SOME ETHNOVETERINARY INFORMATION FROM SOUTH SUDAN

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http://www.vetwork.org.uk/evkfison.pdf

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INTRODUCTION

In recent years, increasing attention has been paid to ethnoveterinary knowledge (EVK) and local veterinary practices (Martin, McCorkle and Mathias-Mundy, 2001, ITDG, 1997). There is acceptance that some of these are of therapeutic value and therefore, there is good reason for documenting them before the knowledge is lost. Furthermore, local treatments are usually much cheaper than imported drugs and it is helpful to promote them as an option for livestock owners. There are instances of people being shifted away from indigenous practices and made dependent on western drugs: if the latter become unavailable or too expensive then they are left with no treatment options. Obviously, by its very nature, EVK resides in local people but the very fact that outsiders show sufficient interest to document it, may enhance its value in their eyes and, thus, contribute to its continued use.

There is another reason for documenting EVK. Currently, there is increasing interest in community-based schemes for delivering animal health services, particularly in pastoral areas. An essential aspect of these is the involvement of local people in setting them up and running them. The process of obtaining and documenting EVK is an excellent way of engaging local people and respecting their knowledge. Tapping into EVK is a prime example of the participative approach, which is rightly deemed essential in good development practice. It is also intrinsically interesting and, where the use of plants is involved, may contribute also to the value put on local resources and environment.

EVK in south Sudan

Schwabe and Kuojok (1981) described four kinds of local healers among the Dinka. They all practiced as both human and veterinary healers and were paid according to the success of their treatments and the value of the animal or wealth of the person. These were the *atet* (a term for experts in various practical skills ranging from rope-making to bone-setting), the *tiet* (exorcists and exponents of religious-based healing), the ran wal (herbalists) and the *ran cau* (witch-doctors who countered the curses of witches). The main areas of *atet* practice were bone-setting, wound surgery (including suturing with giraffe or cattle tail hairs), lancing of abscesses, blood-letting, castration, horn surgery, bonesetting (including grafting), obstetrics, retained afterbirth removal and replacement of prolapsed uterus. Schwabe and Kuojok also describe the *atet*'s knowledge of anatomy, physiology, epidemiology and recognition by signs of individual diseases and go on to suggest the possibility of integrating local healers into the Medical and Veterinary Services.

From 1991 to 2001, UNICEF was the lead agency in the livestock programme of Operation Lifeline Sudan and took the role of coordinating and directing the NGOs who were implementing livestock programmes in southern Sudan. UNICEF encouraged the documentation and promotion of EVK by NGOs and commissioned a specific study on EVK amoung the Nuer and Dinka by Lindquist, Adolf and Blakeway (1997). These authors documented a number of herbal treatments and listed local names for animal diseases amoung the Nuer and Dinka. They showed how the OLS livestock programme could include EVK more strongly in its policy and pointed out that links were there to be made between education, schools and the process of documenting EVK.

Save the Children Fund (SCF) had, independently of UNICEF, written EVK into its initial proposal for developing a livestock programme in southern Sudan and the information presented in this report was compiled during the course of the SCF programme in southern Sudan from 1993-2000. It refers only to Nuer and Dinka areas in Upper Nile and Bahr el Ghazal.

METHODS

The bulk of the information was collected by the author, with the help of Nuer and Dinka colleagues and informants, as part of the training courses for community animal health workers (CAHWs) held by SCF. During this time, 15 such training courses for community animal health workers (CAHWs) were held. The curriculum of these courses included sessions on local knowledge of clinical signs, causation and treatments of animal diseases. This information was documented at the time on flip-charts and later worked up into a more formal system. Further information was also gathered at various community meetings and conversations with individual herders when opportunities presented. A special workshop for *atet* was conducted in conjunction with VSF (Switzerland) and the information from this is also included.

It should be stressed that this documentation of EVK was carried out rather as a sideline to the main implementation of the programme. Time constraints did not allow a systematic investigation and so it is very incomplete. The author was not able to verify the actual use of the EVK, let alone assess the efficacy of any of the treatments. He was also unable to see clinical cases of many of the diseases described. Efforts were made to collect and identify the plants, which had been stated to be used. However, often these were unavailable in the immediate vicinity and lengthy walks would have been necessary to obtain them or else it was the wrong season for them. It was frustrating to have to record only the vernacular name of a plant.

It should also be said that the linguistic and veterinary acumen, so vital to an accurate understanding of EVK, of the translators and interpreters was very variable. It should, of course, also be borne in mind that the knowledge and opinions of the informants may vary enormously, just as it may among professional veterinarians!

RESULTS

SIGNS OF GOOD HEALTH IN ANIMALS

Before considering the signs and symptoms of diseases, CAHW trainees were always asked to brainstorm the question: how do you know an animal is healthy? The following lists are revealing in that they show how closely the pastoralists observe their animals.

CATTLE

Good appetite (looks for grazing straight after release, stomach full after grazing), observe whole herd grazing;
Stomach empties quickly;
Good condition with smooth coat and good colour, look beautiful and happy;
Absence of skin disease and skin elastic;
Show no discharge from eyes, nose, vulva or prepuce and no excessive salivation;
Nose without discharge but moist and expired air cool;
Normal breathing and no coughing: exhaled air may be like smoke in early morning;
Milk normal in colour, quantity (same amount in morning and evening), quality, amount of fat and taste;
Teats all good;
Normal lactation length;
Dung normal consistency and frequency and contains no worms or grass remains;
Clean anus;
Urine pale yellow, copious, no froth, sinks quickly into ground, gives good taste to milk;
When back squeezed, it flexes freely;
Quiet at night, sleeps for only an hour at a time with head held up,gets up and stretches in early morning;
Rises quickly when disturbed, especially if genitalia touched;
Stands straight and looks forward;
May call to be released and may break the tethering rope;
When released, shows active movements: moves around and may fight.;
Calls in normal tone and at normal times eg when sees other cattle;
Returns at normal time, in the front of the herd, in evening and lies quietly;
Lead cow always in front;
Pet cow looks for owner;
Newly calved cow keen to return to suckle and protects calf, a healthy calf is evidence of a healthy mother;
Cow who calves in bush will not return without calf;
Chews the cud;
Comes on heat and breeds regularly;
Produces good calves, no abortion;
Moves on continually when grazing and not shade-seeking;
Looks alert with head held up and ears pricked and move in response to sound;
No teeth grinding;
Flicks away flies with tail;
No hair loss from tail or body;
Cow licks herself and her calf;
Calf suckles well (gets satisfied) and is active and runs around;
Cow retains some milk for the calf (may actively resist being milked out);
Rubs against walls and dismantles thatch with horns;
Stands up in order to urinate;
Cows do not run from a hyaena, all urinate on hearing lion, cows protect calf especially when newly calved;
Aware of rain and looks for it (can smell the fresh wind before the rain), keeps head up in rain.;
Sweats quickly in luak;
Responds to place where animal was slaughtered by bellowing;
Recognises and calls to normal milking girl and responds to owner;
Run away when caught in sorghum field (know when they are in wrong);
Healthy bull hard to manage (always away seeking cows), serve cows actively and bellows frequently, fights and digs ground, after defeat a bull will sharpen horns and return to fight;
Bulls and oxen protect cows from predators;
Eager to drink and chooses clean water;
Reacts to strangers;
Attempts to return when driven on migration;
Few lice (none on eyelids), ticks and flies (especially Hippoboscidae);
Quarrelsome and refuses to be pushed around, some break rope at night;
Kicks out at dog trying to remove ticks;

Enjoys ash being applied and shakes;
Chooses clean, dry area to lie;
Does not stand in deep water and holds tail clear of water, kicks mud from hooves;
Does not sleep much stretched out on side and only sleeps for one hour at a time;
When bled or pecked by tick-birds (*kuek*), blood appears normal;
Normal shape (no swellings);
Not lame, hooves even and no cracking;
Smaller number of healthy cows needed for bride wealth;
Hair along back dry although healthy, pregnant cow may sweat in luak;
No shivering;
Udder shows increase in size as parturition approaches;
Do not get stuck in mud;
Sick cow may be set upon by others;
Show normal behaviour eg not gathering in a group or running away;
Swim well;
When hoof tapped, may see foetus move;
Roasted meat smells good;
Lie down normally.

GOATS

Leap and jump about;
Active: rub against objects, paw and dig the ground, shake themselves, play, hard to herd;
Entire males cry out during the night and seek female in morning (females quiet at night);
Castrates may not graze in the middle of the day;
Reluctant to enter luak in evening and check inside before entering;
Sneeze;
In pregnant females, stomach wobbles on both sides;
Dung produced in small pieces;
Gives birth twice a year and frequently twins;
Kids healthy, suckle well and get satisfied;
Runs back home and never get lost;
May climb trees;
Show dislike of rain and return to luak at approach of clouds but do not seek shade;
Males clash heads;
If give birth in bush, return to luak and lead owner to the kid;
Stand up to dogs;
Sound hooves (no cracking);
Inspects luak before entering;
Holds tail up and waggles it: kid twitches tail when suckling;
Sneezes frequently;
Eats tobacco and Balanites fruit (find regurgitated stones in morning);
Avoid fire;
Roll on ground;
Kids have clean mouths.

SHEEP

Males fight in the morning;
Run away from dog;
Frequently shake body;
Do not shelter from rain;
Have fat tails;
Pigs;
Do not seek dirty places;
Like to play in sand.

CHICKENS

Feathers clean and smooth and not falling out;
Lay well: 20 eggs per clutch, normal size and shape and all hatch;
Hens do not eat their eggs and help chicks to feed;

Cocks wake early and crow and wake everyone up;
Cocks flap wings, chase hens and fight rivals;
Run from sudden threat or danger eg cat;
Hens call after laying;
Return home at correct time;
Hens protect eggs from intruders and chicks from predators eg kites;
Good growth of feathers and kept clean and not falling out;
Lie in sun and use dust bath;
Always busy seeking insects and other food and may go to neighbour's household;
Do not shelter from rain;
No sign of diarrhoea;
Chicks run to look when hen calls;
Fly from dog.

DUCKS

Like water.

DONKEY

Good appetite;
Not lame;
Ears pricked;
Able to carry heavy load eg 3 sacks of grain;
Rolls in the morning;
Bray in early morning.

DOGS

Puppies lie quiet when milk sufficient;
Good appetite;
Bark at night;
Fight strange dogs;
Follow owner and chase gazelle;
Do not eat grass and no vomiting;
Mark territory;
Remain alert even when asleep;
Shun people usually but will respond to friendship;
Hold tail up;
Like to play in sand.

CATS

Chase rats;
Rub against owner when waiting to be fed;

PET MONKEYS

Always on the look out for maize;

DISEASE RANKING EXERCISES

These were performed by first brainstorming a list of the diseases of cattle, goats and sheep. The names were transferred to cards and the participants asked to state which disease they considered to be the most important and then the rest in order. To cross check, the names would be called out and a consensus reached as to how each disease compared with others. The exercises were performed without prompting so the lists were different on each occasion: diseases might be left out because the participants either forgot them or considered them to be unimportant. The main diseases tended to remain fairly constant.

Fifteen ranking exercises of cattle diseases were carried out in Bahr el Ghazal, 4 in north Bor County, 5 in Zeraf Island and 7 in central Upper Nile. In each area, the mean ranking position of each disease and the number of times it was mentioned is shown below. Diseases which received less than three mentions are listed beneath the tables but not in any order of precedence. Some diseases may be known by more than one name and it was disconcerting to find, on occasion, that two names evidently referring to the same disease were ranked at different places in the order.

RANKING OF CATTLE DISEASES

Result of 15 exercises in northern Bahr el Ghazal:

Local names of diseases in order of ranking	No of times included	Suggested English name
Awet	12	Rinderpest
Abuot pwou	15	CBPP
Jok nhial or anguin	15	Anthrax
Marol or manhom	12	Haemorrhagic septicaemia
Manyai or maliei	15	Trypanosomiasis
Dat or acany	13	Foot and mouth disease
Macou	12	Blackquarter
Akuet kuet or marar	10	CNS disease of calves
Acom	9	Liver fluke
Yac or riem	7	Diarrhoea
Aduong or dony dony	11	Bovine ephemeral fever
Weth or atak	9	Mastitis
Manyot	4	Not identified
Cual	4	Hygroma (brucellosis)
Nyintok	4	Eye infection
Acaak	8	Tick infestation
Atherbei	5	Abortion
Nyok	5	Louse infestation
Ajul	5	Aftermath of FMD
Yam	6	Not identified
Matuntun	4	Perhaps Lumpy Skin disease
Pieny	4	Snake bite
Kec	4	Horn cancer
Ngany	5	Amphistomosis
Pier or bor	5	Not identified
Bior	3	Not identified
Anur	4	Not identified
Wath	3	Rabies
Twek twek	4	Tail lesion
Barjiny	4	Skin disease

Other diseases mentioned only once or twice: luong luong (not identified), dir (not identified), nyaliny (flea infestation), geklap (retained afterbirth), luang (type of biting fly), liar liar (not identified), manyuin (skin disease probably dermatophilosis or mange), calcal (not identified), angot (not identified), thio (worms), nyol nyol (not identified), cac (foreign body in rumen), acany (foot rot or perhaps also FMD), guom (ringworm), buku (not identified), akoak (perhaps lumpy skin disease), adhom (not identified), mow (perhaps another name for trypanosomiasis), rieth (tetanus), bieu (not identified), madhainy (not identified), roum (tabanid flies), ril (lack of milk production), rol (infertility), mor (not identified), athido (not identified), thor (not identified), tut (not identified), acidec (not identified), abu (not identified), thol (abdominal discomfort in calves) and tatok (wounds).

Result of 4 exercises in north Bor County:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyanatek	3	Rinderpest
Atuiny or awiir	4	H.septicaemia
Abuot pio	4	CBPP
Luac	4	Trypanosomiasis
Acom	3	Fascioliasis
Arem	4	Arthritis (brucellosis)
Jok tak	3	Anthrax
Cual or weth	3	Abortion
Adony	3	Bovine ephemeral fever
Dat or acany	3	FMD
Banyjar	3	Blackquarter
Dangdang or lok	3	Not identified
Nyin	2	Eye infection
Aluithok	2	Neonatal problem
Adoklil	2	Paralysis
Kec	3	Horn cancer
Manyuany	3	Skin disease
Ngany	3	Amphistomosis
Yac or abarec	2	Diarrhoea
Atak	2	Mastitis

Other diseases listed on only one occasion: adhoric (may be same as yac), aboric (may be same as yac), aguonguong or anguanynyuany (not identified), thiot (not identified), jeth (not identified), jul (aftermath of FMD), jok rat (not identified), acaak (tick infestation), cor (not identified), adhima or hool (not identified), ater nhom (not identified), duong (fracture), ateric (perhaps same as abarec and yac), apen ding (perhaps rabies), beebay bany (uterine prolapse), woc (not identified), bainjoh (not identified), bain yol (not identified), makuandak (not identified), bort (not identified), jony (not identified), juot (not identified), nyok (infestation of small body lice), bany nyok (infestation of large lice in ears, eyelids and tail).

Result of 5 exercises in Zeraf Island (Phou State):

Local names of diseases in order of ranking	No of times included	Suggested English name
Yieth or malpeath	4	H. septicaemia
Loth (also guau, liei or noi)	5	Trypanosomiasis
Dhop	5	CBPP
Nyapec	5	Rinderpest
Dat	5	FMD
Tarau	3	Not identified
But cueiny	4	Fascioliasis
Jok cueiny	3	Internal parasites
Rut	4	Perhaps HS also
Panyuany, gueny or koac	3	Dermatophilosis
Panyal	3	Urogenital infection
Juol	3	Aftermath of FMD
Kiec	4	Horn cancer
Jok caakni	4	Tick infestation
Dony	4	Bovine ephemeral fever
Muol	4	Abscesses
Dang dang or dam dam	3	Not identified
Bec nyin	2	Eye infection
Banyjar	2	Blackquarter
Ngier	3	Not identified
Nguot	2	Not identified
Tiith	2	Perhaps joint-ill
Yong jok	2	Rabies

Other diseases only included once in the disease rankings in Zeraf: nyok (lice infestation), kuei loak (not identified), pier(not identified), yieny (not identified), tak hook (mastitis), yopyop (not identified), nyaliny (flea infestation), thor (abortion), luek (not identified), kuat (skin disease), lir (absess), dheng (abscess), rieny (tetanus), bot (not identified), ngah (not identified), rieny lot (not identified), potpot (not identified), piay yang (not identified), mawuomlual (not identified), guo (not identified) and kimiri (not identified) .

Results of 7 exercises in central Upper Nile:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyapec	7	Rinderpest
Noi	7	Trypanosomiasis
Jok puoth	7	CBPP
Yieth or rut	7	H.septicaemia
Jok com or wut cueiny	7	Fascioliasis
Dat	6	FMD
Juol	3	Aftermath of FMD
Kuem	5	Hygroma (brucellosis)
Dangdang	5	Not identified
Yong	3	Rabies
Thor	2	Abortion
Doiny	6	Bovine ephemeral fever
Banyjar	5	Blackquarter
Caak	5	Tick infestion
Jok tak	5	Anthrax
Tuiny	4	Diarrhoea
Tak	3	Mastitis
Kiec	6	Horn cancer
Panyuany or koac or gueny	5	Dermatophilois
Kon	3	Skin disease
Muol	4	Abscesses
Lir	2	Abscess
Dheng	4	Abscess
Ngony	2	Not identified
Pier	3	Not identified
Tiith	3	Perhaps joint-ill
Kir kir	3	Overgrown hooves

Other diseases in central Upper Nile which were only included once: nyok (lice infestation), tarau (perhaps part of noi complex), kom (perhaps worms), cieth (diarrhoea), lot (worms or trypanosomiasis), rau (not identified), panyal (genito-urinary infection), and rieny (tetanus).

DISEASE RANKING IN GOATS AND SHEEP

Owing to limitations of time and the lower importance attached to goats and sheep compared to cattle, fewer ranking exercises were conducted with goat and sheep diseases. On the occasions that they were, it was not always clear whether the participants had understood that each species was being considered separately in turn. Many names of diseases are common to cattle, sheep and goats but they may not refer to the same disease. In general, it was recognised that sheep were much more similar to cattle in many respects, including disease susceptibility, than were goats.

Results of 10 goat disease ranking exercises in Bahr el Ghazal:

Local names of diseases in order of ranking	No of times included	Suggested English name
Akuak (akoak) or tuet	9	Goat pox
**Manyuin	8	Mange
*Anguin	3	Perhaps anthrax
**Matembiok	4	Skin disease
Yac, yac nyangtar or manyang	9	Diarrhoea
*Jok nhial	4	Perhaps anthrax
Abuot	7	Perhaps CCPP
Adhom	5	Perhaps anthrax
Dat	4	FMD
Amiok	6	Orf
Cot nyin or nyin tok	3	Eye infection
Awet	3	Perhaps rinderpest or PPR
Atak or weth	3	Mastitis
Liny	4	Flea infestation
Anur	2	Not identified
Atherbei	4	Abortion
Acaak	4	Tick infestation
Manhom	2	Not identified
Acany	3	Footrot or FMD
Cac	2	Foreign body in rumen
Nyok	2	Lice infestation
Pien	2	Snake bite

* Note that anguin and jok nhyal may be one and the same disease: the clinical picture seemed to be similar.
** Note also that manyuin and matembiok may also be synonomous: it was difficult to distinguish the clinical picture of skin diseases from descriptions alone.

Other goat diseases only mentioned on one occasion: acom (fascioliasis), liet (not identified), tel (not identified), rol (infertility), nyok (lice infestation), kom (perhaps Oestrus ovis), athido (not identified), pier (not identified), ngany (amphistomiasis), abiu (poor milk production), rap (not identified), tatok (wounds), angot (not identified) and aduony (not identified).

