markedly since the visit she made in 1985, as reported in the January, 1986 *Gnusletter*.

"We visited the Shimba Hills in December, 1988, and the news was — for a change — good! Sable numbers seem to have picked up since 1983-85 when they had dropped to an all-time low, mainly because the Shimba Hills were not being managed. There was no rotational burning, no researcher to keep an eye out, and uncontrolled poaching by villagers, rangers and Forestry Department workers. Below is a table showing the numbers of sable in two main herds (Longomagandi and Risley's Ridge) in the last 27 years — some of the data are of course yours!

Counts of two Shimba Hills sable herds

Year	Longo Magandi	Risley's Ridge
1961	40	8
1968	36	7
1969	45	9
1975	69	18
1976	84	?
1977	78	?
1980	65	16
1981	67	20
1982	45	16
1983	34	25
1984	22	?
1985	9	2
1988	43	14

"The figures show that there was a large increase in numbers of sable in the mid-70's (I wonder why??).* Numbers remained stable until 1982 when they began to decline. This was partly due to excessively wet weather and high infant mortality. I left the Shimbas in mid-'82, but returned each year subsequently, and was shocked at the relentless decline of the sable.

"When I left in 1982 there were 11 roan antelope *[Hippotragus equinus]*, with two new calves and three 2-year-old females who should have bred that year. That was the last time I saw any roan in the Shimbas. The Game Warden agrees that they are now extinct in that area. On a trip in 1984 I was so concerned about the future of the Shimbas that (off the record!) I went to see a well-known witch doctor who put a 'protective spell' over the sable on the plateau area. It may seem fanciful, but I wonder if that has helped, as I passed word of the witch doctor amongst rangers and villagers.

"I did not meet the new Warden, Mr. Ngonze, who was on leave but according to John Arkle, resident naturalist at the Shimba Lodge, he is interested and very competent. He has started a rotational burning programme and carries out anti-poaching patrols. This must have helped the sable, as reflected in the increase in numbers. The population is back up to 1969 figures, the year Shimba was made a National Reserve. The sable population appears healthy, with many calves and juveniles. Eighty percent of the adult females I saw were pregnant or with calves. What we need most is a total count of sable (aerial and ground counts) as the safety of the population depends on the presence of the six or so different herds — I only saw two on my last visit.

"The other news from Shimba is that a lodge has been built by Block Hotels. It is situated in the valley opposite the main gate, an area where there was no road access previously. The site is well chosen as the lodge and its comings and goings do not interfere with visitors in the main part of the reserve. It has been built in such deep forest that it cannot be seen from elsewhere. The lodge is in fact a 60-bed treehouse, situated above a series of water holes that are used by elephants, and there is a walkway through the upper canopy of the forest that surrounds the water hole. It has been beautifully built, and one can spend the evenings overlooking the floodlit waterhole. In one evening, I saw bushpig, water mongooses, a genet cat, two snakes, a monitor lizard and a few elephants. In the morning the birds are wonderful. It was quite the most comfortable night I have ever spent in the Shimba Hills! Definitely an asset to the Reserve, and at least now the visitors are able to find some sable."

*The Warden at that time regularly burned the grassland to improve pasture conditions, despite the objections of the Forest Department, which shares jurisdiction over the reserve with the (newly reconstituted) Kenya Wildlife Service. [Ed]

SOUTH AFRICA

Kruger National Park

Darryl Mason, Senior Research Officer in Kruger NP, has sent a copy of his latest (February, 1989) semiannual report on the survival and recruitment rates of the Park's ungulates. This one deals with juvenile survival in the wildebeest and warthog populations during the mid-summer drought of 1988/89. Unfortunately there is only space enough to quote the introduction.

"During the 1988/89 wet season in the...KNP, the sudden onset of cold weather with the first substantial rains was associated with limited mortality of herbivores in certain areas. Moreover, follow-up rains were scanty or failed over large portions of the Central, Northern and Far-Northern Regions.

"Wildebeest in the KNP are most numerous in the area between the Sabie and Olifants Rivers (the Central Region), where their population experienced a dramatic decline during the 1970s but subsequently recovered during the 1980s, reaching a peak in 1987. Below-average rainfall cycles favor wildebeest population expansion via changes in habitat condition (Whyte 1985). Wildebeest are also more tolerant of drought because of their mobility than relatively sedentary herbivores like warthogs. However, juvenile mortality of both these species can be very high in times of severe drought (Child 1972, Mason 1984), and drought effects on wildebeest can be greatly aggravated by fences that restrict their seasonal movements (Williamson and Mbano 1988).

"The 1988/89 birth periods of wildebeest and warthogs in the Central Region coincided with extensive dry conditions which affected early survival of their juveniles and probably recruitment in other seasonally breeding ungulate populations also."

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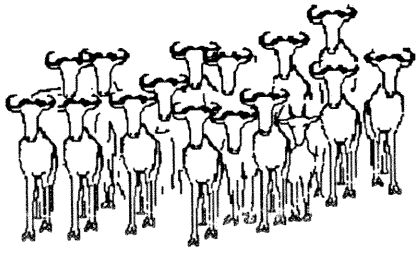

ASIA

SAUDI ARABIA

The King Khalid
Wildlife Research Center

After several years in England, Jane and Douglas Williamson have returned to the desert, only instead of the Kalahari (see Sept. 1985 Gnusletter, p. 5) they are now in Arabia. Jane has written (6 April 89) describing their new job.

