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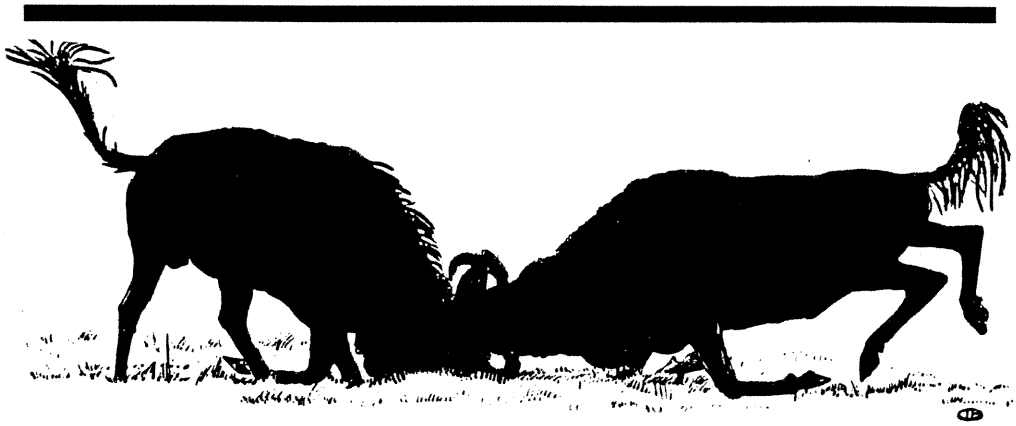

GNUSLETTER

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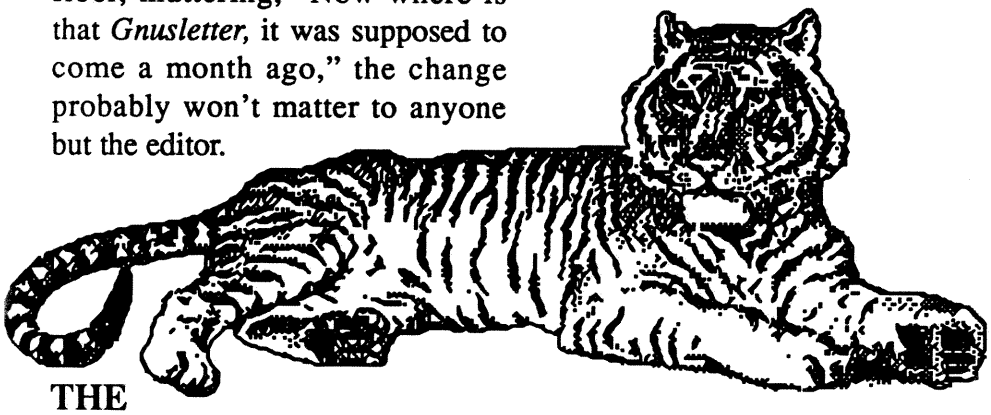
ASG NEWS

GNUSLETTER PUBLICATION MONTHS: SOME GIVE (NO TAKE)

To mark the beginning of the second decade of publication, *Gnusletters* will no longer carry the month of publication, but just the number. Up until now, I had always managed to send out newsletters within or just after the three designated months of January, May, and September. This time, the threat of a further delay in the publication of my behavior guide (following news item) until I had secured permissions to reprint a number of illustrations forced me to put off writing the *Gnusletter.* For the first time, I sought outside help in editing some of the articles, and was fortunate to gain the services of Edie Sabine next door in Dublin, daughter of old friends and a pro at writing as well as laying-out newsletters and reports. But even with this help, I had no time to edit her output or put in my two cents worth before leaving on 1 February on my annual safari to

Tanzania, whence I returned on the 18th.

Eliminating the month from the newsletter heading provides wriggle-room in the event of future time-binds that put me behind by up to a month. As it seems unlikely that anyone will be pacing the floor, muttering, "Now where is that *Gnusletter,* it was supposed to come a month ago," the change probably won't matter to anyone but the editor.



THE BEHAVIOR GUIDE TO AFRICAN MAMMALS

By R. D. Estes. University of California Press, 640 pages, 374 illustrations. $75.00 cloth. Publication in April (or May).

The knowledge gained through field studies of African mammals during the past 30 years is summarized and synthesized in this book, which profiles 91 ungulates, carnivores, and primates. Although these separate species accounts are the primary focus of the guide, introductions to each order, family, and subfamily, and to the different tribes of antelopes, compare related species and include information about species that are not treated in separate accounts.

To make the information as accessible as possible, these standardized headings are used in chapter introductions and species accounts: Traits (description), Distribution (a map for each species), Relatives, Ancestry (in family introductions), Ecology, Social Organization, Activity, Postures and Locomotion, Foraging or Predatory Behavior, Social Behavior, including Communication and Agonistic Behavior; Reproduction, Sexual Behavior, Parent/Offspring Behavior, Antipredator Behavior, and References. The 374 illustrations have been rendered as drawings, of which over 300 were done by my friend and colleague, Dan Otte, Curator of Entomology at the Academy of Natural Sciences, who grew up in South Africa. Nearly all the drawings illustrate displays and other species-typical behaviors. A 37-page bibliography includes the important publications relative to the socio-ecology of the included species through 1988 (with added references up to 1990).

By arrangement with the University of California Press, ASG members and other *Gnusletter* readers can obtain signed copies of this book from me at a 20% discount for the next three months. Add $2.25 for U.S. postage and packaging; for overseas surface mail add $3.50 ($22.90 for airmail book rate).

THE SSC AND IUCN MEETINGS IN PERTH

For the opportunity to attend the SSC meetings and the IUCN General Assembly in Perth I am indebted to Earthwatch, where I served as Acting Director of the Center for Field Research from February—October, 1990. But to justify their investment, I had to spend most of the time lining up new projects for the CFR. I had no time before the meetings to study the mountain of IUCN draft proposals and thus was not in a position to contribute much to the IUCN plenary sessions or workshops, either as Delegate (CFR being a NGO member of IUCN) or ASG Observer.