Result of 5 disease ranking exercises in goats in Central Upper Nile:

Local names of diseases in order of ranking	No of times included	Suggested English name
*Dhop, dhom or dangdang	5	Possibly heartwater
Nyapec	2	Perhaps PPR
Kuat or panyuany	5	Goat pox and mange
Noi	3	Chronic wasting
Nyaliny	4	Flea infestation
**Wut cueiny or jok com	4	Probably fascioliasis
Tuiny	3	Diarrhoea, parasites
Caak	5	Tick infestation
Jok pwoth	3	CCPP or other pneumonia
Dat	2	FMD
Tak or nguatak	2	Mastitis
Kiir	3	Digestive upset

*some groups ranked dangdang separately from dhop.
** some groups indicated that there was a subtle difference between wut cueiny and jok com.

Other goat diseases only being mentioned once in the ranking exercises: nueng (paralysis), tun tun (not identified), lot (wasting: perhaps internal parasites), nyok (lice infestation), tiith (neonatal infection, perhaps navel or joint ill), thor (abortion), kuem (joint swelling: not identified), yieth or rut (haemorrhagic septicaemia), kir kir (overgrown hooves), ngony or ngany (perhaps amphistomiasis), jok tak (anthrax), jok jier (loss of condition).

Result of 4 disease ranking exercises in goats in Zeraf Island, Phou State:

Local names of diseases in order of ranking	No of times included	Suggested English name
But cueiny	4	Unknown liver disease
Kuat or panyuany	4	Pox or mange
Dhom or dop	2	Perhaps heartwater
Nyaliny	2	Flea infestation

Other diseases of goats mentioned only once: tuntun (not identified), kei (horn cancer and eye and ear involvement), lot (emaciation), tiith (neonatal infection), ciith (diarrhoea), rieny (tetanus), dony (posterior paralysis), yong (rabies), gom (not identified).

Result of a single exercise in disease ranking in goats in north Bor County:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyanatek		Perhaps PPR
Abuot pio		Pneumonia
Acom		Fascioliasis
Adhoric, yac or aberic		Diarrhoea
Atuiny or awiir		H. septicaemia
Liny		Flea infestation
Amiok or luguen		Orf
Manyuany, atuet or akoak		Skin disease, perhaps pox
Cual or abeebay		Abortion
Dat or acany		FMD and footrot
Acaak		Tick infestation
Thelecok		Overgrown hooves
Luac		Emaciation
Nyok		Lice infestation
Look or nook		Resembles epilepsy

Other goat diseases mentioned but not ranked: ateric (bloating), akoi (not identified), jok atak (anthrax), ater nhom (not identified), jok piu (not identified), akum nyin (eye infection), aluithok (neonatal problem).

Result of 5 disease ranking exercises for sheep in Bahr el Ghazal:

Local names of diseases in order of ranking	No of times included	Suggested English name
Jok nhial	4	Anthrax
Marol or manhom	5	H. septicaemia
Abuot pwou	5	Pneumonia
Awet	5	Perhaps PPR
Anur	3	Not identified
Yac	5	Diarrhoea
Dat	5	FMD
Liny	4	Flea infestation
Atak or weth	3	Mastitis
Acaak	4	Tick infestation
Nyintok	2	Eye infection
Atherbei	3	Abortion

Nyok	2	Lice infestation
Kom	2	Oestrus ovis
Pien	2	Snake bite
Cac	2	Foreign body in rumen

The following diseases were mentioned only once: acony (may be same as acany and det), amiok (orf), matuntun (skin disease, perhaps goat pox), ril (dystocia), geklap (retained afterbirth), tatok (wounds), dony dony (not identified), abiu (poor milk production), ngany (perhaps amphistomiasis), adhom (sudden death, perhaps anthrax), rol (infertility), liet (not identified), athido (poor milk production), cual (not identified), apanguer (not identified).

Result of a single exercise in disease ranking in sheep in north Bor County:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyanatek		PPR
Abuot pio		Pneumonia
Acom or jok acom		Fascioliasis
Liny		Flea infestation
Adhoric or yac		Diarrhoea
Dat or acany		FMD or footrot
Luac		Emaciation
Cual or abeebay		Abortion
Nyok		Lice infestation
Acaak		Tick infestation
Amiok or luguen		Orf
Atuet, manyuany or akoak		Skin disease

Other sheep diseases mentioned but not ranked: aluithok (neonatal infection), nok (not identified), ngany (amphistomiasis), jok tak (anthrax), aguak (weakness), atak (mastitis), adhima (not identified), jok piu (not identified).

Result of 3 disease ranking exercises in sheep in Central Upper Nile:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyapec	2	Perhaps PPR
Wut cueiny	2	Fascioliasis
Jok puoth	3	Pneumonia
Noi	3	Emaciation
Tuiny	3	Amphistomiasis
Rut or yieth	3	H. septicaemia
Dat	3	FMD or footrot
Jok com	2	Fascioliasis
Nyaliny	2	Flea infestation
Kuat or panyuany	3	Pox or orf
Caak	2	Tick infestation

Other sheep diseases mentioned but not ranked: nueng or nuang (paralysis), kei (horn cancer or ear infection), kuem (lameness and joint swelling), dangdang (central nervous condition, perhaps heartwater), tak (mastitis), tiith (neonatal infection), yuainy (plant poisoning).

Result of 2 disease ranking exercises in sheep in Zeraf Island, Phou State:

Local names of diseases in order of ranking	No of times included	Suggested English name
Jok pwoth or dhob	2	Pneumonia
Panyuany	2	Pox or mange
Nyapec	2	Perhaps PPR
Dat	2	FMD and footrot

Other diseases mentioned but not ranked: yieth or rut (H.septicaemia), tiith (neonatal infection), rieny (tetanus), lot (emaciation), dhom (not identified).

DISEASE RANKING IN CHICKENS

Scant attention was given to chicken diseases due to time constraints and the minor importance afforded to them by the pastoralists. One group admitted that as young men they could not be expected to know about, or be interested in, such household matters as chickens: they were the concerns of women!

Result of 5 disease ranking exercises in chickens in Bahr el Ghazal:

Local names of diseases in order of ranking	No of times included	Suggested English name
Apalac	4	Diarrhoea
Nok	4	Maybe Newcastle disease
Mangok	4	Maybe Newcastle disease
Nyok	5	Lice infestation
Liny	3	Other external parasites

Other diseases of chickens mentioned once but not ranked: yac (diarrhoea), pier (not identified), lith or liet (predatory bird: often the black kite), aduony (not identified), acaak (tick infestation), angou (predator).

Result of 1disease ranking exercise in chickens in north Bor County:

Local names of diseases in order of ranking	No of times included	Suggested English name
Jong yol		Newcastle disease (NDV)
Liny		External parasites
Adhoric, yac or abaric		Diarrhoea
Rotuba		NDV
Jong lok		Not identified
Tong nyin		Eye infection
Nyok		Lice infestation
Nok dhom		CNS signs, perhaps NDV

Result of 3 disease ranking exercises in chickens in Central Upper Nile:

Local names of diseases in order of ranking	No of times included	Suggested English name
Nyaliny	3	Flea infestation
Piny diny	1	NDV
Nok	1	NDV
Doi yoi	1	Not identified
Nyok	1	Lice infestation
Yem nyin	1	Eye infection
Nyapec	1	Diarrhoea
Jok puoth	1	Respiratory problem

Result of 2 disease ranking exercises in chicken diseases in Zeraf Island:

Local names of diseases in order of ranking	No of times included	Suggested English name
Duot	2	NDV
Nyaliny	2	External parasites
Lath	1	Not identified
Yong	1	CNS signs
Ciith	1	Diarrhoea
Panyal	1	Poor hatching

DISEASE RANKING IN DONKEYS

Donkeys are not numerous among the Nuer and Dinka. They are occasionally seen in Bahr el Ghazal and Central Upper Nile where they are used to carry loads (particularly grain) and, perhaps more importantly, disabled people.

Result of 1 disease ranking exercise in donkeys in Central Upper Nile:

Local names of diseases in order of ranking	No of times included	Suggested English name
Yong		Rabies
Noi		Loss of weight
*Minyjin		Preputial discharge
Leany		Skin irritation

* Said to be like venereal disease in humans.

NB The only condition noted for donkeys in Zeraf was fatigue!

CRITERIA FOR DISEASE RANKING

Having established the list of diseases in order of importance, participants were asked to state what factors or disease effects they took into account when considering the ranking. The question was usually posed as 'What are your reasons for thinking disease A is more important than disease B?'. The combined list from all areas is shown below:

Milk production (quantity and quality);
Calf mortality;
Adult mortality;
Frequency of occurrence;
Marriage settlements (appearance spoiled);
Degree of emaciation;
Barter value;
Human happiness (for example, loss of a bull to whom songs are composed) and increased anxiety;
Degree of hunger caused;
Difficulty in treatment;
Meat production (amount and taste);
Abortion rate;
Affect on human health;
Ability to walk (ie capacity to reach grazing and water and to escape from conflict impaired);
Hindering movement of people as well as cattle (quarantine restrictions and lack of milk restricts numbers able to go to dry season areas);
Speed of spread;
Numbers affected;
Fertility;
Cause of blindness;
Yield of blood;
Social effects (having to herd away from others, reduced supply of milk and other products affects ability to cultivate and may necessitate raiding to obtain food).;
Suffering of cow;
Yield of butter or ghee;
Market value;
Urine rendered not suitable for flavouring milk;
Numbers of calves orphaned;
Degree of weakness leading to cattle becoming mired in mud;
Sick and dead animals attract hyaenas;
Work involved in nursing sick animals;
Amount of money and grain used in obtaining medicines;
Movement restrictions on meat, cattle and people may cause quarrels;
Affect on kinship ties due to reduced capacity to lend milking cows;
Burning of dung prohibited due to fear of spreading disease;
Removes tail hair so cattle less able to combat flies.

LOCAL NAMES FOR DISEASES AND ASSOCIATED CLINICAL SIGNS

It is not always possible to equate English or scientific names precisely with local Nuer and Dinka terminology. The local word may describe a sign common to several diseases (eg diarrhoea) rather than a whole disease syndrome. The literal translation of disease names sometimes gives useful clues about local perceptions of diseases. In some cases it is fairly clear that words in Nuer and Dinka are referring to the same clinical entity and they are grouped together. In other instances, it is by no means clear and so are considered separately under their vernacular names. Furthermore, there are different names for the same disease according to Dinka and Nuer dialects and there is no fixed way of transcribing vernacular into English. Different outside observers of different nationalities will inevitably hear and spell vernacular word differently. In this report, for example, the letter *c* in the Nuer and Dinka spellings, as for example in *toic*, should be pronounced *ch* as in chalk.

The author was unable to see any cases of many of the diseases listed by the Nuer and Dinka and was thus not in a position to ascribe English or scientific names to them.

There is a dilemma about presenting this information. Should one categorise by vernacular or English names or perhaps according to clinical pictures or the type of disease agent? There are snags to all these methods. On balance, it is probably best to base it on English names where there seems to be a fairly close fit with local names and clinical picture but to use vernacular names where this is not the case.

The clinical signs summarised below for each disease were, on the whole, described by the CAHW trainees without any prompting from the trainer. Undoubtedly some of the meaning was lost or misinterpreted during the translation so there is bound to be some discrepancies when different people carry out similar exercises. Also, there are many local variations in dialect. Furthermore, there was often insufficient time to follow up on fine detail and, of course, the skills and knowledge of the interpreters varied greatly. Consequently, there is plenty of room for disagreement in the interpretation of these disease names and their western names. There are also annoying apparent discrepancies in the clinical signs ascribed to the same vernacular name by different groups.

The clinical pictures are presented mostly in the English words, which came over in the translation.

A. DISEASES IN WHICH THE CLINICAL SIGNS SEEMED TO MATCH A WESTERN SYNDROME BOTH IN DINKA (MONYJANG) AND NUER.

ANTHRAX

Vernacular names

Dinka: *jok nyal* or *jong nyal* (northern Bahr el Ghazal), *jok tak* or *jong atak* (north Bor), anguin (northern Bahr el Ghazal).
Jok (pronounced *jong* in some circumstances) means spirit or disease, *nyal* refers to the sky, *nyalic* is the word for God, divinity or deity. So *jong nyal* suggests a disease brought from God, implies something mysterious and unseen coming from the sky from nowhere or the animal is taken by God. *Anguin* means sudden death. *Tak* refers to the spleen.

Nuer: *jok tak or jong de tak* (Bieh State),
Disease of the spleen.

Clinical signs

Difficulty in moving, unsteady, grunting, circling (one group said the animal will circle around its peg for 3 hours then fall and die), fever, salivation, inflamed eyelids, staring coat, diarrhoea with blood and strong smell, blood from nostrils and anus which does not clot, blood in the urine, milk watery and tastes sour, breath smells rotten, death may occur rapidly at grazing or the animal may lie down after returning in the evening and then be found dead in the morning.

Post mortem

Carcase rots and swells quickly, swollen spleen and liver, meat and skin full of blood, veins engorged with dark blood, blood issues from nose, anus and vulva.

Epidemiology

Occurs sporacically mainly in April (early rains) and August to October(late rains), mainly in toic but not every year. Particularly in healthy, pregnant cows and good quality bulls.

Other information

People may also be affected if meat eaten or by contact such as being carried.
There is shivering, wounds in mouth and skin, itching in throat (perhaps also from drinking affected milk) and swelling extending to chest. The skin wounds in people are hard swellings which develop scabs with pus underneath: the scabs fall off leaving deep wounds, which are treated with the latex from Ficus trees (*kwel*). Since the disease picks out the best animals, it has an adverse effect on marriage prospects.
At least one group considered that *anguin* is a different entity from *jok nyal*: distinguished by occuring mainly from November to January and in both wet and dry season areas and at post mortem the spleen is normal and no blood spillage from orifices.

BLACKLEG OR BLACKQUARTER

Vernacular names

Dinka: *abany jar* (Bor county), *macou* (BEG)
Abany means to take or pull out or break off, *jar* refers to the scapula or shoulder. *Ma-* means a disease or swelling and *cou* is the front leg.

Nuer: *banyjar* (central Upper Nile), banyjer (Zeraf)
Bany refers to the taking away part of something or to a wound, *jer* and *jar* mean the shoulder.

Clinical signs

Lameness, soft, hot swelling of shoulder and scapula area, which pits on pressure, on occasions extends from the axilla up to the spine and down to the elbow, opinions varied as to whether it was painful to the touch, usually one side affected, leg held up straight and moves with the head as the animal walks, swollen veins, fever, excessive salivation, unable to graze, opinions varied about the course: deaths were stated to occur from a few hours up to several months,

Post mortem

Clotted, dark red blood found in swollen part, one blood vessel thought to be involved. The meat in the affected part is black, rotten and smells rancid and is discarded. The skin is dry and shrunken over the area.

Epidemiology
Occurs sporadically (only one or two in a group) in animals over a year old, especially in bulls and cows in good condition from 18 months to 3 years old, no marked seasonal prevalence though some said it occurred mainly in the wet season, or any particular association with locality. It does not occur regularly every year.

Other information
There is some difficulty in ascribing *banyjar* specifically to blackquarter because of the long course of the disease and the fact that some animals survive. One group thought that what they called *banyjar* was due to an injury, such as stepping into a hole. It may be that the term embraces dislocations as well as blackquarter. Lameness persists unless treatment given. The swelling was stated to be firmer than that in *marol* and resembles that of a snakebite but can be distinguished. It does occasionally occur in the hind quarters. Several groups stated that the swelling made a sound when pressed, which suggested the crepitus so typical of blackquarter, and another stated that 'the skin separates and feels like paper'.

BOVINE EPHEMERAL FEVER (BEF)

There seems to be some overlapping between the terms given below, which seem to fit with the picture of both BEF, and of some features of brucellosis. There may also be some confusion over the diagnosis among the herders themselves.

Vernacular names
Dinka: *aduong* (BEG Alek dialect), *doin doin* (BEG Akon dialect), *aduony* or *adony* (Bor county)
The term *aduong* refers to something broken and *aduony* is paralysis.

Nuer: *duony* or *doin* (Zeraf), duony (CUN)
One meaning of the word duony was given as paralysis both in animals and people. In another place (Motot), it was said to mean a bundle of cloth or a tangled rope.

Clinical signs
Lameness in all legs from joint involvement, difficulty in bending legs (in Bor *duony* was likened to an old man who cannot move his joints), no joint swelling but cow does not move as usual, does not whisk the tail, back arched, difficulty in getting up (so tends to stay lying down), especially when cold, unable to run, fever, shivering, reduced appetite (shows difficulty in eating and chewing cud), bloating may occur, milk production down, no abortion, varied opinions about the length of the disease course: some said only 2-3 days if weather warm. No deaths unless water given.

Epidemiology
In BEG, the opinion was that mainly full-grown animals of both sexes were affected whereas in Bor county, the informants thought that young stock (2-3 year olds) were more susceptible and in CUN, they felt 1-4 years was the main age group. It occurs mostly during the wet season and particularly the early rains (April to July) when the new grass is coming.

BRUCELLOSIS

There are various disease names both in Nuer and Dinka, which may relate to the several manifestations of brucellosis but which are listed by them as different entities . Some of these names might refer to the same clinical sign, which features in other diseases, for example, abortion. There are thus innumerable words said to refer to abortion but the author failed to tease out the subtle differences between them: we know that there is plenty of brucellosis in Dinka and Nuer cattle but of course there many other causes of abortion. It is very difficult to clarify the relationships of these names and to fit an exact English diagnosis to them. These names and the signs described for them are all listed below under the general heading of brucellosis but they may well be part of other diseases. Almost certainly, there is overlap between terms for brucellosis and bovin ephemeral fever (see below).

Vernacular names

Dinka:
arem (Bor county), *cual* (Bor county and BEG), *atherbei* (BEG), and *amul* (BEG), *athorbei* (Bor county), abeebei and weth (Bor county), aduong (BEG).
Ther refers to something being speared, *bei* is out and *a-* signifies plural. *Cual* in BEG was said to denote something cylindrical in shape, growing without branching, as well as to a swelling without pus. In Bor county, cual

was said to refer to pieces of blood clot such as when a cow is bled for food. *Arem* is used to describe aching joints in animals and people. Abeebei is another word for abortion. Aduong means arthritis but *duong* was said by Bor Dinka to mean a fracture. *Weth* may mean itching. Thorbei refers to the event of abortion but athorbei means an aborted foetus or a premature calf, which survives.

Nuer:
thor (CUN), *muol* (CUN), *kuem* (CUN), molle, mol or muule (Zeraf), weth or wueth (CUN)
Thor seems to simply mean abortion. *Kuem* refers to hammering or the knocking of sticks together or the beating of Balanites seeds (thou) with a piece of wood to extract the kernel. People also suffer from a condition which they call *kuem* from the hammering they feel in their bones. *Mol* refers to the knee and also to a lump emerging from something else, *muol* means to cover (perhaps referring to bone covering ie the periosteum) and *mulmul* means something round but of unknown nature. *Molle* means a ball.

Clinical signs
Thor
This seems to be used as a general word for abortion, whether it occurs as a result of another disease such as *noi, nyapec* or *kuem* or simply happens for no obvious reason. It may be regarded as a disease in its own right.

Muol or *muul or mol*
The author was a little confused over the application of this term. It refers to soft, floppy swellings on front and hind legs and often all of them. It affects only the joints (especially the carpus and stifle) in contrast to *kuem* where the swelling extends distally down the limb from the joint. The swellings themselves do not seem to be painful and the animal is otherwise healthy. Lameness occurs some time after the swellings appear and grazing may be impeded. There were differences in opinion as to whether abortion and infertility are associated with *muol*. These terms might be used for either the hygromata of brucellosis or for abscesses (lymphangitis or bovine farcy or non-specific). A group in Zeraf said that when lanced, the swellings of mol produce watery contents mixed with pieces of grass-like material.

Weth or *wueth*
This term was said by one group to refer to an abortion unassociated with another disease.

Epidemiology
Both sexes are affected but usually only those over 2-3 years and, in females, after they have had a calf: there is no seasonal incidence.