"We've been in the Kingdom for nearly five months now, and are beginning to settle in; it's very different from a village in East Anglia and indeed from a tent in the Kalahari! I thought you and readers of the ASG Gnusletter may be interested to hear a bit about the KKWRC and the research that is being done in this part of the country.

"The KKWRC was inaugurated in 1987 and is run by the National Commission for Wildlife Conservation and Development (NCWCD). Douglas was appointed Project Director in November, 1988 and is employed by the Zoological Society of London which has a contract to run KKWRC. The main functions of the Centre are:

¥the breeding of native Saudi species, especially gazelles, for reintroduction into their traditional ranges;

¥the undertaking of research that contributes to the success of reintroduction and conservation programmes implemented by the NCWCD.

"The research centre is situated 70 km north of Riyadh on land which forms a small part of the farm of the late King Khalid. Use of the land has to accord with the values and priorities of the managers of the royal farm, especially with regard to the management of the late King's animal collection, which is now the responsibility of the Centre.

"This collection occupies a large enclosure (580 ha) and includes *Arabian oryx *(Oryx leucoryx)*, afri *(Gazella dorcas)*, idmi *(G. gazella)*, rheem *(G. subgutturosa)*, and other non-Arabian species like Thomson's gazelle *(G. thomsonii)*, [Nile] lechwe *(Kobus megaceros)*, and fallow deer *(Dama dama)*. The animals were acquired over a number of years and the origins of some of the animals are unknown. This makes it difficult to determine the precise value of the collection in terms of its potential to provide stock for reintroduction. However, skull measurements and other physical features indicate that the idmi belong to the Palestinian race *G. g. gazella*, which may not be native to Saudi Arabia, and the rheem belong to the race *G. s. marica*, which is native. Research into taxonomy continues and will involve cytological and biochemical techniques such as karyotyping and DNA fingerprinting.

"Another problem that staff must overcome before reintroductions can take place is that of disease. Tb is by far the most serious disease and affects primarily the oryx and the non-Arabian species; there is much lower incidence of tuberculosis in the gazelles. There is a diagnostic laboratory at the Centre and all animals captured and all dead animals are tested for the disease. Those shown to be free of infection are separated from those having Tb. Stock for reintroduction will be bred from these disease-free animals.

"Another way of obtaining Tb-free animals is by isolating lambs from birth and hand-rearing them. This programme started in February, 1988 and a total of 22 were successfully hand-reared. Currently there are another 14 being reared. The lambs are given a mixture of UHT and evaporated milk in bottles. Other spin-offs from this programme include the generation of life history data which are of both scientific and practical interest.

"Other research carried out in the diagnostic laboratory includes investigating hematological values for gazelles. Other ongoing research projects at KKWRC include a study of gazelle parasites, food intake in gazelle, and capture and relocation techniques.

"A number of field trips and surveys have been conducted by staff members of FFWRC and NCWCD. These include visits to the Farasan Islands, where there is a population of at least 500 gazelles**, and visits to the Al Harrah and Al Khunfah reserves, and also to the Rub al Khali.

"Thumamah, the farm, is in a lovely part of the desert and includes part of the Tuwaiq escarpment. Some of the rock formations on the escarpment are extraordinary and it's a most interesting place to explore and to look for marine fossils.

"I am working and compiling a book to be entitled, 'Status of the Larger Mammals of Saudi Arabia;' this will be along the lines of a Red Data Book. It should take about nine months to complete and will include research in the Cambridge libraries where we will be for much of the summer."

*A current effort to reintroduce Arabian oryx from the U. S. to a protected area in Saudi Arabia is described under Reintroductions.

**For more information about this possible subspecies of *Gazelle gazella*, see Flamand, J. R. B., C. R. Thouless, H. Tatwany, J.-F. Asmodé 1988. Status of the gazelles of the Farasan Islands, Saudi Arabia. *Mammalia* 52:608-10.

NEPAL

Sunder Prasad Shrestha, newly appointed to the ASG, is completing a degree in Veterinary Physiology in the Texas A&M College of Veterinary Medicine. His speciality is Wildlife and Exotic Animal Medicine. In a recent letter (in lit. to Estes, 16 Mar. 89), he provides this background information on the antelopes of Nepal.

"Nilagai antelope*[Boselaphus tragocamelus]*, blackbuck *[Antilope cervicapra]*, and four-horned antlelope *[Tetracerus quadricornis]* are found in Nepal in the lowland forest called Terai. [The] blackbuck was once thought extinct in the forest of Nepal; the last group of about 30 animals was relocated some eight years ago in a small patch of forest. These animals are now found only in western Nepal, a district called Bardia. Captive-bred animals have been translocated in that area from the zoo in Kathmandu. [The] four-horned antelope is considered extremely rare and found in the foothills of what we called [the] Churia range, concentrated mainly in cenrtral Nepal's lowland. The status of [the] nilgai is considered good, because there is no hunting of this animal since it is considered another form of cow, the sacred animal. It is distributed fairly throughout the lowland and foothills of Nepal.

"I am planning to visit Nepal for a few weeks next month. If you need more information, I should be able to provide [some] after I return."

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