Going to Perth and mingling with the 1500 people who foregathered at the Burswood Convention Centre and Casino (W. Australia's answer to Las Vegas, a vast hall containing thousands of one-armed bandits, crap, roulette, and other tables and the gullible souls who played them) was an experience to remember.

Seeing many old friends and acquaintances, some for the first time in years, made it like Old Home Week. And I made many interesting new acquaintances. It was just lucky that ASG business wasn't my main reason for being there. Although I did give a triennial report to the SSC on 26 November (the written version below was prepared later), only four people other than myself turned up at the ASG meeting on 27 November: Steven De Bie[ASG], Ralph Daly (who attended the first meeting at Tsavo N. P. in 1979), Colin Groves[ASG], and Richard Parsons, legal counsel and lobbyist

for Safari Club International. The four other ASG members who were at Perth, M. Macky Ly, Mankoto ma Mbaelele, Mark Stanley Price, and Mike Woodford, either failed to see the notice of the meeting time and place or had to attend other meetings scheduled for the same hour. Later in the week, I scheduled a meeting to discuss the Antelope Survey of Asia and North Africa, in hopes of gaining the assistance of some of the many Asian delegates. Although I posted notices of the meeting and two announcements were read by the Secretary General during plenary sessions, only one Asian showed up at the appointed time–and he was from Japan.

At Simon Stuart's suggestion, I took 25 copies of the *Antelope Survey, Global Survey and Regional Action Plans,* Part 3, West and Central Africa, hot off the press, to Perth to present to selected SSC and IUCN members. Almost twice as long as Parts 1 & 2, they weighed a ton. (I came home with an equal weight of reports, brochures, papers, and other handouts.).

Part 3 has now been sent to all ASG members and others on Simon Stuart's list. The rest of the 1800 copies are sitting in my barn, where they may be ordered at $25.00, plus $1.70 for packaging and postage in the U. S., $2.55 for overseas surface mail, and $11.25 for overseas airmail book rate.

TRIENNIAL REPORT OF THE ANTELOPE SPECIALIST GROUP, 1988—1990

During the last triennium, the Antelope Survey of Africa south of the Sahara has been completed and published, with the support of IUCN. Compiled and edited by Rod East, Action Plan Coordinator and ASG Deputy Chairman, in his free time, *Antelopes, Global Survey and Regional Action Plans,* has been printed in three parts, as follows:

Part 1. East and Northeast Africa, 1988 (96 pages)

Part 2. South-Central and Southern Africa, 1989 (96 pages)

Part 3. West and Central Africa, 1990 (171 pages)

The general conclusions to be drawn from the survey of sub-Saharan Africa are that:

a. Only a dozen of the 76 species of African antelopes are currently endangered or threatened, and about the same number of subspecies. These are the same species that have been identified in the past:

i. The aridland hippotragines and gazelles of the Sahel and Somali Arid Zone, the addax and scimitar-horned oryx, dama, Soemmering's, slender-horned, red-fronted, and Speke's gazelles, the dibatag, beira, and Piacentini's dik-dik

ii. Several forest-dwelling duikers, including the zebra, Jentink's, Abbott's, and Ader's duikers

iii. The mountain nyala of the Ethiopian Plateau

iv. Threatened and endangered subspecies include the giant sable *(Hippotragus niger variani),* Heuglen's, Pelzeln's, and Mongalla gazelles *(Gazella rufifrons tilonura, G. dorcas pelzelni, G. thomsonii albonotata),* the tora hartebeest*(Alcelaphus buselaphus tora, A. b. swaynei)* the western klipspringer *(Oreotragus oreotragus porteousi),* the western mountain reedbuck *(Redunca fulvorufula adamauae),* the white-legged and Ruwenzori black-fronted duikers *(Cephalophus ogilbyi crusalbum* and *C. nigrifrons rubidus),* Haggard's oribi *(Ourebia ourebi haggardi)* and the western giant eland *(Tragelaphus derbianus derbianus).*

b. Many populations of species that are not presently threatened, including subspecies that were not among the particularly distinctive ones singled out in the Antelope Survey, are or soon will be threatened because of the continual, accelerating shrinkage of available wildlife habitat resulting from competition with and exploitation by man.

c. Although the existing network of protected areas appears adequate on paper to safeguard most African antelopes, effective protection and management of these areas is rare in most countries, particularly in the Sahel, Northeast, West and Central Africa.

d. The largest protected areas, often consisting of a national park and contiguous reserves, are important for the long-term preservation of African ecosystems, which must conserve a host of other organisms as well as antelopes.

e. Preservation of any substantial areas of wildlife habitat outside of existing parks and reserves depends on making use of antelopes and other wildlife on a sustainable basis economically more rewarding than other land uses. If their value can be demonstrated in time, it would still be possible to set aside buffer zones around many parks, which would be accepted as inviolate sanctuaries necessary for renewing stocks of species to be hunted for food or trophies in surrounding lands.

f. Nearly all problems of wildlife conservation in Africa stem from the continuing uncontrolled growth and impoverishment of the human population.

ASG Membership and Meetings

Membership in the ASG has nearly doubled in the past triennium, to over 100, representing 43 countries (including 29 African nations). It is expected to increase again as the network of Asian experts expands. Two meetings of the ASG were held, the first in Rome in August, 1989 during the 64th Meeting of the SSC, and the second on 27 November at the SSC Meeting in Perth.

Highest Priorities in the Coming Triennium

1. Complete the Antelope Survey

The second and final phase of the Antelope Survey will cover North Africa and all the Asian countries where antelopes occur; publication is scheduled in time for the 19th General Assembly. SSC members who can provide information about the conservation status of antelopes in any part of this region, and/or who can provide names and addresses of others who are knowledgeable, are urged to contact the ASG Chairman or Deputy Chairman.