Kuem
Lameness with swellings in front and hind limbs, start from joints and then extending distally from, for example, the carpus or elbow. The swellings are soft or firm and contain watery fluid like urine but deep inside are hard pieces like maize and the bone may be affected. Legs tend to be held bent. Associated blood vessels may be engorged. Affected animals find getting up and lying down difficult: may sleep standing up, resting each leg in turn . Females always abort, perhaps repeatedly. The absence of fever distinguishes *kuem* from *doiny*.

Epidemiology
Occurs sporadically in animals over 2 years, long course with no recovery. No seasonal incidence.

Other information
Kuem also occurs in humans as a sequel to untreated syphilis (wueth). It occurs some two years following the syphilis and there may be warts (*top*: presumably genital warts) and a hammering in the bone.

Atherbei
This name appears to apply to abortion occuring at different stages of pregnancy but particularly when the foetus has no hair and from a variety of causes eg trauma (butted by another cow or remated during pregnancy), poor environment (many mosquitoes or a small insect called thor), and other diseases such as *dat, luac, nyapec and about pio*. It may also occur on its own for no obvious reason.

Other information
One group in BEG thought there were various stages in the development of leg swellings and pain. First there is a painful stage (this group called this *aduong* but see also below) characterised by lameness or walking slowly. Only one leg is affected (in contrast to *acany* with all legs affected) and there is no swelling or loss of condition. There is no marked association with abortion. The next stage is called *amul*, in which there is less pain and therefore no lameness. Swellings develop in the joints, particularly the stifle and carpus: initially the swelling is firm and contains little fluid. The third stage is marked by an increase in the swelling, which becomes large, soft with much fluid. There is no pain or lameness. All this stages occur in adult animals of both sexes with no seasonality.

Cual and weth and abeebei

In BEG, the clinical picture of cual was of lameness accompanied by joint swellings in any leg: the carpus is the joint most commonly affected, followed by the stifle. Repeated abortions occur and infertility follows. The testes are not affected. In Bor County, *cual* was described somewhat differently. There was said to be no joint swelling or lameness. There is a white, mucous discharge from the vagina, repeated abortion (associated with blood clots) often at about 5 months of gestation, retained placenta, affected cows show discomfort when mated and hold the tail held cocked away from the vulva, chronically affected cows rub against trees. When the afterbirth is removed, red material comes out (perhaps cotyledons). There is no loss of condition and the animal looks healthy otherwise. No milk is produced and the cow is not acceptable in a marriage exchange. It was likened to venereal disease (*weth*) in humans. In Bor County, *weth* in cattle is abortion in which wounds are seen on the foetus. It was also applied to a condition with skin wounds, hair loss, diarrhoea, apparent pain, vaginal lesions and irritation evidenced by rubbing against trees (perhaps some overlap with cual, see above). In BEG, weth seemed to have a more general meaning embracing *atak, bior, pier* and *atherbei*.

Abeebei seems to refer to abortion when it occurs in association with other diseases such as *luac* or *acany.*

Epidemiology
Cual was said to be not spreading and occurs in adult animals of both sexes.

Other information
One group noted that there are many causes of swellings so they must be felt and watched: if pus appears then the condition is not *cual*. People may also suffer from *cual* in their legs and neck. There were said to be local healers skilled in dealing with *cual* but not for *weth*.

Arem
Soft, fluid swelling in joints, lameness, difficulty in standing up and lying down, sweating on chest, tend to stand in shade, repeated abortion, retained placenta and infertility. There may also be loss of condition. Some people mentioned another type of *arem*, in which the animal is lame but shows no joint swelling. Others said that *arem* may not necessarily be associated with abortion.

One group summed up by saying there are 3 types of arem:

Swollen hip (adhar) but no abortion
Arem of the womb with abortion but no joint swelling (also known as cual or weth and like STD in humans)
Swollen joints in front and hind limbs, may or may not be abortion and repeated mating.

Epidemiology
Occurs in cattle over 3 years old with no seasonal incidence.

CONTAGIOUS BOVINE PLEUROPNEUMONIA (CBPP)

Vernacular names

Dinka: *abuot, abort, abut piu or abuot piu or abut piou* (north Bor) *abuot pwou, abuot pwow* (northern Bahr el Ghazal)
Piu or *piou* and *pwou* or *pwow* means heart (used because it hangs with the lungs) and perhaps also the jugular vein, *abuot, abut* or *abort* means swelling or to swell (but is the word for swelling and the addition of the 'o' indicates that it is internal.

Nuer: *dop or dhop* (Zeraf) *jok pwoth, jok puoth* (central Upper Nile)
Dop or *dhop* means something stuck but which is easily removed, such as a patch for repairing a puncture, *jok* means disease or spirit and *pwoth* is lung.

Clinical signs
Difficult breathing (fast, noisy and deep) and nostrils twitch with each breath, whole body may move too, may be watery nasal discharge and may be froth from the mouth, breath smells bad, muzzle dry, coughing, no bellowing, absence of fever, head held low and stretched out, ears drooping, jugular veins engorged, grunting, grinding teeth, reduced appetite, rumen still full in morning showing that the digestive system is also affected, constipation, reduced urination, back seems stiff (kept rigid when squeezed) and the animal has difficulty in lying down and turning round and walks slowly and hunched up (lags behind and may be unable to reach grazing and water), hair standing up and moist along back and over chest causing a colour change (looks different), skin seems to stick (difficult to pick up fold), milk reduced and contains less fat, excessive thirst, resents being in smoke, stands with legs apart and tends to face the wind , loss of condition, chest sounds dull to a tap

Post mortem
Lungs swollen and firm, stick to chest wall, have thick yellowish membrane around them and show thickened divisions, yellow fluid in chest and meat tends to have yellow tinge to it and is tasteless. Heart also sticking to the lungs. Affected parts thrown away.

Epidemiology
Affects all ages but less in suckling calves and mainly in wet season (associated with luaks). Sometimes recurrs in same animal.

DERMATOPHILOSIS

The diagnosis of skin conditions is difficult even for veterinarians. The Nuer and Dinka have a range of names for diseases of the skin and undoubtedly there is scope for much confusion in understanding them and attempting to match them up to specific English terms and, indeed, equating the Nuer and Dinka names. There is bound to be some overlap between the names and differences of opinion between the herders themselves.

Vernacular names

Dinka:
manyuin (BEG), *manyuany* or *jony* (Bor county)
The term manyuin refers to something hard and rough. Manyuany is used to describe a rough surface like a badly plastered mud wall. Jony is used to describe a human condition of sores over joints.

Nuer: *panyuany* or *pangnyuany* (CUN, Zeraf), *gueny* and *koac* or koay(Zeraf),
The similar word *minguany* (or *nyuany*) refers to something rough such as the tin shaker used in church or the bark on a branch. Panguany also said to mean something ugly, dirty and unpleasant to touch. *Gueny* means an open space or separating something to make an opening to peep through. *Koac* describes a surface changing in texture from soft to hard, for example the hardening of a drumskin. Other informants said that koac referred to something stuck, such as a nut which has been swallowed or a patch on clothing or a puncture repair patch.

Clinical signs
Lesions in the skin, itching (may jump when touched), loss of hair from rubbing on trees and licking, may start anywhere but often on head, muzzle or back and then to axilla, vulva and mouth: may spread all over the body. Lesions start as small spots, then increase, crack and break open to cover a large area like a wound or a burn. Fluid oozes (some said pus) and hard projections form. Skin thickened (strong)Loss of weight and condition and milk reduced. Flies may cause a problem and affected animals tend to stay in the luak. Walking may be impaired. Bulls refuse to mount so infertility is another effect. Many deaths occur if not treated: the course may be up to 2 years. The term gueny is used for the last stage of the disease in which the sores coalesce to cover a large area. Koac refers to the hardening of the skin during the course of the disease. A group in Bor likened the appearance of the skin to a crocodile's back or to a thorny feel: it is no longer possible to clean the coat nicely with ash. The affected animal is considered ugly and 'no longer a cow'! Another group said the skin became white similar to a woman's skin when she does not apply oil!

Epidemiology
All ages affected except small calves less than a year old (others said less than a month) and several may be affected together. Perhaps more in younger than older animals. Some felt it is not seasonal but other groups felt that rain exacerbated the disease and if animals are unable to shelter in a luak they tend to deteriorate faster.

DIARRHOEA

Since diarrhoea is a sign in many diseases, there are bound to be difficulties in the interpretation of the various names under which it is described. Some names may be general terms for diarrhoea whereas others may apply to specific causes of diarrhoea.

Vernacular names

Dinka: *yac* (BEG, Bor county), *aloric* (BEG, Bor county), *abhoric, adhoric, aboric, aberic* (Bor county), *kalkal, kalkap, nyangtaa* and *manyang* (BEG).
Yac means stomach and usually indicates the rumen and/or the abomasum.

Nuer: *yac* (CUN, Zeraf), *cieth* (Zeraf and CUN)

Clinical signs

The diarrhoea was described variously as dark or pale and with or without blood; the appearance of blood gives a poor prognosis. Rapid loss of condition, appetite reduced, excessive thirst, dull, eyes sunken, some deaths occur, particularly if local treatment not given. In Bor, *yac, adhoric* and *abaric* seem to refer to watery diarrhoea without blood: there may be bloating associated with it. One group considered adhoric to mean diarrhoea of sudden onset (akin to cholera in humans) and containing undigested vegetable material. There are few deaths. There were said to be 'things' (perhaps worms) moving in the dung. In Motot, cieth was said to be a greenish diarrhoea, without blood, occurring in all ages. Affected animals lose condition and walk slowly but recover after about 2 weeks. It was not considered a real disease but a digestive upset caused by eating young grass in the toic. It occurs mainly in May to June and from January to February.

Post mortem
Small wounds in the rumen and other parts of the gut, much blood may be seen in the lumen. It was stated that the number of worms is not greater than normal.

Epidemiology
In BEG, *yac* was said to affect mostly calves, both pre and post-weaning from one month (ie before grazing) up to a year old. Opinions varied as to seasonal incidence: the consensus was that it occurs mainly from April to June and November till February. It tends to be worse in hot weather. In Bor, *yac, adhoric* and *abaric* were said to have no age or seasonal incidence, although one group considered *adhoric* to affect mainly adults in good condition. Another group felt that yac occurred more often in large cattle camps in the toic (wut aruel).

EYE INFECTIONS (usually keratitis)

Vernacular names
Dinka: *nyin tok* and *madhany* (BEG), nyin and bort (Bor County)
The literal meaning is wound or pain (*tok*) in the eye (*nyin*): the term is also used for human eye problems.
Nuer: *bec nyin* (Zeraf)

Clinical signs
May affect one or both eyes. Initially, eyes red and inflamed, lacrimation and later purulent discharge, eyes held closed, animal looks sick and is reluctant to graze, nasal discharge. Later, the cornea becomes white and blindness occurs. Affected animals tend to go in different direction from the rest of the herd. In the chronic stage, the word *bort* may be used.

Epidemiology
This problem occurs sporadically in all ages of cattle (but less commonly in animals under one year old), with no marked seasonal incidence although some thought it occurred more often in winter. It does not seem to be contagious. One group considered it to be more common in black or red coloured animals. Others noted it occurred more often in weak animals.

FASCIOLIASIS (liver fluke infection)

Vernacular names

Dinka: *acom, luac acom, guau* or *guak acom* or *jok acom* (Bor county, BEG)
Acom means snail or simply snail shell. Different types of snail were recognised. The name *lua* was stated to mean the snail itself. *Jok* means disease or spirit. One group said that *guau* meant specifically the weakness associated with *jok acom,* whereas *guaak* refers to general weakness in people. *Guak acom* seemed to be used for flukes in the liver as well as amphistomes on the rumen wall.

Nuer: *jok cuiny, jok cueiny* (Zeraf), *jok com* (CUN)
Cui (*cuiny* plural) is the name for a kind of worm coming from wet grass or water, *cueiny* was said to mean liver. It was not clear whether *cuiny* and *cueiny* are
the same thing.

Clinical signs
Loss of condition even if the grazing is good, sunken supraorbital fossa, diarrhoea, infertile (not coming into oestrus or getting pregnant), hair may be standing or it may remain smooth, milk reduced, grinding teeth, weakness, coat colour changes, head drooping, lazy, weak and inactive, may see swelling in throat but it differs from that in HS in that it does not spread, increased sounds from stomach when lying down, dung said to contain small, hard objects and smells bad, appetite and thirst remain normal. Continues 'for months and months'. Several groups stated that 'worms' were to be seen in the dung but in spite of repeated requests, the author was never shown any examples.

Post mortem
'Worms' seen together with grass in the stomach (maybe rumen) and also in the liver, oedematous carcase, liver hard and pale with thickened, white bile ducts and tastes like sand. One group said that broken black and white snail shells (com) were found in the stomach but separate from the cuiny.

Epidemiology
Mainly in adults (especially old cows) because young animals graze in drier areas (not taken to toic), seen mostly in the wet season (May to October).

Other information
Cuiny was said to be the 'brother of *noi*', one group said that white things (perhaps worms) were seen in the dung. When shown liver flukes, people would call them *acom, guak acom* or *cuiny* but they often appeared to believe that the snails where eaten by the cow together with grass and then the soft part of the snail became the parasite in the bile ducts. The broken shell was thought to injure the stomach wall and it then passes out with the dung. On occasions, the author requested to be shown such snails on the grass but either none were found or he was shown young forms of Pila sp., which have nothing to do with disease transmission. One group in Old Fangak, thought that young snails have no shells and are called luek com: these are consumed with the grass and suck blood in the stomach. Rol com are snails which have formed a shell.

However, although the precise details may be misunderstood, the belief that there is a connection between snails and thin cows is very strong. There is a common perception that releasing cattle to graze too early in the morning, particularly when there is dew on the grass, exposes them to more 'worms': whether this is to liver fluke or gut nematodes is not clear.

In the author's experience, most people were very familiar with liver flukes and amphistomes as parasites, they tended to be ignorant of the transmission of Schistosoma bovis. When schistosomes were demonstrated at post mortems, it often seemed that people had not seen them before and there was certainly no sign of them being recognised as a cause of disease in people or livestock.

In contrast to *noi, liei* and *manyai*, there is no loss of tail hair in *jok acom*. However, more of the body hair is lost and may be seen where a cow suffering from jok acom
has been lying. Also, with *jok acom*, the cow never gets to the stage where it needs help to stand. *Jok acom* is known to be hard to treat.

FLEA INFESTATION

Vernacular names
Dinka: *liny* (BEG), *nyaliny* (Bor county)
Nuer: *nyaliny* (Zeraf and CUN)

Clinical signs
Loss of hair, itching, loss of condition, suck blood, prevent calf from suckling properly, cause wounds, affected animals tend to stand in the sun.

Other information
Fleas were mentioned more in connection with kids and lambs but some said they cause problems in calves too.

FOOT AND MOUTH DISEASE (FMD)

Vernacular names

Dinka: *det* or *dat* (BEG), *acany* (Bor county and BEG)
Dat refers to a slow faltering step like a baby learning to walk. It was also stated to mean a small part remaining from a much larger quantity. *Acany* refers to a state of unhappiness or something changing quickly such as an unstable man changing his ideas or rapid movements of the feet. There seems to be some possible confusion between *dat* and *acany*: in BEG, *acany* was distinguished from *dat* (see below) but in Bor it appeared to mean the same disease.

Nuer: *dat* (central Upper Nile and Zeraf)
Dat means lameness or abnormal gait as it does in Dinka.

Clinical signs

Excessive salivation, wounds on top of tongue, in mouth and throat, swellings and cuts between the hooves and round the coronet, blood vessels in legs may appear prominent, reduced milk supply and cow may refuse to suckle calf, yellowish milk, stops grazing, lameness and may be unable to stand, loss of condition, urine greenish-yellow, chews the tongue and froth comes from the mouth, fever, seeks shade and likes to stand in water, hair stands up especially along the back, increased drinking, lesions on teats which may become blocked, abortion, swollen submaxillary lymph nodes, calves show rapid respiration and die rapidly, hooves may drop off, milk and breath smell bad (stated to be generally a 'smellful disease'), bulls are unable to mount cows.

Epidemiology
Spreads very rapidly (faster than cholera) through saliva, by means of birds, wind and people. Usually many animals of all ages affected together. It is not seasonal.

Other information
People sometimes get mouth lesions from drinking the milk from cows with *dat*. In BEG, *acany* seems to be distinguished from *dat* by the absence of salivation and it only causes a single, localised bad-smelling wound between the claws, whereas in *dat* there are wounds all round the foot. *Acany* is usually in adult cattle and occurs when the land is flooded (August to September): it causes the occasional death.

CHRONIC OR LATE STAGE FOOT AND MOUTH DISEASE
This is clearly recognised by both the Dinka and Nuer as a separate clinical entity and given a particular name.

Vernacular names

Dinka: *jul* or *ajul* (BEG),
Jul refers to the rough appearance (like the hide of an elephant). It also suggests a change from the natural condition (something not as it was before).

Nuer: *juol* (CUN, Zeraf)

Clinical signs
The animal looks ugly (different from the other animals) with a long, staring coat (hair becomes 'like a sheep's'), rapid and laboured breathing, seeks shade (prefers to graze alone and at night) and likes to stand in water, no milk production and teats may be blocked (called *dhiu* in Nuer), abortion, shows no oestrus and may become fat, hooves become elongated, never improves,

Post mortem
The meat has a bad smell, skin thickened.

Epidemiology
Juol only occurs in an animal after it has had *dat.* It usually follows several weeks
after recovery from dat. Usually in animals over 2 years. Most cases of dat develop into juol, particularly if the traditional cure of bleeding is not carried out.

HAEMORRHAGIC SEPTICAEMIA (HS)

Vernacular names

Dinka: *marol* and maybe *manhom* (northern BEG), *awiir* or *wiir* (south Bor), *atuiny* (north Bor), *anguat* (north Bor).
Ma- refers to a swelling or disease, *rol* means throat: *marol wut* is an alternative name for *bany wut*, which refers to the leader of a cattle camp. *Nhom* means head, *awiir* means cold eg the coolness of a river (because the disease occurs mainly in the cold season ie the rains) and *atuiny* refers to a smell such as from cooking or from dried fish (some also said it describes the haemorrhages seen at post mortem).

Nuer: *yieth* or *yiith* (central Upper Nile and Zeraf), *malpeath* (Zeraf), *rut* (pronounced route).
Yieth is a term used for something not well-known or accidental. It can mean an acute pain such as a spearing or an injection or a goring by a bull: it may also denote the urge to kill when a wild animal is suddenly seen. *Malpeath* refers to something rapid or in a hurry. *Rut* seems to mean the snoring sound associated with difficult respiration: it is used when referring to the death rattle when people die and also to the noise of a sewing machine.

Clinical signs
Stands still with drooping ears, arched back and sometimes with one front leg held up, salivation (perhaps frothing at the mouth) and perhaps lacrimation, eyes appear to protrude, vomiting, shivering, hair stands up, swelling under jaw extending to brisket and perhaps the shoulder, base of tongue also swollen, laboured (whole body moves), rapid and noisy (snoring) respiration, breath smells, may show nasal discharge, circles round tethering

peg, tongue may protrude from the mouth , milk suddenly reduced (hence may be noted first by women), bloating, absence of bellowing, dark urine, nearly all affected animals die and often within minutes or hours (occasionally up to 2 days).

Manhom seems to be synonomous with marol: the whole head becomes swollen such that it resembles snakebite. Death occurs in a few days.

Post mortem
Haemorrhages on the meat, rumen, chest wall and heart, lungs dark red, dark bile, throat floppy with yellow fluid (oedema), lymph nodes are red and swollen. The acute nature of the disease is shown by the finding of plenty of fat surrounding the kidneys. Heart may have a cooked appearance. Meat tastes abnormal. One group in BEG stated that the spleen was also enlarged in cases of *marol* so there may be an overlap with anthrax.