2. Begin to implement action plans.

The highest priority will be to plan and support field studies and/or captive breeding of the most endangered antelopes, focusing on species about whose socio-ecology very little is known. Most species that fall into this category live in Somalia, the Sudan, and Chad, where political conditions presently make field studies impracticable. However, one of the most vulnerable unstudied species, the hirola *(Damaliscus hunteri),* occurs in Kenya and accordingly has a very high priority for a field study. The forest duikers are also accessible through very difficult to study.

3. Collaborate with other specialist groups in joint action plans, especially with the Captive Breeding and Reintroduction Specialist groups, but also with other taxonomic specialists, and with the WCMC.

4. Continue to monitor the status of African antelopes, updating the information published in the survey, adding to the ASG and WCMC data banks, and publishing newsworthy information in the ASG newsletter.

1991 ACTION PLAN PRIORITIES

Although ASG Deputy Chairman Rod East was unable to attend the meetings in Perth, I was able to stop over in New Zealand and visit him on the way home.

In response to a directive from SSC Chairman, George Rabb, to specialist group chairmen to recommend specific projects for possible funding (of up to $20,000) from the $1 million gift by the Sultan of Oman to the Peter Scott Memorial Fund, Rod and I produced the following list, under the subheading:

PRACTICABLE HELP FOR ENDANGERED ANTELOPES

1. Hirola or Hunter's antelope *(Damaliscus hunteri).* Investigate the status of the Kenya population and develop an action plan to assure its survival.

2. Two endemic Ethiopian antelopes, mountain nyala *(Tragelaphus buxtoni)* and Swayne's hartebeest *(Alcelaphus buselaphus swaynei).* Assistance to be channeled through the Ethiopian Wildlife Conservation Organization, with the guidance of ASG member, Chris Hillman.

3. Safeguard Jentink's duiker *(Cephalophus jentinkii)* by better protecting its main range in Ivory Coast: Tai N.P. and adjacent Western Area Forest Reserves.

4. Investigate the status of Ader's duiker *(Cephalophus adersi),* which occurs on Zanzibar and the adjacent mainland, especially on the mainland.

5. Explore the feasibility of translocating a breeding herd of Western giant eland *(Tragelaphus derbianus derbianus)* to Comoe N.P., Ivory Coast.

6. Determine the current conservation status of the giant sable *(Hippotragus nifger variani)* and explore the possibility of capturing enough sable to establish a captive-breeding herd.

In a covering letter (25 Jan 91) to George Rabb, I wrote, "Although some of the antelopes in Somalia, the Ogaden, the Sudan, and the Sahel are arguably even more endangered, we have singled out species and populations that are reasonably accessible and which have not already received substantial attention."

I also noted that we may wish to reorder the priorities or add to this list after receiving input from other ASG members. Thus, the inclusion of Ethiopian antelopes and of the duikers need Chris Hillman's and Vivian Wilson's endorsement to be viable. All other members are also invited to suggest changes or additions.

Putting the hirola at the top of the list is not just a judgement by Rod and me but is also based on the strong support for undertaking this project voiced by all the members of the Kenya delegation that attended the General Assembly; moreover, the uncertain status of this relict damaliscine species was proposed a year ago by Pieter Kat[ASG] (see 9(1) *Gnusletter).*

TEXAS A&M UNGULATE SYMPOSIUM PAPERS FINALLY PUBLISHED

The Conference on Ungulate Behavior and Management held at Texas A&M in May, 1988 in honor of Fritz Walther, will be published in late March as a special issue of *Applied Animal Behavior Science,* volume 29, numbers 1-4. Edited by Elizabeth Cary Mungall[ASG], a prime organizer of the symposium, the publication is 519 pages long and includes 34 papers and 21 abstracts. I managed to get a faxed copy of the contents and instructions for ordering from Elsevier just before going to press. The price for the hardcover edition (a book) is approximately—hold your hats!—$195.00, and for the paperback edition, $187.00, the volume price of the journal. The book can be ordered from Elsevier Science Publishing Co., Inc., P. O. Box 882, Madison Square Station, New York, NY 10159-2101. The paperback edition should be ordered directly from Elsevier, c/o K. C. Plaxton, P. O. Box 330, 1000 AH Amsterdam, The Netherlands. No extra charge for postage will be made for pre-paid orders (cheque or credit card).

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ANTELOPE NEWS

FOREST ANTELOPE RESEARCH

Impact of Human Activity on Antelope Populations in Gabon

Sally Lahm[ASG] returned to the U. S. in January (home address 6335 Lambda Drive, San Diego, CA 92120), having completed her study of the impact of human activity on rainforest wildlife, based at the Institute de Recherche en Ecologie Tropicale, in Makokou, Gabon (see *Gnusletter* 8(2), p 9)

In a letter dated 30 Nov 90, Sally writes, "Although my research concerns all larger game species from porcupines to elephants, I can give you some of the results regarding ungulates, based on a report written last year for Wildlife Conservation International. More information will be forthcoming next year after further data analyses. I have also recently [written] for WWF-US a preliminary inventory of the fauna in a remote area near the Cameroon and Congo borders, but the report has not been [completed]."

UNGULATES 91 INTERNATIONAL CONGRESS

The Institut de Recherche sur les Grands Mammifères (IRGM) is convening a major International Congress from 2-6 September 1991 in Toulouse (France). According to the flyer:

"The purpose of this congress is to bring together researchers and wildlife biologists and managers which are directly or indirectly related to the knowledge, management or protection of free or captive wild ungulates (individuals, social groups and populations)."

"Papers (in English or French) are invited on all aspects of ungulates study: conservation, ecology, ecophysiology, ethology, evolution, genetics, management, paleontology, parasitology, pathology and systematics.

"The symposium fee including all the preliminary documentation (program, abstracts, . . .) is expected not to exceed 1200F (reduced rate for students)."

The Scientific Committee that will select from among the submitted contributions includes Leonid Baskin, François Bourliere, Lutz Briedermann, Tim Clutton-Brock, Valerius Geist, and Sandro Lovari.

The deadline for pre-registration was 31 December (but the flyer only reached Peterborough in January). To find out more, write

I.R.G.M.
Centre de Recherche Agronomique de Toulouse
B.P. 27 F-31326 CASTANET-TOLOSAN, France.

"I conducted socioeconomic surveys of village men of the three major ethnic groups in northeastern Gabon. Questions pertained to hunting, trapping and fishing methods, crop damage by animals, sources of family income, agricultural land usage and food preferences. Survey data from discussions with all available hunters in two villages of the Kota, the most populous ethnic group, reveal that the blue duiker, *Cephalophus monticola*, is the species most frequently encountered during hunting forays (73% frequency) and trapline checks (82% frequency).

"Peter's duiker, *Cephalophus callipygus*, and the bay duiker *C. dorsalis*, are also important, but less numerous, game species. *C. callipygus* had a 13% frequency for both hunting and trapping success, while *C. dorsalis* followed with 5% for both activities. No other ungulates had higher frequencies than these three species.

"Thirty-five percent of the men cited the blue duiker as their preferred bush meat for consumption, followed by the brush-tailed porcupine, *Atherurus africanus*, and the red bush pig, *Potamochoerus porcus*, and finally monkeys. Hunters named a variety of game which they consider inedible for reasons of clan, tribal and societal taboos or simply personal taste. The only ungulate mentioned was the yellow-backed duiker, *C. sylvicultor*, (31% frequency) owing mostly to the supposedly bitter flavor of its flesh. This species also had the second highest frequency (21%) after the red bush pig as being the largest animal hunted by villagers, followed by the sitatunga *Tragelaphus spekei gratus* (18%)

and the medium-sized red duikers (11%). This response refers mainly to the bay and Peter's duikers because the other two species of this category *C. leucogaster* and *C. nigrifrons* are present, but more rarely seen in this area.

"The sitatunga and the yellow-backed duiker (25.9% frequency each) also followed the red bush pig (66.7%) in importance as being the largest animals trapped by villagers. Predictably the blue duiker proved to be the most frequently mentioned game species taken (34.6% frequency) during each village's most recent hunt or trapline check. Other duiker species mentioned were the bay duiker (11.5%), Peter's duiker (7.7%) and the Gabon duiker, *C. leucogaster* (3.8%).

"Duikers, particularly *C. monticola*, are the most numerous game species present near villages. Ungulates comprised 56.8% total of 125 animals harvested by villagers, followed by primates (20.8%) and rodents (10.4%). **The blue duiker accounted for 38.4% total of all game and 67.6% of all ungulates listed** (emphasis added). Peter's duiker contributed 14.3% and the bay duiker .06%, respectively, to the total number of ungulates harvested.

"Seventy-eight percent of the men cited the sale of bush-meat alone or combined with the sale of gold, fish or bananas, as the most important means of gaining revenue. Of the 32 hunters interviewed, 31.2% are totally dependent on bush-meat sales alone as a primary source of income. Nearly 2/3 of those interviewed reserve only 1/3 of their gained bush-meat for family consumption. The remainder is sold. Larger animals such as the bush-pig and sitatunga are often butchered and sold in sections, depending on the size and weight of the animal.

"Hunters tend to sell the most popular game meat and consume the smaller species. Thus, of the 125 game animals harvested, the majority of primates and rodents were consumed locally, while 72% of the ungulates were sold. Of the 77 ungulates listed, 60.5% were gained with 12 gauge shotguns and 35.2% were obtained by cable snare trapping.

"Net hunting was once widespread among the Kota, but it has largely been replaced by hunting with firearms and trapping with cable snares rather than natural materials. Trapping and night hunting appear to be the most serious threats to local wildlife. Ungulates in particular are much easier to shoot when they 'freeze' in the glare of a headlamp. Although setting and checking traps is certainly time consuming, a trapper can gain a greater percentage of game than a hunter because he can leave the area of his traplines relatively undisturbed for the unsuspecting game to approach. Hunters complain that excessive trapping ruins an area because trapped animals emit odors and vocalizations which warn other animals to flee or totally avoid an area. Most of the Kota men interviewed (81% of the total) practice a combination of hunting and trapping as a means of maximizing their harvest and chances of gaining income."

Duikers in Tai N.P., Ivory Coast

Helen Newing, ASG, of the University of Stirling, sent in the following report on her duiker study last November. (See *Gnusletter* 9(1):3).

"I am writing at last with news of my work on duikers in Tai National Park, Ivory Coast. I now have 9 Maxwell's duikers radio-collared: six in forest in the National Park and three in farm bush 10 km. away — and have begun tracking them."

"Before going to Tai I spent a month in Sierra Leone working with Glyn Davies on his duiker surveys, and in Tai also I have been trying different techniques of censusing duikers. Again, I believe censuses at night could yield useful results and I hope to explore its possibilities more fully over the next year. I have grave doubts about estimating population densities from animals seen during drives, as we have seen animals walking away as we approach and I am sure many others go undetected. I have also been disappointed with using line transect censuses of duiker pellets. Although Tai is full of duiker dung I am not happy about distinguishing different species. I spent two weeks in Monrovia Zoo just before the war broke out, measuring duiker tracks and pellets and came to the conclusion that size and shape of pellets and dung could be used only to distinguish large duikers (yellow-backed and Jentink's) from small duikers (Maxwell's, bay, black, Ogilby's and zebra). I know that some researchers — and many hunters — believe more fine distinctions can be made, and I will be

delighted if someone can convince me of this.

"A quick run-down on subjective impressions of duiker status in Tai. Order of frequency of encounter in the forest is: Maxwell's, bay, Ogilby's, zebra, Jentink's (I have yet to see the last two but there have been many reliable sightings of both by other researchers since my arrival in February). In secondary forest I have seen black and yellow-backed. I have had a hand-reared black duiker in an enclosure in the forest and hope to collect more captive animals."