Epidemiology
Mainly affects animals in good condition in the 1-3 year old age group (not in unweaned calves and aged animals), mainly in wet season (although there were differing opinions as to seasonality) but occurs both in toic and in village areas. Usually sporadic but several animals may be affected. Manhom was said to affect mainly calves but not the very young ones.

Further information
In Zeraf, there was some confusion between *yieth* and *malpeath. Malpeath* was said to be slightly different from *yieth* in that it kills more rapidly ie before clinical signs have a chance to develop (a bull being played with might just drop dead or a cow might arrive back from grazing and die in minutes), it occurs when *yieth* has already appeared in a herd and at post mortem there is little to see. *Rut* is a term used in Bieh State (central Upper Nile); which seems to refer to a syndrome very similar, if not identical, to *yieth*: it may be used in cases where the respiratory efforts are particularly laboured and noisy. In cases of *rut*, the animal appears disturbed by the tethering rope and, hence, circles round its peg. *Manhom* is probably another Dinka name for HS but applies in cases where the swelling involves the whole head.

HORN CANCER

Vernacular names

Dinka: *kec* or *cec* (BEG, Bor county)
Kec means a bee or a state of disturbance or pain, perhaps the association with bees is due to the idea that the affected animal looks as if it has been stung. Kec or cec may refer to the maggots found inside the horn.

Nuer: *kiec, kiei, kei* (Zeraf, CUN), *guo* and *tuoth* (Zeraf).
Kei refers to putting something inside: in Zeraf, people denied that there was anything to do with bees and said it was derived from *keih*, which means a complex association or 2 things coming together. The group in Motot stated that the word referred to something akin to haemorrhoids.

Clinical signs
Head held tilted towards the affected side, pain in the horn, rubbing horn against objects such as trees, shaking the head or hitting the affected horn on the ground, swelling and wounds round base of horn, which then droops and may eventually fall off, an affected animal becomes afraid of others, the pain seems to prevent cudding and the animal may cease to graze. Death may occur if the brain becomes involved. One group stated that if a hole is made in an affected horn, pale, moving parasites like bee larvae (perhaps oestrids) emerge. It was felt that the maggots may enter the brain, causing death.

Some say the ear is involved too. Groups in Juaibor, Old Fangak and Panyagor said that the disease may start as a swelling behind the ear like an abscess and pus may discharge from the ear, the ear droops and the head tilts. Something starts to grow inside the ear and then appears externally: hearing is affected. The ipsilateral eye may also become involved: the lids turn out as if something growing from the eye and there is discharge. Blindness may result. A group in Langken said that only the eye may be affected but it still seems to be called *kei*. Once the horn is affected the Nuer in Zeraf apply the name *tuoth or guo*. The course of the disease may be up to three years and animals may become emaciated.

In Ajiep, one group considered there to be a distinction between *cec*, which involves t he whole horn, and *kuet kuet*, which affects the tip only.

Post mortem
Some people reported seeing worms or maggots (perhaps similar to bee larvae and hence the name).

Epidemiology
It occurs sporadically, mainly seen in adult stock with large, long horns (*wer* in Nuer) and, therefore, is less common in the shorter horned stock of northern BEG. It is commoner in cows than bulls.

Other information
There is a certain amount of confusion over this disease. There were differences of opinion about whether the ear and eye were involved and the order in which they were affected. The author had some tissue from horns of affected animals in Bor county examined histopathologically and the diagnosis was squamous cell carcinoma of the horn epithelium. The eye problem in cases of kei may be carcinoma also. The Nuer thought the disease process in the horn was akin to termites eating away at a dead branch, which eventually falls off.

LOUSE INFESTATION

Vernacular names
Dinka: *nyok* (Bor county and BEG)
Nuer: *nyok* (Zeraf and CUN)

Clinical signs
See animal scratching, both the large lice (*bany nyok*) attaching to the eyelids, ears and tail and the small species (*nyok*) found over the body are distinguished. Those on the eyelids were felt to be more troublesome. Body lice were thought to suck blood and cause itching and loss of condition in calves.

MASTITIS

Vernacular name

Dinka: *tak* or *atak* (BEG and Bor County), *weth* (BEG)
The word *atak* denotes something growing by itself, with implications of a sudden, mysterious appearance. People in Bor County said it referred to something filling with pus. *Tak* can also mean an idea. *Tak tak* means a bad smell. *Weth* is applied to something departing or going its own way, implying that it is different from other diseases: it can also be a general name for abnormality and a group in Panthou gave the example of an SRRA official called Col who had a hunchback.

Nuer: tak (CUN)
This seems to have several meanings. One group said it referred to something affecting a bone or udder until it breaks. Others stated it was used for a smell or something all over (eg the whole udder goes). It may also refer to the spleen and a plait.

Clinical signs
This disease may occur in the udder and/or the spine. The udder becomes swollen, hot and hard: it is uneven in appearance and may affect the animal's walking. The milk has a poor taste and may be greenish in colour: it becomes thick (like engine oil!) and may contain blood. Some said that there is pus in the udder swelling. One or more teats become blocked and non-functional, the cow refuses to suckle her calf, which often dies due to lack of milk. The teat may drop off. The appetite is not affected but opinions varied as to whether there is a fever.

Epidemiology
Tak may occur before calving or during lactation but never in a heifer. It is not seasonal.

Other information
Tak also seems to refer to a condition in which the spine appears bent as if broken. One group said that the spine was first affected and then it appeared in the udder. It is also used for spinal TB, mastitis and breast cancer in humans. *Weth* is a very confusing term: as well as being used for mastitis, it is also sometimes used in the brucella complex (see above). Like *tak*, it also may refer to a spinal problem.

RABIES

Vernacular names

Dinka: *wath* (BEG), jong ci yong or weng yong (in cattle in Bor county), *apiny ding* (in dogs in Bor county).
The word *wath* seems to refer to a state of fury, yong means madness, jong means dog and weng is cow.

Nuer: *yong jok, yong*

Yong means dog and *jok* is disease. Yong may also mean madness.

Clinical signs
Excess salivation, frothing at mouth, hair changes (looks like grass), not grazing, behaviour changes, looks around aggressively as if wanting to fight, eyes shifting and ears moving, never stands still, runs about biting and butting, bellowing, trying to harm people and fights all other cows (takes many ropes to tie it down), refuses to drink, refuses to suckle calf, does not return home, chases dogs, causes disturbance at milking time, period of aggression followed by quiet, falls over and struggles prior to death, which occurs in about five days to 2 weeks.

Epidemiology
Occurs sporadically with no seasonal, age or locality incidence.

Other information
People are also affected by yong but, whereas in cattle death always occurs, some recover. Affected people show aggression followed by peaceful periods: they may throw back water if it is offered.

RETAINED AFTERBIRTH

Vernacular names
Dinka: *geklap* (BEG)
Gek refers to the retention and *lap* means placenta.
Nuer: *geklap* (CUN)

Clinical signs
The placenta fails to come away, particularly following an abortion at 3-7 months of pregnancy. It may, therefore, be part of atherbei, weth and tut. The cow may look sick with a rough coat and cease grazing. Some bloating may occur.

Further information
The Dinka and Nuer like to see the placenta drop away within about 90 minutes of giving birth so they may try to remove it after this period.

RINDERPEST

Vernacular names

Dinka: *awet* (Bahr el Ghazal), *nyapec* (north Bor County), *nyanatek* (south Bor County).

Nuer: *nyapec* (Central and Eastern Upper Nile), *gieng* or *gieny* (Western Upper Nile).

In both Nuer and Dinka, *nya-* denotes femininity and *-pec* refers to raiding. *Awet* in Ajiep was used to describe a situation when everything was lost ie grain, cattle and clothes. In northern Bahr el Ghazal, *awet* was said to mean a scattering of wealth (ie a cattle herd) till nothing left. *Tek* in North Bor referred to taking out ie all the cattle are removed.

Clinical signs
Fever and shivering, milk production reduced, loss of appetite but increased thirst, discharge from eyes (may not see well) and nostrils, which starts clear and later becomes purulent, lacrimation, staring coat, lesions on gums, cheeks and lips, excess salivation, peeling and cracking of nostrils and muzzle, unpleasant smell, depression (stand hunched up with drooping ears and tooth grinding), rapid respiration, vaginal lesions, abortion, skin lesions like pox and hair loss, diarrhoea (variously noted as bloody or watery) with straining, rapid loss of condition and eyes become sunken, seek shade, becomes recumbent and unable to drink, lesions under tongue and on gums, cheeks and lips. During recovery, may see sores where the animal was lying. High mortality, especially among young stock.
Post mortem: meat said to be floppy, and smelling bad with poor colour and bitter taste, thickened fascia subcutaneous and around muscles,stomach inflamed, red striping in the intestine and perhaps blood in the lumen. Some said the gall bladder was enlarged.

Epidemiology
Many animals usually affected and it was often mentioned that calves, except those still suckling, were more affected than adults. Sometimes it was noted that the prevalence had been reduced since vaccination started. On one occasion, it was stated that it occurred more in the dry season because wild animals, such as tiang, buffalo and gazelles brought it in. On a number of occasions, this disease was stated to affect either goats and sheep or

only sheep in addition to cattle. The author was present at one rinderpest vaccination site in Bahr el Ghazal when the owners insisted on their sheep being included. In Africa, rinderpest is said to only affect cattle so there may be some confusion here with peste de petit ruminants (PPR).
Other information: doubtless any severe diarrhoea in cattle might be called the above names but there seems to be reasonable consensus that they refer usually to rinderpest. In Zeraf, the last outbreak was remembered in 1989-90 because that year was named the year of the *thou* (Balanites aegyptiaca) ie people had to resort to wild foods more than usual due to the lack of milk.

SNAKEBITE

Vernacular names
Both the **Nuer** and **Dinka** use the word *pieny* to describe snake or snakebite.

Clinical signs
Swelling at the site, excess salivation, shivering and drop in milk production. The fang marks are sometimes found.

TICK INFESTATION

Vernacular names

Dinka
Caak or *acaak* (Bor county, BEG)
Caa also means milk and there was a suggestion that the word *caak* was derived from the similarity between the blood sucking action of the tick and the suckling of a calf. Also, it may suggest something attached and not falling off easily.

Nuer
Jok caakni or *cakni* (Zeraf, central Upper Nile)
The author found it difficult to understand the meanings of these words. *Caa* refers to something created mysteriously like the ticks appearing from nowhere in the wet season and causing wounds. Hence, *caak* or *cak* means tick, -ni is plural in Zeraf, whereas in CUN, *caah* was said to be the plural of *cah*. *Cak* also means milk (see also above under Dinka meanings where ticks and milk seem to be related) but it is difficult at times to hear the difference between caa, caah, cak and caak. One group said that *caa* means a lie.

Clinical signs
Many ticks seen on the animal, suck blood (some people considered them to be a cause of *noi*), loss of weight and change of condition, weakness, milk reduced, wounds and swellings related to tick attachments on belly, udder (may be swollen, painful and becomes spoiled) and teats, mastitis, pimples on ears, lameness when ticks attach to feet. Tick lesions in axilla, chest and inguinal area sometimes cause cows to walk with legs held apart. Testicular swelling.

Epidemiology
Mainly in wet season

Other information
It seems that *jok caakni* refers to the effects of the ticks themselves rather than any tick-born disease. Udder damage was several times stated to be the worst effect of ticks. Ticks were often not considered to be a causing a major problem. Two types of tick recognised in BEG: one brown (probably Rhipicephalus sp) and the other brightly coloured (probably Amblyomma sp.). The latter known to be difficult to remove and often the head is left in situ and causes a wound. In CUN, 3 kinds distinguished: *caak lual* (red tick, probably Rhipicephalus spp.), which attach to ear (spoil the ear) and eye, *caak nyang* (brindled tick, perhaps Amblyomma spp.), which cause swellings at attachment sites, and *caak lou* (white ticks, perhaps Boophilus spp.) which cause skin lesions (*panyany*).

TRYPANOSOMOSIS

Vernacular names

Dinka: *luac* (Bor county), *luac mou* (Bor county), *luac anoi* (Bor county), *luac aguak* (Bor County), *maliei* and *manyai or manyiei* (BEG), *mou* (BEG)
The term *luac* seems to be a general word to describe loss of weight, emaciation and weakness in people and animals. A similar condition in people is also called *acin nol. Mou* seems to be a Bari word for tsetse fly but one group said that it also referred to an animal which does not know where it is going. *Luang* means fly in Dinka so

tsetse is sometimes referred to as *luang mou*. *Luac mou* may be a separate category within the overall term *luac*. There is also a disease in Bor County known as *luac ere* or *nger*, which seems also to be characterised by anaemia but is much more acute than the usual course of trypanosomiasis: *ere* or *nger* means white or pale. *Luac acom* (see below) probably refers to liver fluke. *Nyai* and *liei* indicate tiredness, or a lack of power, in different dialects in BEG Dinka (*liei* is used in Rumbek). *Manyai* is also used for similar condition in people. *Ma-* seems to indicate plurality or a swelling and also masculinity in cattle names.

Nuer: *noi* or *anoi* (central Upper Nile and Zeraf), *guau*, *liei* and *luot* or *loth, tarau* (Zeraf)
Noi refers to a slow, long term, progressive loss of condition and may be used to describe crops, people or livestock. *Guau* denotes extreme emaciation (only bones remain) in people or cattle. *Liei* describes a property in the body which is only present intermittently: it might be used when children play only at certain times. *Luot* or *loth* refers the action of drinking through a straw or pipe ie suggesting something is taking away the blood. *Luot* was said to be the equivalent of a condition called *liau* in people. One group in Zeraf suggested that *luot* was the same disease as *tarau* (see below) although the latter seems to refer to dehydration and dryness.

Clinical signs
Loss of condition over a long period (one group called it a 'slow' disease and it takes time to realise that it is present), maybe diarrhoea or constipation, shivering (particularly in the morning or evening), coat may change colour eg from white to grey, either because the hairs do change or because they stand up and become moist, especially along the back, sleep longer and reluctant to stand up in the morning until the day has become warm, tends to urinate and dung while lying, milk reduced in quantity and more watery (calf also becomes thin), prominent lymph nodes, ears droop, sunken eyes and deep supraorbital fossae, lacrimation, loss of hair from the tip of the tail in the late stages, pale mucus membranes, urine may be dark, grinding teeth, shade seeking, weakness (appears lazy and walks slowly with cracking joints), no loss of appetite ('keep eating but do not get fat') but reduced cud-chewing, maybe excessive thirst, not showing oestrus ('not liked by the bull'), may attract many flies and ticks, abortion, lies down carelessly and has difficulty in getting up (weakness) and may need assistance in rising. Recovery may occur when grazing improves or move to warmer place eg to luak from toic. It was stated on one occasion that a general, temporary loss of hair may occur during the recovery phase.

In mou, the animal loses condition and there is some abdominal swelling (or oedema?), the eyes are sunken and the dung is soft and dark. There is also loss of hair from the tip of the tail (in manyai the same informants stated that the hair loss started from the base). To add to the confusion, one group in BEG stated that mou differed from maliei in that there is no loss of tail hair and abortion occurs! They considered mou to be brought by tsetse flies (the author never managed to see one) which are found in the toic.

Post mortem
Absence of fat and blood in the carcase, meat pale, soft, tasteless and watery (steams when roasted), fluid round joints, watery bone marrow, oedema round spinal cord, yellowish liver, dry spleen.

Epidemiology
Usually in animals over 3 years old and more commonly in adult cows than bulls: it was stated not to occur in calves under one year old. Associated with flooding and periods of grazing shortage (hence, some groups said that it occurred mainly in the dry season and others in the wet, particularly in August). Many may be affected together. *Mou* only occurs in adults.

Further information
This disease is part of the thin cow syndrome and all the associated complications. Sometimes *noi* and *acom* seem to be used almost interchangeably, whereas on other occasions people seem to claim to be able to distinguish them. Shivering, lacrimation, coat colour changes and loss of tail hair are, for example, said to occur with *noi* and *luac* but not with *acom*. Swelling of the throat may be seen in *acom* but not in *luac* or *noi*. The Nuer mention different categories of *noi*: *noi tarau* refers to a more acute disease which kills healthy cows, takes away the blood and is characterised by hard dung. The term *noi en bor* is used in cases where the dung is soft. *Noi tarau* does not occur every year. Tarau was on one occasion said to be an old name for loth but at other time was described as a separate entity, creating a confusion which the author failed to satisfactorily resolve. Note that the Bor Dinka, whose land adjoins that of the Lou Nuer, also use the term *luac noi*.

Casual observation or even careful examination by a trained veterinarian might simply show a thin animal but pastoral owners are often much more discerning. The author remembers vividly on one occasion in Bor county that a cow was brought to him for treatment and the owner confidently stated the case to be one of *luac* and not *acom*. However, the animal was in good condition and careful questioning failed to elucidate what signs had led the owner to believe that it was *luac*. A blood sample was taken and trypanosomes were demonstrated. On another similar occasion, an owner had observed that, although to an outsider the animal looked in normal condition, it had not put on weight as he had expected given the pasture quality. This was enough to convince him that the animal was suffering from *maliei*. Many southern Sudanese automatically translate *luac*, *noi* and *maliei* as trypanosomiasis

whereas it might be more accurate to say that these terms refer to loss of weight and condition and a common cause of this is trypanosomiasis.

One group in Bor County considered *luac aguak* to be characterised by emaciation, lacrimation, hair loss from the tail, staring coat, abortion but no throat swelling: whereas in *luac acom*, there is emaciation but no loss of tail hair, shivering, abortion, lacrimation and the coat remains smooth and there may also be throat oedema.

The loss of hair from the tail tip is worth some emphasis. This sign is insisted upon by many pastoral people and yet it usually does not feature in text book descriptions of trypanosomosis. The author attempted to assess the validity of this sign by checking the blood of cattle with, and without, loss of tail hair. There did not seem to be a very close correlation. The explanation might be that this occurs only late in the course of the disease.

Another group in Bor stated that there are 5 categories of luac:

- Luac ather nhom: circling and rapid death in an otherwise healthy animal
- Luac tarau: showing a swollen gall-bladder at post mortem
- Luac ere: also showing a swollen gall-bladder
- Luac anoi: emaciation, loss of tail hair, 'does not die easily', meat not consumed by people.
- Luac acom: emaciation but no loss of tail hair.

Some people opined that luac tarau and luac ere were the same disease and perhaps part of luac ather nhom. Thus, it can be seen that there is considerable difficulty in interpreting the various meanings and syndromes of luac!

B. DISEASES DESCRIBED BY BOTH NUER AND DINKA BUT FOR WHICH THERE IS NO OBVIOUS ENGLISH NAME

DANGDANG (BEG and Bor County), ***MARAR*** and ***AKUETKUET*** (BEG), ***DAMDAM*** (Nuer in CUN).

Vernacular names
Dinka: *dangdang* (BEG and Bor County), *marar* and *akuetkuet* (BEG).
This term refers to an up and down movement like a wave or to the sadness the disease causes to the owner (his heart beats rapidly and hard!). Akuetkuet was said to refer to rapid steps like a rat running, or someone running round in one place or to the sound of a chalk tapping on a board.

Nuer: *dangdang* or *damdam* (Nuer in CUN)
One group said that this term described the staggering gait of a drunk person. Others stated that it referred to something scattered or jumping from place to place and disorganised.

Clinical signs
The disease often starts in the night. The animal may repeatedly fall suddenly first on one side then the other: on rising again, it appears unbalanced. It moves like a blind man feeling his way along, hesitating as if afraid, eyeballs protrude giving an appearance of madness, tends to move in a straight line unless stopped, appears unable to flex joints, jumps from leg to leg, the legs are lifted in jerks, reluctant to put the head down. If not tied, forgets mother and runs off. There may be pattering of the feet so that the hooves make a tapping sound (*kop kop*). There is fever, shivering, grinding teeth and locked jaws and staring coat. It may lie on its back, kicking. The animal may circle round its peg before collapsing and dying. Death invariably occurs and usually within a few days.

Post mortem
The liver and heart are engorged with blood and the carcase is dark with congestion.