Helen has also written a very informative "Report on the capture of Maxwell's duiker in and around Tai National Park, Ivory Coast, May—October, 1990," which is too long to include in this issue but will be included in Number 2.

Survey Methods Employed for Tracking Duikers in Gola.

Glynn Davies[ASG] has sent (13 Nov 90) a report on the methods he used to survey antelopes and other wildlife in the Gola Reserve of Sierra Leone, and a covering letter commenting on the results. First, the description of the survey methods.

The purpose of the survey project is to provide information of sufficient quality to allow formulation and execution of realistic wildlife management policies by FDA, WWF and SCNL. The survey project is being carried out in two complementary parts: A. the Large Mammal Population Survey and B. a Wildlife Utilization Survey.

Large Mammal Population Survey

In general terms this part of the project can be divided into three categories: Distribution surveys — which allow the geographical distribution of species to be mapped, incorporating comments on which habitats the species occupies; surveys of relative abundance — which indicate where a species is most common, uncommon or rare; and surveys of absolute abundance — which allow populations to be measured in terms of animals (or groups) per sq km.

Distribution Surveys

The maps of Liberia on which a 10 km grid (UTM Series) is superimposed offer the simplest way of recording data from different sources to build up a picture of each species' distribution. There is sufficient variation in the mosaic of vegetation types to make the 10 km grid a useful level of resolution, whereas a larger scale grid (e.g. half-degree squares used in the large expanses of savanna in southern Africa) may obscure trends. In areas of special interest there is no reason not to use a finer grid (down to 1 km), as Tom Butinsky did for his primate surveys in the Bwindi forest, Uganda.

From the outset it is useful to focus on indicator species (see Appendix) and ensure that data on environmental factors (e. g. vegetation types and hunting pressure) are collected with each sighting. The primary data sheet designed for the Gola Project and the smaller sheets for the Faunal Survey of Sierra Leone have worked well for professional surveyors and interested amateurs respectively.

Obvious sources of data for the maps are the reviews by Kuhn (1965) for the whole country and Coe (1975) for the Nimba area. Discussions with C. Steiner and H. Gilmore should also yield old records. The current surveys are going to fill in many gaps, along the planned SCNL mapping program, and all avenues should be explored for getting data, especially experienced hunters. Any inaccurate information should be disregarded since inaccurate records invalidate the whole exercise.

Since the mapping process is ongoing, it is useful to mark old records (say pre-1980) separately from newer records. This allows assessment of changing distributions of species in the face of human activities. In particular it can show whether forest-dependent species are retreating in the face of logging or agricultural activities, and whether savanna species are invading the forest zone. It was apparent, for example, that there were conspicuously fewer estrilid weavers on the roadside between Monrovia and Zedru than would be seen on a journey of similar length in Sierra Leone. In part because there is so much roadside rubber in Liberia, but also because there are fewer grasslands.

Transect Methods

The principle of the transect method is for observers to walk along a survey line looking for animals, or their signs. The survey line needs to be sufficiently long, and the surveys repeated sufficiently often, to ensure that small sample sizes do not preclude analysis of the data.

The assumptions of the method are that: a) animals (or their signs) are distributed at random relative to the trail; and b) the sighting of each animal (or group) is an independent event.

Duikers

Transect methods have been recommended by Vivian Wilson in his pan-African duiker survey, and they have been carried out in Ivory Coast by Roth and Hoppe-Dominik. Direct sightings of animals have considerable advantages over indirect methods, since no conversion factors have to be estimated (e.g. defecation rates). The only drawback is that sample sizes may be small, so many surveys are needed — 60km seems a minimum for realistic calculations of high density populations in Sierra Leone.

Walking very slowly along the survey path without talking, even with more than one observer and raking footprint plots, appears to be an effective way to flush duikers once they are detectable. Considering the 60-70 km walked at Mogbae and Koye (Sierra Leone) and Gola (Liberia), over 40 duikers were sighted or flushed at each site. This is ample for estimation of strip width, as long as the resting places of animals that were flushed but not seen can be pinpointed. The results give figures comparable to those collected by Koster and Hart (1988), and attention should be focused on this method.

The two indirect methods tried are pellet counts and footprint counts. Koster and Hart found the pellet count method useful in Zaire, during their intensive study of two sites. In Sierra Leone and Liberia, however, we have all had trouble with the method.

It has proved difficult to distinguish different species on the basis of pellet size or pile size (*maxwelli* is much larger than *monticola*). The pellet decay is very variable, requiring a large sample before decomposition rates can be calculated. For example, Bakarr noted fresh pellets disappearing overnight (presumed insect and rodent feeding), Poelker noted fresh pellets disappearing within a week in the dry season, but 8 piles changed little over 7 weeks in the same survey period. To compound these problems, few pellets are being found, mostly in the middle of survey lines, and we have no good data on duiker defecation rates.

It is probably appropriate to look into these problems at a study site over at least one year to see if we can better interpret these data. The Gaboni study area lends itself to such an exercise.

The footprint survey has yielded much data in high forest sites, since small, medium and large duikers can generally be distinguished, but less information has been derived in the farmbush and plantation areas. The best time for footprint surveys is at the beginning and end of the rains, when the ground is kept damp, but rainless days are sufficiently common to avoid footprints being continually obliterated.

It is difficult to estimate animal numbers from footprint densities on the raked footprint plots, but it was hoped to come up with indices of relative abundance. However, as Poelker has pointed out, there are few sandy areas along the transects that readily take up footprints — there were three times more sandy plots at Mogbae compared to Koye, making comparisons between the two sites inappropriate.

Despite these shortcomings, the method did confirm that Maxwell's was three times more abundant than the medium-sized duikers at both sites. In the farmbush and plantation it was possible to show that only Maxwell's and bushbuck occurred, at unknown densities. Similarly, only footprint records showed the presence of larger duikers in Gola (Liberia), although no abundance measures were possible because the larger duikers appear to follow the transect, stepping in adjacent plots, which the smaller duikers do not do.

Raking about 90 plots is very time-consuming, and it may be just as useful to smooth over sandy areas (e.g. gully bottoms and stream beds) to come up with these presence/absence data.

Drives

Koster and Hart used drives to measure duiker densities, and 13.5 ha were surveyed in this way at Mogbae and Koye. Each drive involved 9-10 men — 7 beaters and 2 chainmen. A 100 m net was set in a straight line to catch duiker (none was caught, but the net was used for consistency between sites), watched by 2 men from concealed positions. A line of 5 beaters (20 m apart) walked towards the net, from a perpendicular starting position 150 m away. The 2 remaining beaters were 100 m from either end of the net (50 m ahead of the other beaters) to reduce the chances of duikers fleeing to the side of the 'beat'.

Surprisingly large numbers of duikers were caught at both sites (giving estimates of 45-50/sq km of all species). However, a larger sample is needed to get reliable estimates. A net is not necessary, as long as men are counting animals that move out of the beat area, and clear lines around the edge of

the 'beat' allow fleeing duikers to be seen — the majority of sightings were of duikers breaking back between the beaters. If more men are available, then a larger area should be surveyed to reduce the chances of duikers fleeing the area when the beaters are making noise while getting into their start positions.

Excerpts from Glyn's Covering Letter

"Having benefitted greatly from the publication, in *Gnusletter,* of my own letter seeking advice on survey methods for forest-dwelling antelopes [see 8(1), p 8] at the beginning of the Gola Project, I wanted to share my thoughts with you now that the research part of the project has been phased out. I was further spurred into action on seeking excerpts from Mark Infield's letter and Rod East's concise and thorough reply [in the last *Gnusletter*].

"After getting settled in the Gola area, survey sites were set up in: unlogged forest, logged forest, recent- and long-established farmbush fallow, cocoa plantations and a tree plantation. Antelope surveys were concentrated in the unlogged and logged forests, and the tree plantation and the recently established farmbush, with the following methods tried out:

"i) line transect, walking slowly and quietly around a 1km x 500m transect between 07.00 and 12.00 hrs (50-75 km walked); ii) pellet counts along trails that were cut through the survey grid area (2-5 km searched); iii) foot print plots (1m diam) raked at 25 m intervals along the survey transect (3,000-7,500 plot-days monitored); and iv) drives with 10-12 men beating through 1.5 ha blocks of forest (13.5 ha searched).

"As well as trying them in Gola, I had the opportunity to liase with the WWF/FDA survey teams working in Liberia before the recent civil unrest, and incorporated both their comments and my opinions in a report on survey methods for Liberia (sponsored by WWF). I enclose relevant passages. [Due to space limitations, publication of these will be deferred to the next issue, along with Helen Newing's report on capturing Maxwell's duiker. Ed.]

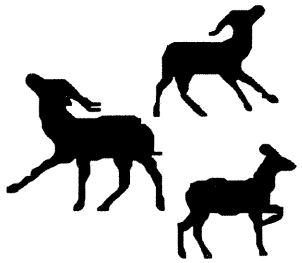
"As you can see, reasonably consistent counts were obtained using line transects in the two forest sites, where a sufficiently large sample of duikers were sighted/flushed, assuming of course that a large majority of all duikers within the survey transect were encountered — which was not easily justified (see below).

"Taking a 20-25m survey strip width, based on known sighting distances of flushed and sighted animals (which needs checking), then there are about 10 Maxwell's duiker in both unlogged and logged forest. Medium-sized duikers *(dorsalis, zebra* and *niger)* ranged from 8/sq km in the unlogged, little hunted forest to about 1/sq km in the heavily logged site. Sighting frequency and therefore population density estimates declined markedly in the farmbush (2-3 *maxwelli*/sq km, very sparse *niger),* but the vegetation was too thick and the data too erratic to place great faith in these estimates.

The pellet counts were unreliable because so few were encountered. Furthermore, their decay rate was very variable, which seemed to be related to whether they were produced in the wet or dry season, and whether or not they were in latrines. Finally, we had no good measures of defecation rates, although this could perhaps be overcome by only considering fresh pellets (mucilage on surface, still sticky), if sample size was sufficient.

"Footprint plots did indicate the presence of some species which were not seen, but getting density estimates was unrealistic. They did not generate enough information to justify the effort put in, since similar presence/absence data could be collected by searching stream banks, etc.

"The drives were encouraging because many animals were seen for the amount of time invested.



unfortunately time only allowed a short period of survey, so statistical confidence is low, but the results did indicate a much higher abundance in the two forest sites, where drives were practical, compared to the transect methods — 15-30 *maxwelli*/sq km, and 15-30 medium-sized duikers/sq km.

"All this leads me to conclude that it may be possible to get relative population densities for different habitats (logged v. unlogged, hunted v. unhunted) using several methods each with different inherent biases, but calculation of absolute population density requires careful long-term studies. In this respect we are fortunate to have

Helen Newing looking at the same species in Cote d'Ivoire.

"For conservation management, relative population densities give us a guide to identifying vulnerable species and selecting priority areas, but we are a long way from estimating off-take by hunters, etc., especially since hunting and trapping is so difficult to gauge anyway.

"I look forward to another dialogue with fellow ASG members through *Gnusletter,* which I am enjoying more and more."

Black-fronted Duiker Densities in Rwanda

From the University of Bristol Andrew Plumptre[ASG] writes (3 Sept 90), "As yet I haven't analyzed the data I have on the black-fronted duiker densities in the Park National des Volcans fully, but some preliminary results suggest numbers varying between 25 and 5/km^2 depending upon the habitat. Bushbuck numbers range from the low twenties up to about 60/km^2. These estimates are based upon fecal counts from permanent plots, cleared every month and assuming a defecation rate of 4.4/day for the duiker and 19/day for the bushbuck."

Pan-African Duiker Survey

"My survey of the duikers of Africa is really progressing at an incredible pace, wrote Vivian Wilson, ASG (circular letter of 24 Sept. 90) from Zimbabwe, "and I now find very little time for correspondence, as I am often away from Chipangali for long periods.