Epidemiology
Occurs only in suckling calves, which have begun to graze and mostly from one week to 3 months old (maximum age of 2 years). Sporadic and uncommon. Opinions varied on its seasonality: some said it occurs between September and December, others stated December to June (mei to ruel) and one group reckoned the main season is May to June and that it stops when the rivers become full. It is not associated with any particular place.

Other information
It was said that girls should not eat the meat of an animal, which had died of *dangdang*. Some informants said that *akoklil* and *dangdang* were the same disease.
On one occasion, there was a suggestion that *dangdang* is associated with ticks.

Tentative English differential diagnosis: heartwater, plant poisoning or tetanus.

KUAT

Clinical signs
This is a skin disease, which is described by both Nuer and Dinka but the author is not clear whether they are referring to the same clinical entity. In Zeraf, one group said that it began in the axilla or udder (hence, ladies tend to notice it first) and spreads to the inguinal area, legs and around the eyes but not to the whole body. There are dry lesions without pus, which cause scratching and develop into large wounds resembling burns. The milk production is reduced and the calf is not suckled.

LIIR

This word means to cut a piece from something with a spear or knife, for instance the cutting of the long plastic sheet into sections for the CAHWs to lie on.

Clinical signs
There is a hard swelling in the neck behind the ear, which may extend to the shoulder. It contains brown or grey pus, with small hard pieces. The abscess may burst on its own discharging pus but is usually lanced first. Both the Nuer of CUN and the Dinka in Bor County used this term particularly for abscesses in superficial lymph nodes and, although usually in the neck, may occur anywhere on the body. There may be several abscesses and they may be of different shapes (in *dheng*, there is only one and it is always round). The appetite is not affected but the

abscesses are painful and weight loss may occur. It develops slowly and may continue for a year before the animal dies. It usually recurs after being lanced. *Liir* may occur as part of *tak.*

Epidemiology
Liir occurs sporadically in all ages, although rarely in animals under one year.

Suggested English name: general term for abscess or perhaps bovine farcy.

PIER

Clinical signs
The animal is disturbed and runs about. Something seems to be biting the anus. There may be repeated episodes and abortion and infertility may result.

Epidemiology
This occurs sporadically in animals over 2 years, with no seasonal incidence.

TAROU or TARAU

This is said by the Nuer to mean dryness. It is similar to *noi* (see above) but faster in it effects. The animal does not graze, the dung is dry, the eyes are dry and there is some impediment in the hindlimbs. The Bor Dinka used the word *tarau* synonomously with *luac ere* or *luac nger*, which mean white *luac.* They described it as a disease which kills quite rapidly and causes loss of blood (or thinning): at post mortem the carcase is pale.

The author wondered whether tarau might be anaplasmosis, although these organisms were found very rarely in blood smears.

Vernacular names
Dinka: *ngany* (BEG and Bor county)
The word means restless and might be used to describe a restless child.
Nuer: ngany (CUN and Zeraf)

Clinical signs
Restless, cannot stand still: walks a bit, lifts legs and then lies down. The animal may lie down when its stomach is full after grazing. Turns around uneasily. May fall or throw itself repeatedly on the ground and roll about paddling and thrashing, apparently from pain in the stomach. Unable to chew the cud properly. The condition may last a few hours and then recurr after some weeks. The animal's general condition and productivity is not affected. A few deaths may occur after a course of 6 months.

Post mortem
Amphistomes, which are called *nyol nyol* or *nyany*, are found in the stomach.

Epidemiology
Affects mainly adult animals in seasons of good grazing.

Other information
On many occasions, herders would blame *ngany* on the various species of amphistome, which are a common finding at post mortem examinations. Quite often it seemed that the term *ngany* actually referred to these parasites, which, unlike liver fluke (*guau*), are not thought to suck blood.

C. DISEASES DESCRIBED ONLY BY THE NUER

DHENG

This word means something growing or emerging or to the lancing of a swelling with a traditional knife.

Clinical signs
A swelling is seen, usually in the neck or udder. It may be associated with a lymph node. There is loss of hair and the swelling starts hard but progressively enlarges, becomes soft, rounded and pointing: there may be fever until it bursts discharging pus. If the udder is affected, all quarters are involved and the cow will never be milked again. *Dheng* differs from *liir* in that there is only one abscess, the contents are yellowish, the swelling develops more rapidly and after bursting or lancing, it heals over in 5-7 days and there is usually no recurrence. Liir is more chronic and tends to recur over a long period.

Epidemiology
It only occurs in animals over a year old.

KIER KIER or *KIIR KIIR*

Clinical signs
The hooves become overgrown and the animal may be lame. Usually all the feet are affected. It is a long-term problem and lameness persists.

Epidemiology
It is an uncommon, sporadic problem in older cattle. Associated with wet areas and occurs mainly in the rainy season.

KIMIRI

This word means deafness.

Clinical signs
The head becomes swollen and is held drooping, the nose may be rubbed from side to side along the ground. The animal becomes deaf but continues to graze. There may be repeated episodes continuing for years. There is no discharge from the ears. There are a few deaths only.

Epidemiology
All ages are affected.

KIR

Clinical signs
The animal stops eating and cudding: it is constipated, remains full and becomes bloated. There is absence of urination and the milk is reduced. The occurrence of belching and diarrhoea heralds recovery. If no diarrhoea occurs, then there is a likelihood of the animal dying.

Epidemiology
It affects all ages and at any season.

KON

This refers to pulling something away from the main part like the bark from a tree.

Clinical signs
Skin lesions on the back, with hair loss, swelling and peeling of the skin leaving a reddish wound. The disease may extend down the sides. Occurs particularly in white cows or in the white areas of multicoloured animals. There may be fever. Some deaths may occur after a long course of 2-3 years. *Kon* is similar to *panyuany* but becomes worse with the sun and often remains restricted to the back: in contrast, *panyuany* is exacerbated by rain and tends to spread to all areas of the body.

Epidemiology

It occurs sporadically in adult animals (although one group thought that a calf might become infected from its dam).

LOD

This is the word for maggot, such as might be seen in *tuoth* (horn cancer) or rotting meat.

LOTH

There is some confusion over the application of this word. There is definitely some overlap with *noi* (see below) but it may also be used to describe something different.

Clinical signs
Diarrhoea but less watery than in *cieth*. White organisms in the dung. The animal is not sick but it loses condition.

Epidemiology
All ages affected, mainly from May to August (wet season).

Other information
While doing a post mortem on a young bull in Motot, the author demonstrated some Haemonchus and Oesophagostomum worms and was told that these were what was meant by *loth*.

MAWUOMLUAL

Wuom means nose and lual is red.

Clinical signs
Nose changes colour, hair loss from the face, wounds occur around the nose and the body seems to change colour.

Epidemiology
Occurs in adults of both sexes and always in *jom* (October to December).

NGAH

A condition in which the cow never gives birth and the vagina is small. The animal is typically fat. A similar condition in humans is called roc.
It seems likely that *ngah* is referring to a free-martin (infertile female twin of a male calf).

NGIER (may be the same disease as *rieny* in Dinka)

This word refers to a wild plant and also to sorghum regrowth after being cut.

Clinical signs
Full stomach and bloating, shivering, tongue held out, difficult respiration, lies down, not passing dung or urine, often death occurs in 12 hours. One group said that it caused sudden death without any premonitory signs.

Epidemiology
Affects all ages except calves which have not begun to graze, mostly in ruel (April to June) with the first rains when the dura is sprouting but also in yom (October to December). It was also said to be associated with the rainbow's end!

NGOINY

Clinical signs
The affected animal is restless and aggressive: its dung is hard and it may vomit. There are no deaths.

Epidemiology
Animals over 2 years are affected at any season.

NGUOT

This seems to be another term for worms but it was very confusing: the organisms described as *nguot* were said to develop into *cueiny* or *cuiny* ie liver fluke. There appeared to be the idea that snails are crunched up as cattle grazed and the shells injure the stomach and that, perhaps, the soft part of the snail was nguot. But paradoxically, in the disease known as nguot, the liver was said to be unaffected. The milk of affected cows is watery.

PANYAL* or *PANYABOL

Panya is a term for mucus, while *cibol* or *cebol* refers to something becoming rotten over a long period. One group said that *nyal* was something slimy like cooked coudra.

Clinical signs
Some white material, presumably pus or purulent discharge, from vagina, which is often seen at the end of urination but also at other times. Repeated abortions or calf born small and weak, return to oestrus, animal becomes non-productive and infertile.

Other information
Panyal is associated with retained placenta or embryotomy: it might be either metritis or cystitis. It is likened to STD in humans. The end stage of *panyal* is called *bot*, which means unproductive. A cow with *bot* has no further pregnancies and shows irregular oestrus.

PIAY YANG

This refers to a reduction in milk yield.

POTPOT

A swelling of one or more legs with lameness, often following a long walk. Usually resolves on its own without treatment but tends to recurr.

Epidemiology
Often occurs following a long walk. Usually in cattle over one year old and without any seasonal incidence.

RAU

Something red emerging from the vagina, follows mating, it is seen when the cow lies down and returns when she stands up. There is no bleeding and all affected animals recover.

RIENY

A condition of sudden onset with the whole body becoming stiff. The animal may fall over and often dies in 2 days. *Rieny* might be tetanus.

Epidemiology
All ages may be affected (including neonates) but it often occurs after castration. There is no seasonal incidence.

RIENY LOTH

In this context, loth was said to mean something floppy like a fish. The animal falls over but is not stiff. Death usually occurs in one or two days.

Epidemiology
There is no seasonal incidence or any association with particular places.

TIITH

The literal meaning of *tiith* is colostrum. This is a disease of neonatal calves with a variety of clinical descriptions. The first sign is that the calf refuses to suckle and its ears droop. There may be mucus or saliva coming from the mouth and nostrils. There may be pale diarrhoea (like milk) or there may be constipation or failure to pass the meconium (*lony*). There may be swollen, painful joints in front and hind limbs and reluctance to stand. There may also be laboured, noisy respiration with the nostrils moving. The umbilicus may also be swollen. The course of the disease is about 1-2 weeks and most affected calves die if not treated.

In one form of *tiith*, the stomach is hard and full and death occurs in a few days unless dung (often diarrhoea) is passed.

Post mortem
A clot of colostrum is found in the abomasum.

Epidemiology
It occurs only in very young (usually from 5 days to one month) calves of both sexes and mainly in the wet season.

TUINY

This was said to refer to something biting or pinching in the intestine.

Clinical signs
Diarrhoea containing blood, loss of condition, the appetite is reduced which was thought to reduce the amount of dung. There may be a few deaths.

Epidemiology
Occurs mainly in the dry season in toic areas and is associated with a change of grazing to good grass after the cattle have been used to dry, old herbage or to their grazing in rivers. Some said it affects all ages while others thought that it only affected animals under 2 years old.

Other information
There would seem to be some overlap with *cieth (see above). Tuiny* should not be confused with *atuiny*, which is a term used by the Bor Dinka to describe HS.

D. DISEASES DESCRIBED ONLY BY THE DINKA

ALUITHOK (Bor County)
Thok refers to the mouth and alui denotes the moisture (like sweat) around the mouth.

Clinical signs
The mouth is held open so that the teeth can be seen. Wetness surrounding the mouth. Some deaths occur.

Epidemiology
Small calves, less than 6 months old, of either sex are affected sporadically in the wet season.

APEN
This refers to infestation with Cysticercus bovis.

BARJINY *(*BEG)
The word *bar* refers to an area of bare, open ground or a pond with no vegetation in it. *Jiny* signifies shaking or a feeling of something wrong such as shivering with cold, itching or the start of malaria.

Clinical signs
Skin wounds with loss of hair, starts on back and spreads to neck and tail. Some of the lesions bleed. Scabs form.

Other information
Barjing might apply to cases of Dermatophilus congolense ie it may be the same or similar to *panyuany* in Nuer (see above). The author saw one case of *barjiny* in Amou, which appeared to be dermatophilosis.

GUOM (*and perhaps also called moak)*
This word seems to signify dots or something hitting.

Clinical signs
Circular, hairless patches, itching, mainly on head and neck, usually recover spontaneously in about 6 months.

Epidemiology
Usually seen in young calves and often fat healthy ones.

Other information
The author was shown a calf at Panthou, which was stated to have *guom* and the lesions had every appearance of ringworm and microscopic examination revealed fungal spores.

ATER NHOM
The word nhom means head and ater denotes something thrown ie it goes straight to the head.

Clinical signs
Laboured breathing, head held up and swaying, milk reduced, muzzle dry and no discharges from eyes or nose, appears mad and aggressive and death comes rapidly.

Post mortem
The brain is yellow and soft with yellow fluid (perhaps the meninges) around it. The pericardium contains excess fluid. There are blood clots in the heart and the gall bladder is enlarged.

Epidemiology
Affects mainly animals over 3 years, especially the beautiful ones (hence it affects marriage prospects). It occurs sporadically at any time of the year.

Tentative English diagnosis
Heartwater

ADHOM

Clinical signs
Calves found dead in the morning.

Post mortem
No abnormal findings except for the legs being held stiff and straight.

Epidemiology
Only occurs in calves of 2-3 months, which have not started to graze. Picks out one animal at a time and usually the healthy ones. No seasonal incidence.

RIETH
Rieth is the name of a certain grass or reed growing along rivers: it is used for basket-making.

Clinical signs
Bloating, run about as if mad, often die in 24 hours.

Epidemiology
Sporadic, any age except small calves, usually in May as the rain brings the first grass growth. Only occurs when animals graze along rivers.

TUEK TUEK
Tuek refers to the action of pulling a spear out of the ground or removing the metal tip from the wooden handle by knocking it. *Tuek tuek* means a woodpecker.

Clinical signs
Wounds or lesions around the base of the tail, hair loss and tail falls off in about 10 days.

Epidemiology
This disease occurs sporadically in adult animals. There is not any seasonal incidence.

ATERIC
This word seems to apply to something filled with gas and, hence, it is used for bloating.

ANGUANY NYUANY (north Bor county) or ***ALONGLONG*** (south Bor county)
These terms apparently refer to tongue movements.

Clinical signs
This condition is characterised by the tongue being swollen and protruding, the eyes are also said to protrude. The animal walks with a swaying gait as if drunk. There is usually a course of about 3 days and death occurs following convulsions.

ADOKLIL (Bor county)
Adok apparently refers to a corner or something crooked, *lil* means the hind end or rump.

Clinical signs
The animal is partially paralysed posteriorly: it moves with the hindlegs going to one side or being pulled by the front end. There is a progressive deterioration until death.

Epidemiology
One group said it occurs only in adults but others said all ages can be affected: it is sporadic and there is no seasonal incidence.

DUONG (see also above under BEF)
This means something broken.

Clinical signs
Fractured bone, unable to rise or to walk.

JETH or JUOTH
The term means to remove a piece or to look somehow different

Clinical signs
Wounds appearing anywhere on the body, initially small but become large, animal licks them. Death may occur after a course of 6-12 months.

YAM
This word applies to something new starting suddenly and unexpectedly (an example given was that of the author suddenly appearing to start the veterinary programme with SCF!).

Clinical signs
This disease starts by itself with no warning signs. The animal returns from grazing lame in one hindleg. It resembles the lameness seen in macou (blackleg) but there is no swelling: the foot cannot be put on the ground. The lameness persists unless treated: the animal cannot walk straight. Some people thought the disease started in the bone. The skin cannot be pulled up into a fold over the gluteal and hip area: it seems to stick to the underlying muscle. Some sound (*taktak*) is heard when this is attempted. There is loss of condition and milk production drops. There is muscle atrophy. There is no mating. The condition is progressive until the animal dies after 18 months to 2 years. A few do recover after a long period.

Post mortem
In the affected area, the meat is white and is cut away and given to dogs to eat.

Epidemiology
Yam is only seen in adult animals (cows after third calving and large bulls). It is sporadic and not seasonal although it tends to be associated with villages more than the toic areas.

MATUNTUN
This word was said to denote swellings all over.

Clinical signs
Hard swellings are seen all over the body, which seem to be irritant because affected animals rub against trees. There is no pus formation but some informants said that the skin is lost over the swellings. The animals do not appear sick or lame and there are few deaths. There is no loss of condition although milk production is reduced and the coat may appear rough. The feet appear normal. The problem persists unless treatment is given.

Epidemiology
Mainly occurs in adult animals between August and October (one group said September to March).

NYOR
This term means powerlessness. An affected cow is not sick but aborts at 3-4 months of pregnancy. There does not appear to be any pain.

THIO
This term refers to the guinea worm (Dracunculus medinensis). It is not a disease although the dung is soft and contains worms.

Post mortem
White worms are found in the stomach or rumen (**yac**) and these are longer than those seen in the dung but are not considered harmful.

Epidemiology
Thio is never seen in calves which have not yet started to graze.

NYOL NYOL
The term refers to a swarming eg bees or maggots in rotting flesh. Red parasites are seen in clumps inside the wall of the rumen: these are called *nyol nyol* (see above). They are believed to cause *ngany*.

PIER OR BOR
This refers to something growing or putting out from the ground or the skin. It may also describe the growth of a young child. One or more superficial abscesses are found any part of the animal: these may involve the lymph

nodes and a part called the *gierthok*. The general health is not affected but the animal may be lame. It is not transmissable. The swelling starts hard, progressively increases in size and becomes soft. The abscesses may burst on their own.

Another form of *pier* was described in which the lungs are affected: there is coughing but there is no loss of appetite and the animal stays in good condition.

Epidemiology
This condition may be seen at any age but usually not below one year old and is not seasonal.

Further information
The term pier may also refer to TB in humans or animals.

ANUR (BEG)
This means the shrinking and withering of grass.

Clinical signs
This disease may be the same as aluithok, described by the Bor Dinka. There is oily saliva around the mouth. Death occurs rapidly and sometimes calves are just found dead.

Post mortem
Nothing unusual noted.

Epidemiology
This condition usually occurs in calves from 6-12 months soon after they have begun to graze. Several may be affected at once. It does not occur every year but usually in cold, wet weather (rut and ker) and in the toic.

ANGOT
The word means licking.

Clinical signs
Bloating but differs from rieth (see above) because there is no frothing at the mouth. The animal licks at the ground and soil is seen in the dung. Constipation and less frequent urination. Cudding is reduced.

ATHIDO
This term is applied to a cow with little or no milk. The udder appears normal and the animal is not sick.

CAC
This refers to the rubbish lying around the homestead.

Clinical signs
Loss of condition, milk production drops, dung hard, appetite unaffected. The animal had eaten a foreign body such as a piece of plastic or rag. Most die after a course of about one year.

Post mortem
Find the offending artefact in the yac (rumen)

THOL
The word is used for heart burn in humans, with nausea and vomiting from bad food.

Clinical signs
Calves make a noise due to discomfort, perhaps due to a hairball and/or colostral intake.

ABIU or BIEU
This is used for something empty and dry.

Clinical signs
Poor milk production: the udder is small and has no milk in it but the cow remains fat. The problem is noticed because the calf becomes thin. It is probably genetic.

RIL
This word suggests something which is hard to extract.

Clinical signs
Difficulty in giving birth.

MANYOT
Nyot means vulva or vagina and ma- indicates enlargement.

Clinical signs
Reduced appetite, blood in the urine, difficulty with passing dung, swelling of the vulva. One group in BEG described this as a perinatal problem either prior or post calving with a high mortality. It was said also to occur in women before giving birth.
There may be some confusion here with prolapse of the cervix or vagina.

TATOK
Tok means wound so this term probably refers to any kind of wound.

THIOT
Swelling and drooping of ears, develops over a day and then resolves in another two.

Epidemiology
Occurs in suckling calves up to a year old, in the rainy season.

ABEEBEY BANY
Abeebey refers to taking or coming out, *bany* was said to mean the uterus (but *abany* was said to refer to 'taking out' under blackleg).

Clinical signs
After delivery, the uterus prolapses. This may occur in any age of cow, including heifers.

ABEEBEY AMOK
Amok refers to the rectum.

Clinical signs
The animal starts to strain and then the rectum starts to emerge progressively in a prolapse. It is red in colour. The animal ceases to graze.

Epidemiology
All ages may be affected. It occurs sporadically in any season.

ABOT
This is a general word for abscess used by Bor Dinka.

WOC
Lameness from an accident such as falling or stepping into a hole. The joint seems to be involved so perhaps it refers to a dislocation.

MAKWANDAK
Makwan refers to something caught or trapped so it cannot move, dak seems to denote something not releasing.

Clinical signs
The animal is unable to stand, the legs 'seem to be tied up somehow and unable to be straightened'. When help given, the legs just bend, the animal shakes and 'just cannot manage'. It can happen overnight but most recover in a week. The appetite remains good but grass and water have to be brought and help given in standing.

Epidemiology
It occurs sporadically in adults in any season.

JUOTH
This word means a large wound in animals: in humans the equivalent is *jong hok.*
Juoth might mean the same as jeth (see above).

Clinical signs
There is a clearly demarcated area which the animal licks and rubs against trees till it bleeds. It starts small, often on the neck or over the ribs but it may be anywhere, and progressively grows to a large size. The general health remains good and no deaths occur.

Epidemiology
This occurs in adults at time of the year.

AKOAK
Small pimples occur all over the body, the coat is rough and there is fever. There is hair loss and itching, leaving reddish areas.

BUORJUNG
This refers to a hard swelling of the foot and accompanying lameness.
Affected animals tend to stay apart from the rest of the herd.

ANUR
Sudden death in calves.

ADHOM
An acute disease in which the animal cries out, collapses, paddles the legs and then holds them stiffly out straight, fluid comes from the mouth and nose. Death usually follows in about one hour. Several may die together under a tree.

Post mortem
The carcase and heart appear dark.

Epidemiology
This affects only small calves from 2 weeks to 4 months old. It occurs at any season and in most years.

BIOR
A disease of the skin with loss of hair and wounds but with absence of itching. It only affects adult animals and there are no deaths.

ROUM
This word refers to Tabanidae flies and cattle may run away to avoid their bites.

THOR
This refers to a small biting insect, which is considered to cause weakness and loss of condition similar to *maliei, mou* and *acom*.

TUT
A term for infertility: the owner may think a cow is pregnant and then she returns to oestrus and is served again.

ACIDEC
This seems to refer to choking when some object is stuck in the throat: the mouth is held open and the tongue hangs out.

LOCAL METHODS OF TREATING CATTLE DISEASES

Rinderpest (awet, nyapec, nyanatek)

1. Take fruit of *cuei* (Tamarindus indica), boil it, allow to cool, work it with
2. hands, filter through grass and apply the fluid to the mouth lesions. This is
3. used for cattle, sheep and goats.(D)
4. Kill a small animal called *yok* or *shiduar* (probably hedgehog but might be porcupine), dry the stomach and intestines, boil in water, cool, give as drench and into the nostrils. One set of viscera was said to treat 20 cows and about 3 out of 10 treated animals survive.(N and D)
5. Take the fruit of a tree called *doi yok* (found in Ayod and Pagou, not to be confused with the similar *but but* [Capparis sp.], which should be avoided), dry it, pound it, mix with cold water, give as drench and repeat after 3 days.(N)
6. Tie up to prevent drinking.(N)
7. Take root, leaves and bark of plant called *kuok,* which resembles a sweet potato, pound them, give as drench twice daily until improvement. (N)
8. Take fruit of plant called taiyat, pound, soak in water for 6 hours, drench once a day for 4 days. (N)
9. Give oxytetracycline capsules orally.(N and D)
10. Take a plant called amagak (probably Striga sp., a red flower, parasitic on maize and sorghum), cut in pieces and soak in water, filter, give as drench daily for 4 days.

Contagious bovine pleuropneumonia (jok puoth, abuot pwow, abuot piu)

1. Take the root bark of a tree called beel (Cassia sieberiana), pound it, mix with
2. water, give as a drench in the morning and evening for several days. It is used
3. in cattle, sheep and goats but is not always effective.(D)
4. Take the root bark of a tree called kuel (Ficus sp.), pound it, boil in water, give
5. as drench and pour into nostrils twice daily for 5 days and then once daily.
6. This is used in cattle, sheep and goats. (D)
7. Take capsules (250 mg) of oxytetracycline, break open and mix contents
8. with boiled, cooled water, inject over the ribs or intravenously. Give 3 to a
9. large cow, 2 for a smaller one and 1 to a calf.(D)
10. Collect termites (*yot*), pound them up, add cold water, drench the mixture on 2
11. occasions. This is used mainly in the wet season (perhaps because of termite
12. availability).(D)
13. Cut a fresh gourd, remove the flesh and soak in water, drench the mixture
14. every 3 days. (N)
15. Take the stem of a climbing plant called *rieng or depgany(N) and areng(D), (*Cissus quadrangularis, *dep*=rope, *gany*=monitor lizard), cut it in pieces, soak in water for one day, drench daily for 14days. This may cause coughing.(N and D).
16. Drench an infusion of red peppers, made by pounding them, soaking, filtering, daily for 3 days (N and D)
17. Put affected animal in luak and light dung fire to induce coughing.(N)
18. Give ghee or butter as a drench, twice daily for a week.(N and D)
19. Take root of the tree called *kiirwith*, pound, soak in water, squeeze out the material and give as drench twice daily for 4 days.(N)
20. Take root of *buoc* (Ampelocissus africanus), pound, soak in water, squeeze out the material, give as drench twice daily for 3 days. (N)
21. Take root of the tree called makar, cut in pieces, soak in water, drench
22. twice daily.(N)
23. Take the tuber of a plant called *lieau*, which is like an onion or potato, cut in pieces, soak in water for 6-8 hours, drench daily for 14 days.(N)
24. Take root bark of *rual* (Kigelia aethiopica), pound it, boil in water, filter,
25. drench the infusion once daily for 5 days.(D)
26. Take the root bark of *milo* (Albizzia amara), pound it, add water, filter,
27. drench, apply to nostrils once a day for 2 days. (D)
28. Take whole root of plant called *awutak*, which has thorns and yellow fruit (probably Solanum sp.), pound, soak in water, filter, give as a drench and put into the nostrils once daily for 4 days.(D)
29. Take whole root of *aciek*, which is a climbing plant, pound it, mix with water, filter, put in nostrils daily for 4 days.(D)
30. Take root bark of a large tree called *ling gir* (it resembles Tamarindus indica), pound it, add water, filter, put in nostils once daily for 6 days.(D)
31. Take root bark of tree called *acier* (Acacia albida), pound it, soak in water, filter, drench once daily for 4 days.(D)
32. Take tuber of climbing plant called *nyanagok* (*matabu* in Jur), pound it, add water, filter out the chunks, give the fluid as drench and put it in the nostrils once daily for a week. (D)

Trypanosomosis (*luac, anoi, noi en bor, noi tarou, loth* etc)

1. Take the root and root bark of tree called *toin*, chop it up, soak in cold water, place in sun, give as a drench in the evening for several days. (N)
2. Find the tukul (house!) ie the nest, which is a mass of tangled yellow threads, of a particular spider (*karkar*) in a tree: it is usually found in the wet season. The young spiders are orange coloured, pound the nest and young spiders all up with some cold water, leave in the sun until the evening, pour into both nostrils on one occasion only. One nest treats several cows. (N)
3. Take the root and bark of a tree called *makar* (found in Pieri, CUN) clean them, chop them, pound them, place in water in the sun, give as drench and pour in the nostrils in the evening for several days. (N)
4. Take the root and bark of a tree called *kuom*, prepare and use as for *makar* in 3. (N)
5. Take the roots of both *kuom* and *makar*, mix them, boil in water, drench the resulting infusion.(N)
6. Take the bark of a tree called *koikit or kombor*, which is found in Nasir, Malakal, Akobo, Doleib Hill and Bor: it is an introduced tree with long, thin leaves like a mango (perhaps neem), boil in water till it turns red, filter, give as a drench. The bark can also be chewed and put into the nostrils. Repeat twice daily until the animal improves.(N)
7. Take the bark of a tree called *kumbor*, soak in water, filter, give as a drench. It can also be chewed and applied to the nostrils.(N)
8. Take the fat of a python, heat in a pot (theiny) to liquify it, apply to the nostrils. (N and D)
9. Use infusion of climbing plant called *depgany* (Cissus quadrangularis).(N)
10. Take kernels of *thou* (Balanites aegyptiaca), roast on hot pan, cool,
11. pound, add cold water, give as drench once daily until recovery. The
12. treatment may cause diarrhoea.(D). Drench an infusion of thou fruits daily for
13. 2 weeks.(N)
14. Take the root of a tree called *riir nhom,* which is found around Nyirol,
15. chew it and spit into the nostrils, repeat several times.(N)
16. Take the root of a tree called *kolkuk*, which is found around Ayod, cut into pieces, soak in water for 12 hours, drench every 2 days.(N)
17. Take the fruit of *tor lor* (Solanum sp.), boil in water, cool, apply into the nostrils.(N)
18. Mix the contents of 2 oxytetracycline capsules (*thok jok*) with water and inject into the buttock.(N)
19. Use the tuber of *nyanagok* as for *jok nhyal*.(D)
20. Take the stem bark of a tree called *akuoi (or akuei) kit* (Cordia sp.), which is found at Dhiam Dhiam and in the Bor woodland, chew it, spit it into the nostrils (causes sneezing, urination and defaecation) every morning until recovery. This treatment is also used for any cow, which is off colour. (D)
21. Take the root or stem bark or fruit of a tree called dhet, which is found in the Bor woodland and east of the canal line, pound, add water, give as drench once daily until recovery or until Novidium can be obtained. It is not so effective as *akuoi kit.(D)*
22. With a small knife (*nhom*), make cuts into the back of the cow.(N)
23. Soak the bone of a crocodile, drench the infusion.(N)
24. Soak dried hyaena meat, drench the infusion.(N)
25. Bleed into a gourd.(N)
26. Mix honey comb (after removing the honey) with water and give as
27. Drench daily for 5 days.(N)

Liver fluke *(jok com, acom, luac acom* etc)

1. Take bark and root of the tree called *markar*, cut in pieces, soak, drench
2. the infusion.(N)

Anthrax (*jok nyal, anyuin, jok tak*)

1. Take bark of stem or root of a tree called adhot (Mitragyna inermis), pound it, boil in water, cool, give as a drench and pour into nostrils twice on first day and once on the next.(D)
2. Use oxytetracycline capsules as above.(D)
3. Take seed of *anyei*, pound, add cold water, give as drench and pour into nostrils twice daily for 2 days.(D)
4. Take fruit of *kuel* (Ficus sp.), pound, soak in cold water for an hour, drench and pour into nostrils twice daily for 2 days.(D)
5. Take root, and root bark, of bush calle *ajuet* (Capparis fascicularis), pound, add cold water, give as drench and pour into nostrils in morning and evening of first day and the next morning.(D)
6. Use termites as above.(D)
7. Take a piece of a tuber called *nyanagok*, pound, soak in water, give as drench and pour into nostrils (the author witnessed this and a snail shell was used) twice daily until recovery. Pieces of nyanagok may be dried and carried in case of need.(D)
8. Take leaf of plant called *tabdor* (it resembles tobacco), boil, cool, pour into nostrils twice daily.(D)
9. Use tree called *duk*, which is found in North Sudan, Juba and Marom.(D)
10. Bleed the animal by cutting the skin on the head and the tail.(D)
11. Take the roots of a small tree called *dong* (Gardenia ternifolia), pound it, soak in water, give as drench.(D)
12. Take blood from the jugular vein.(D)

13. Take the flesh from a green gourd, mix with water, filter and give as a drench.(D
14. Take the fruit of aciir (Acacia albida), pound, soak in water, give as a drench.(D)
15. Take tuber of nyanagok (see above), pound it, add water and give as drench. Cut one ear to bleed it, tie up the animal until the evening to prevent it grazing. Repeat for 2 days.(D)
16. Mix brewing waste grains with water, filter, give as drench daily for 5 days.
17. Give some urine from a man as a drench daily for 4 days.(D)
18. Soak tobacco in water, apply to nostrils to provoke sneezing.(D)
19. Soak cannabis in water, put in nostrils and ears.(D)
20. Take the roots of a plant called *apabuong*, pound it, add water, give as a drench.(D)
21. Take some meat of a hyaena, burn it to charcoal, pound it, add water, give as a drench.(D)
22. Take the fruits of thou (Balanites sp.), soak in water, filter, give as drench.(D)
23. Inject 10 mls of locally brewed spirit (*arek*) into the back. Later repeat with 5 mls.(D)
24. Place the leaves of a tree called *nguit* on a fire and make the animal inhale the smoke.(D)
25. Call the spearmaster (person with magic powers) to remove the disease from the area.(D)

Haemorrhagic Septicaemia *(marol, atuiny, yieth, rut)*

1. Use oxytetracycline capsules as above.(D)
2. Remove blood from jugular vein. (N)
3. Crush bone of a hyaena, give as drench.(N)
4. Take the whole root of milo (Albizzia amara), pound it, boil in water, filter, drench once daily for 4 days.(D)
5. Drench salt (one tomato paste tin full)
6. Cauterise the back and neck with a heated fishing spear (biith).(N)

FMD (*dat, det, acany)*

1. Take the leaves of *cuei(D) or kwat (N)* (Tamarindus indica), boil, cool, drench daily.(D and N)
2. A traditional healer, called *liet hok or kuur* by the Nuer, removes blood from the jugular vein by raising it with a cord round the neck, incising into it with a special knife (*nhom*) and filling a bowl. One group in Bor County thought that 2 litres should be taken. Some said this had to be thown away but others considered that it could be consumed in the usual way. The animal is then tied up in the sun. A smaller amount is taken 2 months later. People think that if blood is not removed, the animals is more likely to develop *juol.(N and D)*
3. Apply cow's urine, which has stood in the sun, to lesions on the feet and in the mouth.(N)
4. Mix the flesh of a pumpkin with water and give as a drench. However, pumpkins are not available between April and September, when det usually occurs.(N)
5. Wash lesions on feet and in mouth with boiled salt and water.(D)
6. Giving honey may reduce the loss in milk production.(D)
7. Cut the tips of the hooves.(N)

FMD aftermath (juol or jul)

1. Some people try oxytetracycline (N)
2. Take root of plant called *kulkuk* (perhaps the same as *kolkoo,* which is found in Ayod), cut in pieces, soak in hot water overnight, give as drench. One group stated that the infusion may damage the teeth so it should be given through the spout of a kettle straight into the throat and several helpers are needed to administer it.(N)
3. Kill a hedgehog (letcandak), dry the whole body, pound it, soak in water, give the infusion as a drench.(N)
4. Take a human bone, dry it, pound it, soak in water, give as a drench.(N)
5. Smash up a whole pumpkin (kolon), add water, give as a drench. This may be done once the signs of *det* are over in order to prevent *juol*.(N)
6. Feed brewing waste.(N)
7. Catch a fish called *jul*, boil in water and give the soup as a drench.(N)
8. Cauterise back and neck with heated spear or other piece of metal.(N)
9. Prevent affected animal from going to the river.(N)
10. Slaughter or sell the animal

NB the above remedies are only effective in fresh cases.

Blackleg (*macou, bany jar)*

1. Use oxytetracycline capsules as above.(D)
2. A traditional healer, *liet hok*, cuts the skin in 3 places over the shoulder (where the skin has separated) with a small knife, a thin stick sharpened at each end,is then threaded through one hole, out of the next and then in again. This is left for one day then removed. The whole area is cleaned up with cow's urine, which has been left in the sun and boiled . Fingers are inserted into the wounds and blood clots removed from between the skin and the muscle. Recovery is said to take place in a month.(N)
3. As a variant on 2, informants in Bor County said the operation involved cutting through the skin and down to a vein. A blood clot is removed with a special hook called alau or with a fishing hook. The blood is then allowed to flow freely. The animal was said to walk well again after 5 days.(D)
4. A traditional healer (kur) who specialises in bany jer treatment, makes
5. series of cuts around affected area and down the centre, allow to bleed, apply urine or salt.(N)

Hygroma *(aduony, cual, kuem, molle)*
1. Cut open with knife (ngom) or spear on both sides to release the fluid. All the contents of the swelling must be removed. (D)
2. As in 1 but in addition, wash the wound out with warm cow urine twice daily until healed. It may recurr in a different place.(N and D)
3. Heat a fishing spear, cauterise the swellings.(N)
4. Take the fruit and root of a tree called gar, which is found in Ayod and on the border with Ethiopia, pound it, soak in water, drench the whole mixture twice daily until improved.(N)

Abscess (*pier*)
1. Cut with knife and remove pus.(D)

Coughing *(pier*)
1. Take bark of tree called *akon* (Parkia biglobosa), pound, add water, drench once daily for 3 days. (D)

Lice *(nyok)*
1. Take tuber of vine called *mador,* cut in pieces, pound, mix with cow urine for 2-3 days. Apply once only.(D)
2. Take root bark of bush called *yarber*, pound, mix with cow urine for 3-4 days, apply once only.(D)
3. Apply mixture of cow urine and ash.(N)
4. Apply mixture of cow urine and infusion with unspecified part of a tree called *tiit* (Khaya sp.) and apply topically.(D)
5. Apply ash from dung fires.(D)
6. Remove the large lice from the eyelids by hand and apply urine.(D)

Fleas (nyaliny)
1. Take mabior liny (presumably a plant), pound it, soak in urine, apply topically.(D)
2. Pound up tiit (Khaya sp.) with cow urine and apply topically.(D)

Bior
1. Apply *lulu* (Butyrospermum) oil.(D)

Ticks (*acaak, caak, jok caakni*)
1. Use mador as above for lice.(D)
2. Make fire of *agep* (Borassus palm), root of *apac* (Piliostigma thonningii), *thou* (Balanites aegyptiaca), and *aminthok*, take the ash (*awan kec*), pour water through it, collect water in container and apply several times.
3. Prick each tick with a thorn. (D and N)
4. Apply warm cow's urine, preferably which has been left standing for several days until it smells strongly.(N)
5. Apply a mixture of stood cow's urine and soil or powdered dung.(N)
6. Remove daily by hand and throw on fire: may need to cast the animal.(N and D).
7. Take all parts of the plant depgany (Cissus quadrangularis), pound them together, soak in water for 3 days (becomes reddish) and leave in sun for a day, apply just before the animal is released for grazing. This treatment may cause irritation and the cow may rub against trees causing sores.(N)
8. Apply salt solution.(D)

Bloat (*rieth*)
1. Drench warm water.(D)
2. Drench *lulu* oil.(D)

NB rapid death makes treatment difficult.

Horn cancer (*kiec, kec, cec, guo, tuoth*)
1. Make holes at base of affected horn (some recommended both horns) by rotating the hot tip of a fishing spear (*woum woum*). A piece of cloth may then be inserted and kerosene applied to it to prevent flies.(D and N)
2. Heat point of fishing spear and pierce ears (N)
3. Make a cut into the horn, at the base for a cow and at the tip for a bull, mix tobacco with a grass called tuot (Sporobolus sp.), pound together, add cow urine, insert in the holes. (N)
4. If the eye is involved, remove the growth with a small knife (ngom).(N)
5. Cut off the horn using a spear with a serrated edge or a red-hot spear (*mut*) and apply guet (probably a plant extract), old urine, paraffin, salt or DDT powder.(N)
6. Make affected cow inhale smoke.(N)
7. If the ear is affected, remove the growth with a knife (may have to cut right down inside) and apply urine repeatedly until healed. In extreme cases, remove the whole ear.(N)

NB a traditional healer is called to perform 1 and 5.