"I have just had a very successful trip to Burundi, where I spent a full month conducting a duiker and large mammal survey. A very detailed report covering the survey has been produced but as the report was rather expensive to photocopy and bind, I am only going to send copies to those people who really want to know something about Burundi and would be prepared to read the 50 page report. Therefore, if you would like a copy please do let me know and I will have a photocopy made for you.

"My son Barry and I are off to Congo in a couple of days time where we will be carrying out a large mammal, duiker and "bush-meat" market survey on behalf of the Conoco Conservation project. We will be away for about 6 weeks and will be working in the coastal area just south of Gabon. We hope to be back by the middle of November 1990. In addition to the last three duiker News Sheets (no 2-4) I have also enclosed a pamphlet on "Why the indigenous people of Africa need duikers."

"We are looking for funds for a massive "bush-meat" market survey and if you should know of any organization that would be prepared to help with the funding of a project of this nature, please let me know."

ARABIAN ORYX IN OMAN

News about the Arabian oryxes reintroduced in Oman has been received from two sources: an article by Andrew Spalton, Project Biologist, and I. McLeish, Chemical Immobilization of Wild Arabian Oryx (Oryx Leucoryx) in the Sultanate of Oman, and a letter from Steve Kingswood from the Center for Reproduction of Endangered Species at the San Diego Zoo. The following brief excerpt from Spalton and McLeish's article gives an indication of how rapidly this population

Today's mail brought the profoundly depressing news that Barry Wilson is dead.

The announcement, dated 17 Feb 91, signed by Paddy and Vivian Wilson begins, "It is with deep sorrow and utter despair that we inform you of the tragic loss of our beloved son, Barry. After a motor accident Barry suffered severe lung and head injuries and lay in a coma for six days before passing away on the evening of January 30, 1991."

The accident was caused by the reckless driver of a large truck who was driving on the wrong side of the road. Barry's death is not only a devastating personal blow for the Wilson's, but a major setback to the Pan-African duiker survey, on which he was working closely with Viv, and to the running of the Chipangali zoo. "It will be extremely difficult," write Viv and Paddy, "to find some one so totally committed to Chipangali as Barry was. We still cannot believe that this has happened. Barry was respected by all who knew him."

On behalf of the Antelope Specialist Group, this notice conveys our deepest sympathies to Paddy and Vivian, and their surviving son, Kevin.

has increased; to find out all the details, readers are referred to the article by Spalton in the latest CBSG News [2(1):8-10], entitled Recent developments in the reintroduction of the Arabian oryx *(Oryx leucoryx)* to Oman.

"The Arabian oryx was first reintroduced to the desert in 1980 and released into the wild in 1982. The wild population reached 100 in early 1990 and had increased by 42% in 1989. The population has a known range exceeding 10,000 sq km. A new monitoring programme has recently been developed and this has necessitated the immobilization and tagging of a number of wild-born animals.

"Cribiu *et al* (in press) described the occurrence of a Robertsonian translocation in captive oryx in Saudi Arabia. Work carried out in Oman in early 1990 identified two carriers of the translocation in the wild population. In October 1990, as part of a programme to determine the extent of the occurrence of the translocation in the wild and world captive populations and to investigate possible breeding effects, additional animals were immobilized for karyotyping."

As explained in Spalton's CBSG News article, the occurrence of Robertsonian chromosome translocations in the Arabian oryx has caused concern among those involved with the captive-breeding of this species and its reintroduction on the Arabian Peninsula. Robertsonian translocations involve the fusing of two chromosomes to give a karyotype of 2N=57 in heterozygotes and 56 in homozygotes, instead of the normal 2N=58. Robertsonian translocations have been found in various mammals and in some species (e.g., beef cattle and blue foxes) reduced fertility has been reported.

Steve Kingswood's report throws further light on the subject. "Cytogenetic analyses of six Arabian oryx in Oman were performed during February and March of 1990. Arlene Kumamoto at San Diego Zoo's Center for Reproduction of Endangered Species has documented a karyotype of 2n=58 for 25 captive Arabian oryx in the USA. Jean-Francois Asmode and Edmond Cribiu studying the herd in Taif, Saudi Arabia found several individuals with chromosome translocation polymorphisms resulting in karyotypes of 2n=56 and 57. A scimitar-horned oryx found by Kumamoto to have a karyotype of 2n=57 raised the possibility of scimitar-horned/Arabian oryx hybrids in some herds in the Middle East. Ralph Daly, Oman's Advisor for the Conservation of the Environment, invited Kumamoto, Oliver Ryder and Steve Kingswood to collect blood and skin biopsies from several oryx in which hybridization could not be ruled out by pedigree analysis.

"Three samples were collected from the free-ranging herd at Yaloonia and three from captive animals in Muscat. These samples were flown to Kenya for analysis at a wildlife genetics laboratory of the National Museums of Kenya, located at the Institute of Primate Research. This lab was set up earlier in 1990 by Dr. Ryder through a technology transfer grant from the Pew Foundation. Two of the six oryx sampled did have the chromosome translocation, giving them a karyotype of 2n=57. However, the translocation involved different chromosomes from that in the 2n=57 scimitar-horned oryx, so it appears that these polymorphisms are not due to hybridization."

REGIONAL RUNDOWN

NIGER

John Grettenberger wrote the following account of a return visit he paid to the Air and Tenere National Reserve and W National Park a year ago (in lit. 16 Oct 90).

"I spent February and March, 1990, in Niger, mostly in the Air and Tenere National Reserve, working on a landscape classification system and a framework for a management plan for the reserve. I was most pleased to observe the noticeable increase in populations of dorcas and dama gazelle, and ostrich. There was also a marked decrease in their flight distance when approached by vehicles, indicating a significant decrease in the vehicle poaching that had previously decimated populations. Habitat conditions were also very good compared to 1984, when I left the reserve.