Dangdang (perhaps heartwater)
1. Heat a long needle, cauterise the head, back and hip.)N)
2. Boil catfish (*rec macar*) and drench the resulting soup in the morning and evening of one day.(D)
3. Slit both ears with a spear and allow to bleed.(D)
4. Fasten a rope around the neck.(N)

Snakebite (*pien*)
1. Take whole root of tree called *malual dit*, dry in sun, put in fire, knock off burning tip, apply to fang marks. Some people always carry a piece for emergencies.(D)
2. Take bark of the tree called *gummel* (Sclerocarya birrea), pound it, soak in water for 1 hour and give as drench.(D)
3. Apply human urine.(D)
4. Take root of tree called kaar (Catunaregam spinosum), pound with water, filter, give as drench.(D)
5. Drench fresh milk.(D)

Mastitis (*atak, tak, weth, pot pot, nyou*)
1. Take the bulb of plant called *tar* (Sansevieria sp.), cut into pieces, pound, add water, give as drench and apply directly to the udder. (D)
2. A traditional healer cuts the spinal lesion with a small knife (N)
3. Apply warm stone to udder.(N)
4. Apply mud to the udder.(N)
5. Release pus by cutting with special knife (nhom or pal). (N and D)
6. Insert clean grass stem into the teat to keep it open.(N)
7. Warm the skull of a dog or a grinding stone and apply it to the udder daily.(N and D)
8. Take the root of a plant called akolkou, which is found in the Duks and the Bor woodland and can be smelled from a distance, cut into small pieces, soak in water for a day, give as a drench several times. This only works in fresh cases. (D)
9. Cut with knife (pal) to remove pus, wash with warm water.(D)
10. If teat blocked, remove with knife.(D and N)

Yam
1. Make 2 cuts with a spear or a knife, push a stick through one hole and out from the other and work it to and fro to free the skin. This work is done by a special *atet*.(D)

Acidec
1. Massage throat with the hand and work the object up or down.(D)
2. Bend the tip of a spear over like a hook and insert it down the throat to engage the object and pull it out. (D)

Tut (infertility)
1. Take bark of tree called adhot (Mytragyna inermis), pound it, add water, give as drench just after service.(D)
2. Cut each side of the vulva and apply salt.(D)

Rabies (*wath, yong, bany joo*)
1. Take the root bark of small tree called *kaar* (Catunaregam spinosum), pound, soak in water for one day, give as drench.(D)
2. Boil a monitor lizard, drench the resulting soup.(N)
3. Take the bark of the tree *thiep* (Acacia sieberiana), soak in water and drench the infusion.(N)
4. Tie up the animal with ropes, bring grass but withold water (some also said water could be given).(N)
5. Slaughter both the cow and the dog and bury the carcases.(D)

Diarrhoea (*yac*)
1. Take tuber of mabora (cassava), pound it, add cow's milk, give as drench only once.(D)
2. Give merissa or mou (beer from sorghum, also called 'white stuff') as a single drench.(D)
3. Take the sprouting seed (*rok*) of *agep* (Borassus palm), pound it, add cow's milk, give as drench once only. (D)
4. Dissolve an oxytetracycline capsule in water, squirt into the anus with a syringe.(D)

Thor (biting insects)
1. Leave in luak with dung fire.(D)

Keratitis (nyintok or madhany)
1. Dissolve contents of oxytetracycline capsules in water and apply to eye with syringe.(D)
2. Take the leaves of thou (Balanites aegyptiaca), chew them, spit juice into the eye. (D)
3. Pound barjino (presumably a plant), add water, filter, apply to eye.(D)
4. Chew tobacco and spit into the eye.(D)
5. Burn cowrie shells (gak), pound, mix with water, wash eye.(N)

6. Apply fresh milk and ghee.(N)
7. Wash with soap.(N)

Abortion (atherbei, thor)
1. Ask the mother (better), or father, of twins to come and tie a special, thin rope made from a grass called muon (probably Cynodon) around the neck of the aborted cow. They must also say some special words.(D)
2. Mix the flesh and seed of a pumpkin and give as a drench.(N)
3. Take the leaves and root of a creeping plant called doar, chop them up, add cold water, mix, remove the material and give the liquid as a drench twice on the first day and repeat 4-5 days later.(N)

Retained afterbirth (geklap, lap)
1. Dig up a plant like an onion, called *jal*, cut in pieces, place in fire, mix with water, drench only once.(N)
2. Take leaves of tree called *nyuat* (perhaps Acacia sp.), cut them up, soak in water for a day (colour changes), remove the leaves and give the infusion as a drench.(N)
3. Take the underground part of *toar* (Sansevieria sp.), cut in pieces, mix with water (colour changes), drench once only.(N)
4. Take *depgany* (Cissus quadrangularis), cut in pieces, soak in water, squeeze out the material, drench the infusion once only.(N)
5. Take a grass called *koi* (perhaps also called *dor*), which has a large leaf, pound it, mix with water, drench in the morning and evening of the same day.(N)
6. Take the leaves of akoi (probably Cordia sp.), cut in pieces, soak, give as drench. (D)
7. Take the leave of areng (possibly same as depgany), cut in pieces, soak, give as drench. (D)

NB One of the above is applied if the afterbirth is not passed within 2-3hours of parturition. If it has not been passsed by the next day, 2 local healers (*kuur*) are called: one performs magic, the other puts in his hand for examination and attemted removal.(N)

Cual (brucellosis)
1. After abortion, insert hand into uterus, break down blood clots (the author wonders if the informants meant peeling the membranes from the cotyledons?), pull out the placenta.

Arem (brucellosis)
1. Cut swelling with a small knife (pal in Dinka, nhom in Nuer), release yellowish fluid together with white bits, wash with warm water, break oxytetracycline capsule and apply powder to the wound. The swelling will not recur at that site but another may appear at another joint.(D)
2. Keep affected animal in a warm place. (D)

Weth
1. Kill a small animal (perhaps a mongoose), boil it and drench the soup together with pieces of meat .(D)

Panyal *(genito-urinary infection)*
1. Take the plant buol (Euphorbia sp.), cut in pieces, soak overnight, drench the infusion twice daily for up to 14 days till recovered.(N)
2. Take the bark of the tree called duony (baobab, Adansonia digitata), cut in pieces, soak overnight, drench the infusion once a day for 4 weeks.(N)
3. Take the underground part (bulb or tuber) of a plant called wal micar (black medicine), cut in pieces and soak overnight, drench the infusion twice a day for 7 days.(N)
4. Take the root of the plant called kerwith, cut in pieces, soak overnight, drench twice daily until recovery.(N)

NB the most effective was said to be 3

Bovine ephemeral fever (*doin doin, adhony*)
1. Tie the patient near a fire made of the leaves of *agep* (Borassus palm).(D)
2. Tie up in hot sun or in luak if cloudy, prevent from eating or drinking, release next day. (N and D)
3. If no improvement from 1 or 2 by the following day, remove blood as for *dat* except less is taken since usually smaller animals are affected with doin doin.(N)
4. Wind a cow tethering rope around the neck.(N)
5. Cauterise the lower legs and back with a hot spear.(N)

Athido
1. Take the bulb of small plant called nyinkor (the eye of a lion), which resembles taar (Sansevieria sp.), pound it, leave soaking in water for 1 hour, give as a drench. (D)

Adhoric (diarrhoea)
1. Pound some soil (about a handful) taken from a termite hill, mix with water and give as drench.(D)
2. Mix the contents of 3-5 oxytetracycline tablets with water and give as a drench. Repeat every 5 days.(D)

Ngany (colic or amphistomiasis)
1. Drench with warm water and salt.(D)

Ateric
1. Tether to prevent grazing.(D)
2. Massage abdomen.(D)

Tuiny
1. Take the leaves of a plant called ngony, boil in water for one hour, throw out the leaves, leave the liquid in the sun for whole day, give as a drench in the evening. Repeat after 4 day. (N)
2. Take the nest of a potter wasp (bulbul) or hornet, including the mud and larvae, crush and mix with water,drench once or twice.(N)
3. Take root of the bush called tony (Lannea schimperi), pound, soak in water, give as drench twice daily for 2 days.(N)
4. Dose with oxytetracycline capsules.(N)

Kir and ngoiny
1. Drench with warm water.(N)

Ater nhom
1. Use a small knife (pal) to make a cut in the centre of the forehead and a slit at the end of each ear and allow to bleed. (D)

Dermatophilosis (*panyuany, manyuin*)
1. Place sorghum in water to soak overnight, then place in pot closed with a sack, leave for several days until it sprouts, dry it, pound it, mix with water, apply to skin. This is more effective if the hair has not yet fallen out.(N)
2. Take leaf and stem of the climbing plant *rieng or depgany* (Cissus quadrangularis), chop up, add water, leave soaking for several hours, apply to skin. Then apply salt or DDT powder (£S500 per tin) to prevent flies. Repeat every 2 days.(N)
3. Take leaves, bark and root of plant called *wamac*, chop it up, add cow's urine, mix with ash from dung fire, apply to skin.(N)
4. Apply oil of *lulu* tree (Butyrospermum) (D)
5. Collect urine from cattle, allow to stand for 2-3 days, wash body and rub it in, continue daily for a long time.(D)
6. Apply kerosene to affected areas every 2 days.(N)

Kon (skin disease, perhaps photosensitisation)
1. Take some fresh skin of an elephant, cut it into pieces, soak in cold water for several hours, give the liquid as a drench twice. (N)

Abscess (dheng)
1. Wait till the abscess is ripe (perhaps indicated by hair being lost), cut with knife (nhom or *nghom*), let out pus and apply butter oil (*lieth*) or old urine daily until healed. (N)

Abscess (liir)
1. Cut with knife (nhom): release pus and perhaps remove whole lymph gland. Apply warm urine which has stood overnight.(N)
2. Burn something called cancan or guar, pound residue to powder and apply topically.(N)
3. After lancing, take the root of a flowering plant called wiel, which is similar to tobacco, cut in pieces, soak in water overnight, drench daily for 14 days. (N)
4. Take any part of a plant called *buol*, which has a white latex (perhaps Euphorbia sp.) and is found in a field after the harvest and may be planted specially for treating liir, cut in pieces, soak in water overnight, mix, filter, drench the infusion daily until recovery.(N)

NB for *liir* in humans, the treatments 1 and 4 are used.

Koay, koac and gueny (may be part of panyuany)
1. Bleed from jugular vein. (N)
2. Heat a fishing spear, cauterise legs, neck and pierce the ears.(N)
3. Apply urine.(N)

Rau or abeebey bany (vaginal prolapse)
1. Clean with cow's urine.(N)
2. Hold vulva closed and make the cow stand up.(D)

Muol (perhaps the same as kuem)
1. Wait for the swelling to become soft (perhaps 3 months), cut in several places, let out fluid, wash out with cow's urine daily till healed. The same liet hok operates on kuem and muol. (N)

Kier kier (overgrown hooves)
1. Use red hot knife to cut hoof. (N)
2. Use small meloda (sharp hoe) to remove excess horn.(N)

Tiith (neonatal problem, perhaps joint-ill)
1. Mix maize flour (coarsely ground) with water and drench daily for 2 days. (N)
2. Boil a kind of fish, *rec car* (cat fish), remove bones, cool, drench daily for 2 days. (N)
3. Drench with warm water twice daily for 7 days.(N)
4. Take fruit of plant called thor lor (Solanum sp.)*, pound it up, soak in water, drench or give as enema once daily for 2 days.(N)
5. Kill and dry a monitor lizard, pound it up, soak in water, drench in the morning and evening of one day.(N)
6. Make soup of catfish (rec car), drench the whole soup once only.(N)
7. Take the bowl of a pipe (gueat tony) where the nicotine collects, soak it to remove the nicotine, give as drench or as an enema only once.(N)
8. Take the tuber of a plant called leau, chop in pieces, soak in water, drench the infusion twice on one day.(N)
9. Take the seeds of a plant called nyuom joak (probably Ricinus communis, the castor oil plant), grind them, soak in water, give as a drench.(N)
10. Take some maize, fry it, grind it, mix with water, administer as an emema.(N)
11. Take the ripe fruit of thou (Balanites aegyptiaca), soak in water, mix up with the hand, give the whole mixture as a drench. The kernels may also be fried and used. (N)
12. Take a creeping plant called *wal tiithni*, grind the whole plant, soak it, give as a drench twice on one day only.(N)
13. Drench sour milk.(N)
14. Drench diluted urine.(N)
15. Drench a mixture of soil from a hornet's or potter wasp's nest and water.(N)
16. Lance the joint swellings with a knife, release the pus and apply urine.(N)
17. Boil the leaves of neem, Azadirachta indica, and drench infusion until improvement.(N)
18. Make an infusion of the leaves of a small tree called *kash*.(N)
19. Grind the seed of water lily (*yil*), mix with water and give as drench.(N)
20. Take the yeast (*thop*) from brewing, mix with water, give as drench.)N)
21. Burn dung (*ngol pou*) and give as drench to counter diarrhoea.(N)

* Also used orally for constipated human babies.

Aluithok (neonatal problem)
1. A traditional healer (or perhaps a wizard or kujur) takes some grass called *noon* (Hyparrhenia rufa), lights it, passes flame all round the calf (for a fee of £S1!).(D)

Guom
1. Bleed calf by cutting tip of ear.(D)

Jeth or Juoth (wounds)
1. Cover with mud to prevent flies.(D)
2. Apply a heated meloda (hoe).(D)
3. Apply the white latex from a plant called *biol* (probably Euphorbia sp.), which is found in the Bor woodland, Kop at Nyany, and the Duks.(D)

Woc
1. Attach a rope to the fetlock in the event of dislocation of the carpus, hock or stifle and to the hock in cases of hip dislocation. One person then applies traction and another hits the stretched rope with a stick in order to add power and jerk the bone back into place.

Duong (fracture)
1. Cut open with small knife (*pal)* to remove blood clots. Take some sticks specially cut and smoothed and lay them in order on the ground and tie them together. Place them around the fracture site like a cradle to hold it steady. Every 2 days, remove the sticks and wash the site with warm water. Continue for one month.(D)

Thiot (ear problem)
1. Apply flat side of a red hot spear to the ear, forehead and neck.(D)

Makwandak
1. Can only nurse the animal: turn it round, bring grass and water.(D)

Rieny (tetanus)
1. Make cuts with small knife (nhom) on each side of the spine from the head to the tail.(N)

Rieny Lut
As for *rieny*.(N)

Nguot (connected with worms or fluke)
1. Take the root of the creeping plant called *kerwith*, soak in water overnight, drench the infusion twice daily until recovery.(N)
2. Chew the root of a plant called *shan*, spit into the nostrils.(N)

Ngier
1. As soon as animal falls, quickly cut off part of ear and place dung in its mouth.(N)

Piay Yang
1. Take leaf of *pah* (Calotropis procera), cut in pieces, soak and pound in water, drench infusion twice daily for 2 days.

LOCAL METHODS OF PREVENTION AND CONTROL

RINDERPEST *(nyanatek, nyapec, awet)*

1. Isolate affected animal or animals, either by tying up (and restricting water intake) or removing to far place. (D and N)
2. Move healthy herds away from the affected one and unaffected cattle camps move away from the affected one, which is given separate area of toic for grazing and drinking: control animal movements. (D and N)
3. Roast the meat of the first animal to die within the herd so that the smoke has a preventative effect on the rest (N). Others stated that the meat of affected animals should not be cooked near other stock. (N)
4. Restrict movement of people and bulls: people should wash before returning
5. from affected place.(N and D)
6. Prevent the movement of meat.(N and D)
7. Stop burning the dung of affected animals.(N)

CBPP (*jok pwoth, dop, about pwou*)

1. Remove sick animal outside the luak: it may be housed in the kitchen tukul (agung). (D)
2. Take healthy animals away: affected group should be herded separately eg one ghol in a cattle camp.(D and N)
3. The dung of affected animals should not be used in a luak. (N)

ANTHRAX (*jok nhyal*)

1. Isolate affected animals. (D)
2. Avoid known areas which harbour it. (D)
3. Meat should not be eaten but if the carcase is butchered, all the remains should be gathered together and grass is burned over it. (D)
4. Call the spearmaster to perform magic: he will officiate over the skinning and butchering of an animal which has died of *jok nyal*. (D)

BLACKLEG (*macou*)

1. Isolate affected animal and restrict movement. (D)
2. Affected camp changes site but remains in same area, other camps move well away. (D)

HS (*awiir, yeth, rut*)

After one cow has died of HS, the chief or cattle camp leader (bany wut) orders as follows:

1. People should go off and kill a hyaena (anguei), the meat is then brought and some is placed on the fire until it is black in each ghol (family grouping) in the camp in the evening, so that other cattle inhale the smoke. (D and N)
2. A kujur or wizard (bany kier) should kill a ram, carry it around the camp and then run off into the bush to leave it. Some of its meat may also be burnt in each ghol. (D)
3. Prevent affected herd from mixing with others. (N)
4. Affected herd or ghol remains in cattle camp and others leave. (N)
5. Take a bundle of burning grass and move through the camp waving it about, move all the cattle from the camp leaving the ropes, pegs and dung and stay away until following year. (N)
6. When a cow is seen with atuiny, calmly release the rest and each *ghol* or *din* goes in a different direction. The tethering pegs are replaced by sticks: this confuses the jok (spirit) of atuiny, who thinks that the cattle will return! (D)
7. When an animal dies from yieth, remove the carcase far away, and only young men should eat the meat. The bones should be buried deep.
8. The dung from affected animals should not be used to make fires near other cattle till 2 months after the last case. (N)
9. When a hyaena is killed, people know that HS will strike so they bring the meat and use it as in 1.
10. After a hyaena attacks (but does not kill) a cow, long ropes of twisted grass are made and burnt in the camp and at the same time people walk round imitating the calls of the hyaena.
11. When a cow is killed by a hyaena, some raw meat is eaten and then the carcase and anything else contaminated with blood is buried. The attendants then wash and have grass burnt round them before they enter the cattle camp: grass is also burnt all round the camp.(N)
12. Isolate affected animal, graze and water affected group separately. (D)

NOI

1. Refrain from roasting the meat of affected animals near others
2. Dung from affected animals is not used for fires near other cattle
3. Put cattle in luak with smoky fire to combat mosquitoes.
4. Keep cattle away from known tsetse areas.

RABIES

1. Kill affected dogs and tie up affected cows or people. (D)

NB the owner of a mad dog which bites somebody and they die, has to pay 15 cattle in compensation. Cattle and goats are replaced on a one for one basis. (D)

FOOT AND MOUTH DISEASE

1. When recovered from acute phase, bleed animal to prevent the chronic aftermath *(juol*)
2. Either move affected herd away or it stays and healthy groups move. In a cattle camp, the affected ghol may remain and the rest disperse or return to the village. (N)
3. Rapid spread makes control difficult.

TIITH

1. Drench calf immediately after it is born with warm water and continue every morning for 3 days.(N)
2. Take about 4 squirts of milk (some said about a cupful, others thought that the amount taken should be proportional to the cow's milking potential) from each quarter before allowing calf to suckle: a boy can do this because the milk taken is not used for adult human consumption (it may be boiled and given to children). If there is a lot of colostrum, this may be continued for several days. (N)
3. Put new-born calf in sun for 2 days.

FLEAS (nyaliny)

1. Evacuate luak, clean thoroughly, leave empty till next rains.(N)

AKUETKUET or ***MARAR***

1. Leaving their tethering pegs in the camp but taking the tie-ropes, drive the calves through a river and take them for about half an hour beyond it. Return to a new camp. Mix some milk with water in a gourd and pour into the river.

BUKU

1. Remove herd to dry, sandy area.

LOCAL IDEAS OF WHAT CAUSES DISEASE OR THE PREDISPOSING CIRCUMSTANCES SURROUNDING IT

NYAPEC (rinderpest)
- Brought by God.
- Brought by wild animals.
- Wind and water borne
- Carried on green grass.
- Occurs when cattle mix in toic (spreads like measles)
- Tick birds and vultures
- Directly from herd to herd.

JOK PWOTH (CBPP)
- Brought by the wind
- Brought by God
- Spread from infected animal to others by close contact and coughing (but not rapidly as in *nyapec*), especially in luaks.
- From chewing bones from infected animal.

NB this disease in not held in the ground.