"In contrast, I had the opportunity for a short visit to W National Park, where I had also previously worked. The picture here was not nearly so optimistic. It was immediately evident from the amount of sign that elephant populations have been decimated. With the exception of roan antelope and oribi, we saw very few antelope, particularly in those areas that are most accessible to poachers. My guess is that

because roan antelope are less tied to riparian areas where most poaching takes place, they persists better in the face of hunting pressure. However, the picture in W is decidedly grim, as the park was staffed with only three guards plus supervisory personnel, which was fewer then when I worked there 8 years ago.

"The contrast between the Air and Tenere National Nature Reserve and W National Park clearly illustrates what can be done with a well-funded and administrated project. However, a park like W National Park, which is of critical importance for antelope conservation in West Africa, is likely to continue to deteriorate unless some outside assistance is provided. I would urge members to support funding for W National Park."

TANZANIA

Selous Reserve Wildlife Threatened by Cattle Invasion

An article in the August 1990 issue of *Miombo,* the newsletter of the Wildlife Conservation Society of Tanzania, entitled Stock route through the Selous, points with alarm to the Ministry of Agriculture and Livestock Development's (MALD) plans to drive 20,000 cattle per year through the Selous Reserve, one of Africa's largest protected areas.

The proposed cattle route is an old footpath which bisects the reserve from north to south.

MALD proposes the stock route as the least expensive method of transferring cattle from northern Tanzania to protein-deficient regions lying south of Selous.

This news has alarmed conservationists and veterinarians alike. The cattle carry parasites, bacterial and viral diseases such as rinderpest and foot-and-mouth, which are endemic in Northern Tanzania and easily transmitted to wildlife. The Selous Game Reserve harbours Tanzania's largest buffalo population and is free from the number of infectious diseases which have already invaded other wildlife parks and reserves in the north of Tanzania.

Another major danger is the spread of diseases, such as distemper, from herdsmen's dogs to wild dogs, an endangered species with a healthy population living in the Reserve. The wild dogs of the Serengeti have become nearly extinct as a result of diseases probably transmitted by domestic dogs.

Spread of infectious diseases to southern Tanzanian regions should be avoided at all costs. Once parasites have accumulated sufficiently on the stock route, it will be virtually impossible to prevent the spread of disease to the south. The transfer of cattle infested with rinderpest toward the Mozambique border may help to spread the disease toward southern Africa, an area which has been free of rinderpest since the beginning of this century.

In the past, cattle have been shipped to southern Tanzanian regions from Dar es Salaam to the ports of Lindi and Mtwara, where they were placed under quarantine and inspected for diseases before being trekked to their final destinations. While the Ministry may be seeking a speedier and less expensive method of transporting cattle from northern regions to the south, there are distinct conservation risks involved in their new plan.

As far as I could determine during my recent trip to Tanzania, the objections to the proposed cattle drive have not caused MALD to drop the cattle-drive plan. Holding

pens for the cattle have already been consturcted near the Selous, financed from Tanzanian sources. The Ministry of Agriculture plans, however, to approach international donors for assistance.

In the absence of effective opposition to these plans by the Tanzanian Ministry of Lands, Natural Resources, and Tourism, one can only hope that the donor agencies which are approached will know better than to support such a potentially disastrous undertaking.

MOZAMBIQUE

Jeremy Anderson[ASG], Director of Kangwane National Parks (Swaziland), has sent information (in lit 4 Dec 90) about the status of wildlife in central Mozambique, where he participated in surveys of Marromeu and the Buffalo Reserve last November.

"The good news is that the habitats are still great, in fact some of the most spectacular in Africa. The sad news is that the wildlife populations have decreased markedly. We repeated the census done by Tello & Dutton in 1977

and our results make interesting comparisons.

"The primary reason for the decline is uncontrolled hunting. We estimated that if hunting effort is constant, that there are about 12 groups of hunters operating on the Marromeu floodplain at any one time. We found sites where up to eight buffalo had been killed in a limited area, and saw parties carrying meat and one cutting up a hippo carcass. We also located camps with meat smoking racks.

"We flew over Gorongoza National Park several times (currently the area of the main Renamo base). We saw small herds of waterbuck, and one of wildebeest, a few reedbuck, impala and nyala. The Park buildings and rest camps are in ruins. We saw a few people, and a little cultivation. In general the habitat is untouched and with a nucleus of game there is still hope for the future.

"Currently, the Mozambique Government and Frelimo are holding talks with a view to a cease fire. However, even if this is successful, banditry will continue for some time as AK 47's are everywhere.

"The Department of Wildlife is under-manned, under-equipped and under-trained to tackle the massive task which lies ahead of it. Perhaps, the most realistic option will be for Government to concentrate on policies and legislation and to encourage private-sector development in the areas which may be viable in the long term."

	1977	1990
Elephant	331	326
Buffalo	55,595	3,696
Waterbuck	36,380	4,480
Zebra	340	1,206
Reedbuck	-	260
Oribi	-	few
Sable	-	100
Lichtenstein's Hartebeest	-	100
Hippo	2,820	37

INDIA

Indra Kumar Sharma[ASG] has written about the effects of a recent drought followed by a flood on the antelopes of Western Rajashan:

"In 1989 the blackbuck in Luni Basin, Western Rajasthan and Thar Desert, India, suffered heavy mortality due to unprecedented drought. Large numbers of blackbuck died of starvation and fell prey to vagabond dogs belonging to villagers and poachers in search of better pastures.

"In early 1990, the blackbuck population recovered considerably but again suffered from mortality during the flood of their. . . region in July-August,1990. Major causes of heavy mortality also included two epidemics: *Haemorrhagic Septacaemia* and black quarter *(Clostridium)* diseases spread from infected cattle of the region [contacted] in communal grazing grounds. "The gazelle and nilgai were not as effected by the drought of 1989 and flood of 1990, as they live in remote areas without epidemic and are able to tolerate drought; [also] their habitat is extremely arid and did not experience flooding.

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