JOK NHIAL or JOK TAK (anthrax)
- Acquired in swampy grazing areas so perhaps present on green grass

NOI, MALIEI orMANHYAI (trypanosomiasis)
- Poor grazing and water
- Cattle staying in wet places: associated with rains and repeated crossing of rivers
- May start in dry season but the disease appears mainly in the rainy season
- Rain drops passing through Acacia seyal trees (*rat* in Dinka) contaminate grass, which is grazed by cattle.
- Mosquitoes bring it.
- Tabanid flies (*roum)*

DAT (foot and mouth disease)
- Spread from wild animals
- Comes from grass and water onto the feet of cattle
- Hot ground in dry season affects the feet
- The animal get fever as in malaria and then the blood carries it the feet and causes lesions.

RUT or *YIETH* or *MAROL* (HS)
- Confused and complicated link with the hyaena: the germ is somehow associated with them.(N and D). If a hyaena kills a cow and the meat is cooked near other cattle, the smoke may infect them.(N)
- The meat and bones of affected animals can contaminate the grazing.(N and D)
- Similar in causation to awet (rinderpest). (D)
- Dirt on grass left when flood recedes. (D)
- Associated with grazing grass with dew on it. (D)

MACOU (blackleg)
- Acquired from the grazing area
- From the air
- Occurs particularly in dry years because of the long distance cattle have to walk to water.

JOK COM (liver fluke)
- Snails (particularly those called *com manyang*) eaten by cattle enter the liver: as floods dry out, the water is covered by a film (perhaps of algae) called *laktuir,* which is where the snails occur.
- Associated with wet places: rain causes snails to move up the grass.

TAROU (possibly anaplasomosis)
- Associated with dryness
- Poor grazing
- Reduction in blood.

JUOL (chronic FMD)
- Always occurs following the acute phase of dat (FMD)

DOINY (bovine ephemeral fever)
- Dirty water and cold weather at start of rains
- Plenty of green grass causes excess blood
- Change in the grazing
- Heavy rain bringing cold and wet.
- Association with worms

JOK TAK (anthrax)
- the germ is held in a particular grass (buor) in the toic.
- Change in the wind
- Association with worms.

DANGDANG (perhaps heartwater)
- Starts with rain and new grass
- Insect or germ on the grass (bok)
- A bluish worm or caterpillar on the grass

KUEM or MUUL (arthritis or hygroma from brucellosis)
- Germs or parasites occurring in dirty water
- Acquired from a bone of an affected animal.
- Too much fluid in the body.

KON (skin disease)
- Follows another disease such as jok com
- Skin abraded by tree.
- Excessive sun
- Spread from elephants by flies.
- Commonly in fat cows because their skin is stretched and therefore thinner
- May spread from mother to calf.

PANYUANY (dermatophilosis)
- Combination of thorns and rain (the latter causes a fever which, in turn, brings on panyuany.
- May be a sequel to other diseases such as *noi*
- Rainwater dripping from Acacia seyal (*lor* in Nuer and *rat* in Dinka) or Balanites aegyptica (*thou*)
- When grazing in flooded area, the tail gets wet and flicks water onto the back as it whisks flies
- A fly known as *mieth* carries the germ to the backs of cows.
- Alternation of soaking wet and hot sun
- Fat, healthy cattle more prone.

YONG (rabies)
- Follows bite of dog
- Sometimes enters cattle by itself (one knows it has come by the voice of the cow)

NB with people, yong only comes from a dog.

TAK (mastitis or spinal lesion)
- Germs in water
- From ticks
- Germs spread from the spine to the udder.

TUINY (diarrhoea)
- Brought by bad water.
- Change in diet: perhaps when good grass found after a period of grazing old, dry grass eg at the onset of rains.
- Associated with toic grasses *riak* and *ke,* especially when grazed in water.
- Another grass called *buor* harbours certain insects, which are also thought to be involved.

KEI (horn cancer)
- Whitish worms or maggots enter through the nose and suck blood.: several may be found in one horn.
- A greenish fly (luang toc), which may be found in latrines, lays eggs in the nasal mucosa and these may develop into the worms mentioned in 1.
- Fighting with horns may activate the process.
- Large horns mainly affected.

NB these worms are often found in the horns of antelopes where they seem to cause no problems. Occasionally, they are found in the horns of normal cattle.

LIIR (abscess)
- Germs,in some unknown way, get into glands
- Scratches from trees
- May occur as part of *tak*

KIR KIR
- constant immersion in water leads to overgrowth

PIIR
- Worm or some other kind of parasite in the anus.

TIITH
- Calf fails to pass dung (meconium). One group thought this might occur when too little colostrum is taken: they felt there was no problem from a calf obtaining ad lib colostrums. Other groups considered that too much colostrum was a cause of problems.
- Germs in the colostrum

KIR and NGOINY
- Grazing new grass, especially the type called *bok*.
- Eating a kind of caterpillar on the grass.
- Overeating
- Worms
- Mixture of foods

CIETH (diarrhoea)
- From eating green grass in toic.

YAC (diarrhoea)
- From eating soil
- Grazing grass calle *apac (*Echinochloa stagnina)
- Grazing too much new grass
- Drinking excessively
- Spread from animal to animal through the milk
- Infestation of *thio* (worms)

THOR or *ATHERBEI* (abortion)
- Occurs in other diseases (especially when fever occurs) such as *jok pwoth, noi, dat, nyapec, yieth* and *kuem*.
- From another aborted animal
- Flies
- A grass called *nur*, may cause abortion in both cattle and women when stepped on.

RIENY
- Follows wounds eg castration.

NYINTOK
- Flies bring it
- Grass awns, especially wild rice (Oryza longistaminata), injures the eye.
- Owner injures the eye with a stick or rope.
- Weak animals more prone to it.
- Dust
- Self injury from itching

BUKU
- Mud collects around hoof

AKUETKUET
- From soil and water in the rains.

CLINICAL SIGNS OF DISEASE IN GOATS

Owing to constraints of time during the training courses and to the secondary importance attached to goats and their diseases, the author acquired and documented far less information about them compared with cattle. It should also be noted that owing to the unreliability of some of the interpreting, it was not always clear whether the informants separated out their knowledge of goats and sheep.

Nyanatek (Bor Dinka) or makuac (Aliab Dinka)
Signs similar to disease of the same name in cattle (rinderpest) but it was clearly stated by informants in Panyagor to have no association with, or spread between, cattle and goats. It seems probable that this term refers to peste de petit ruminants (PPR) but the author did not see any cases. PPR is known to occur in Sudan. There is continuous diarrhoea until blood comes (in contrast with adhoric in which there is never blood), lacrimation, nasal discharge, protruding tongue and reduced appetite. There tend to be skin lesions which later become white spots in black goats (hence, the name *makuac*, which means leopard). There is a high mortality.

***Nyapec* (N) and *awet* (BEG)**
Although in cattle *nyapec* (N) and *nyanatek* (D), both seem clearly to refer to rinderpest, the author was uncertain whether these terms mean the same thing in goats. There was some discrepancy between the various clinical descriptions. Informants in CUN thought that nyapec in goats does come from cattle. There is diarrhoea, a staring coat, salivation and wounds in the mouth, swellings all over the body, fever, lacrimation and nasal discharge, blindness and abortion. Some deaths occur in 1 to 2 weeks and others recover. One group in BEG reported no mouth lesions in *awet* in goats.

Adhoric, aloric, abaric or yac (D)
These are similar to the diseases of the same name in cattle, the main sign being diarrhoea, usually without dysentery. There may be bloating. There is increased thirst, loss of appetite and, hence, also loss of condition. Death may occur in one to three weeks. It may be seen in all ages but it is most common in weaners and mainly during the rains (ruel), although one group said that yac occurred between October and December. Another group stated that yac affected adults more than young animals between August and November. At post mortem, the rumen has watery contents and thio (roundworms) and nyol nyol (amphistomes) are found.

Ciith (N)
This may be the same as the previous disease. It is manifested by diarrhoea of normal colour. Usually several animals are affected and some deaths may occur. It affects all ages and at any season.

***Ngany* (D)**
See under cattle.

Kom (D)
This is a general term for any small creature. The name may refer to infection with Oestrus ovis, the nostril fly. There is sneezing and occasional death. The author found this parasite quite commonly in goats and sheep at post mortems.

Manyuany (D), manyuin (D), matembiok or matem (D), panyuany (N)
Manyuin was said to mean crumpling, such as happens with clothes, which have been made smooth by ironing. The word *atem* apparently refers to a series of cuts across a surface. These terms apply to a skin disease, usually starting in the axilla or on the ears, nose, mouth, neck or lower legs and later spreading all over the body. The goat may have fever one evening and then skin lesions are seen the next day. There is irritation, manifested by rubbing against objects, with pimples or spots developing into wounds with thickening and cracking of the skin: small pieces become detached and the hair falls out so that the animal is bald in about 10 days. There may be ocular and nasal discharge, fever, dullness and loss of appetite so that the animal becomes thin and does not display oestrus. There is reduced milk production and there may be diarrhoea and abortion. The animal resents being tied up and likes to be near a fire and seeks shade. Movements may be impeded and the animal may show reluctance to lie down. It spreads from goat to goat so that many animals may be affected together in a luak. It may be seeen in all ages (except young kids) and tends to occur in the wet season (one group said September to January) and is associated with luaks (one group said that the smell is so bad that people cannot stay in a luak with affected animals!). There may be a high mortality, with most deaths occurring after a course of a month.

These names probably refer to mange and perhaps also dermatophilosis. The author was able to demonstrate mites in skin scrapings from some cases, which the owners had called *manyuany*. One group held the opinion that matembiok started like manyuin but then cuts appeared which tend to bleed and are not irritating.

***Atuet* (north Bor) *or gion* (south Bor)**

These terms are used for skin disease, probably scabies, in humans and may refer to mange or pox in goats. There are spots all over the skin and it occurs especially after rains and floods: the highest mortality is seen in the early rains.

***Akoak or tuet* (BEG)**
The word tuet seems to mean something lost or died. There are small, firm swellings in the skin, which develop into wounds and occur all over the body but particularly on the legs, face (and in the mouth) and ears. A goat may return from grazing with a fever and is eager to enter the luak and lie down: the next day lumps 2 or 3 cms across are observed or felt in the skin. There is reduction in milk yield and the animal may abort. It may affect all ages and at any time of year but especially from October to May: a mortality of 40-50% was mentioned, with a usual course of a month. It often spreads to many animals in a luak. This disease is most likely to be goat pox, although one group said it was the same as *manyuany*, which is probably mange. Another group in BEG considered *akoak* to be synonomous with *atuet* and they described the disease as causing a standing coat, skin irritation, lesion on the teats, nasal discharge, coughing, reduced appetite, impaired hearing and shade seeking behaviour and preference for warmth. There may be diarrhoea if lesions occur in the internal organs and abortion. There is a high mortality. Others said that the term *matuntun* may also be used for this disease.

***Kuat* (CUN)**
Informants in Langken, stated that kuat is the same as panyuany in cattle. Initially small, firm lumps the size of a finger tip, are seen around the mouth: then they extend to the ears, legs, chest, udder and joints. They are painful and the hair is lost: the skin dies over the lumps. There is nasal discharge, which blocks the nostrils, evil-smelling breath, purulent eye discharge, fever, shivering and abortion. The animal is lame and tends to stand still for long periods: grazing may become difficult and weight loss may occur. There is a high mortality with death occurring in one week to a month: if the animal survives till the dry season, it is likely to recover. It occurs in all ages but mainly in kids and usually from May to August (*ruel* to *jom*, wet season), disappearing with the rain. Many animals may be affected together. At post mortem, lesions may be found internally.

NB there thus seems to be a clinical continuam between panyuany, manyuany, matembiok, akoak, atuet, gion and kuat covering goat pox, mange and dermatophilosis.

***Amiok* (D)**
This term means oil or butter and, in this context, refers to the bubbles or froth around the mouth of an affected goat: it also describes the oily effect seen round peoples' mouths when they are eating. There are raised lesions, cracks, sores or wounds around, and in, the mouth and nose (may cause a noisy respiration). These are irritant and may ooze blood or pus: they prevent grazing. It is more severe in kids (particularly in weaners) than adults and it occurs mainly in the wet season (August to September). There are few deaths. The most likely disease described by *amiok* is orf.

Luac aguak and luac acom (D), jok com (D and N)
These conditions are virtually the same in goats. There is emaciation in spite of the appetite remaining normal, and the eyes appear sunken and the ears droop: there is no tail hair loss and no throat oedema, in contrast to this condition in cattle. There tends to be infertility, reduced milk yield and some deaths occur. Many animals may be affected together. *Jok com* is seen in older animals ie the ones which go to wet areas (not only the *toic*). There is a high mortality over two to six months. At post mortem, *com* (snails) or *ruei* are found in the liver.

The general term *luac* refers to any loss of condition. *Aguak* seems to mean general weakness, perhaps due to lack of food as well as parasites.

***Noi* (N)**
As in cattle, this term probably overlaps with the Bor Dinka luac.
There is loss of condition (the animal becomes like a skeleton over a period of months'), fever, lacrimation and nasal discharge, grinding of teeth, drooping ears and tail, the supraorbital fossae are sunken, the spine protrudes, diarrhoea (dung in large pieces), abortion and the affected animal lags behind the others and may not graze well. It may occur at any age but not before the animal starts to graze. There is a high mortality after a few weeks. It mostly occurs in the wet season.

But cueiny (Zeraf) or wot cueiny (CUN)
The author presumed that these terms referred to the same disease: *but* means infertility (also used in women) or it may also mean swelling, *cueiny* is liver and *wot* either means a wound or something eating. The author was unable to elucidate these terms or the disease to which they referred. Some people said they describe a disease causing rapid death. The goat may be heard to cry out in the night and then be found dead in the morning: sometimes shivering is observed prior to death. Another group thought it occurred in a more chronic form with a hunched-up stance with drooping head and ears, rough coat, stilted gait (unable to go out grazing), fever, lacrimation and nasal discharge, a distended stomach (perhaps bloating) although the appetite is reduced and diarrhoea with blood. Most affected animals die after a course of a few days up to a month. Several may be

affected together. It occurs in all ages, although mainly over 6 months, and tends to be seen more in the wet season and especially in years of heavy flooding. At post mortem, the liver is enlarged, dark and 'rotten' (some described wounds in it) and the intestine is gas-filled.

Acany (D), det (D) and dat (D and N)
This often causes rapid death in goats: especially in kids. Foot lesions are only observed in animals, which survive for longer: the feet may be rubbed on the ground. Mouth lesions were said not to occur or tend to be less evident. There is no abortion or equivalent to the long-term effects, such as reduced milk supply and long coat, described in *juol* or *jul* in cattle. It is difficult to say whether *acany* refers to FMD or footrot or both. One group said that *det* spread from cattle to goats and that the signs are the same. It may, therefore, be that whereas *acany* covers both FMD and footrot, *det* is specifically FMD.

Awiir or atuiny (D) and yieth (N)
Throat swelling, excess salivation and frothing at the mouth, fever: death may occur in a few hours or it may be so rapid that no signs are observed. *Yieth* in goats differs from adhom because there is no crying out. A group in Langken were condident *yieth* was different from *rut*: the latter not being seen in goats

Jok nhyal or anguiny (D), jok tak (N)
This seems to be same or similar to that in cattle. There is usually sudden death without premonitory signs. Several may be affected together. There is no seasonality and it does not appear every year. At post mortem, the gall-bladder and spleen are enlarged but the meat is all right. One group in CUN stated that it could occur in a more chronic form with loss of condition and coughing over a course of 2 months with all affected animals dying. They felt there is no age incidence but that it mainly occurs in the wet season.

Anyur
Another cause of sudden death, as in cattle. It was said to occur only in luaks but in the dry season. All ages may be affected. The goat is usually found dead and bloated. At post mortem, the rumen is distended with fluid and the liver is dark. It is quite likely that *anur* is the same as *anguiny* and *adhom*.

Abuot pio (D) and jok pwoth or dhob (N)
As in cattle, this is characterised by coughing, difficult respiration, grunting, mucus discharge from nose, and refusal to graze. The animal walks hunched up and with the head held down. It is 'hungry for air' just prior to death. It occurs at any age without seasonal incidence: the mortality rate is about 50%. One group thought that this disease spreads from cattle to goats and sheep. Some people said that at post mortem, the lungs are seen sticking to the chest. The obvious impression is that this refers to contagious caprine pleuropneumonia but in that case it should be restricted to goats: there was some difference of opinion as to whether this disease occurs in both goats and sheep. It may, however, include other types of pneumonia such as pasteurellosis. It does not spread from cattle to goats.

Dhom or dhop (N), adhom (D)
The term dhom or adhom refers to an ambush: a secret, slow, creeping approach, prior to pouncing on someone or like a cat hiding to catch a rat. *Dhop* (not to be confused with *dhob* as in CBPP) means to talk or cry out without reason or meaning.

One group said that the animal walks slowly with its head down, it stops eating, and most die after 2-3 days. Another group stated that it is much more acute: the animal cries out, leaps up, circles round as if mad, collapses, struggles and kicks with death following rapidly or it is simply found dead in the morning. Opinions varied as to whether it affects many together and mainly adults or sporadically striking goats of any age. One group said it particularly affected the biggest, fattest pregnant goats. Some considered it not to be seasonal whereas others reckoned it occurs mainly in the season of *tot* when the goats are in luaks. It is similar to *anguiny* except that signs of a struggle are seen on the ground by the dead animal. One group considered that *dhom* might be the same as *dangdang*. At post mortem, there is no change, or only congestion, in the liver or meat, which is consumed. It seems possible that *adhom* is heartwater.

Cual, kuem and abeebei
These were said to be similar to the same conditions in cattle with abortion as the main feature. *Muul* was said not to occur in goats.

***Atherbei* (BEG)**
This is another term for abortion, which may be from a variety of causes, including another disease such as yac, akoak, matembiok or from a beating after being found in a dura field or from dirty surroundings. It may also occur from no apparent cause. It occurs sporadically and the affected goat is not necessarily barren.

***Liny* (fleas), *nyok* (lice) and *acaak* (ticks)**

Heavy infestations of fleas are often seen in young kids, especially when there is overcrowding in a luak and failure to keep it clean. Kids are disturbed by them and lose weight: they are restless, scratch themselves against the wall, suffer hair loss and may be heard tapping their feet, making the same sound as in the disease *kuet kuet* in calves. Most people complained that fleas sucked blood to a significant extent and may even cause deaths in kids. The fleas also bother people. Infested goats tend to seek the sun.

Whereas fleas are more of a problem in goats than in cattle, lice appear to be less so. The word nyok is used to describe something disliked.

The term *acaak* was, on one occasion, said to refer to the action of suckling and an attached tick was likened to a suckling calf! Ticks are mainly a problem in goats when they attach around the feet and cause lameness, which interferes with grazing and causes weight loss. This lameness can be distinguished from that due to *acany* because not all the feet will be affected. Swellings also occur at other attachment sites: udder infections may occur and the ears may droop. Goats of any age may be affected, mainly in the wet season. At post mortem, emaciation and jaundice may be seen, which is thought to be due to blood loss or from another disease brought by the ticks.

Kei
One group in Juaibor stated that this condition may be seen in goats of both sexes. They said it was similar to *kei* in cattle, with the disease starting in the ear and progressing to the eye and horn: the latter may fall off.

***Thelecok or tel* (D) and *kiir kiir* (N)**
These terms refer to an overgrowth of hooves: walking is impaired, mud may clog the feet and the animal may become mired. There is weight loss. It tends to occur in adults in the flooding season.

Adoklil
This is clinically similar to the same disease in cattle, with hindlimb paralysis and death following in about a week. It particularly affects newly kidded females, who have had twins or an abortion.

Aluithok
Neonatal disease associated with the intake of colostrum (tiith)

Dony
This was said to affect the posterior spine, with the animal being unable to stand. It occurs in goats over 1 year old and those affected die. It appears to spread slowly at any season.

Yong
Similar presenting signs to those of *yong* in cattle: the animal runs off in any direction and attacks anything. Death intervenes within 2 weeks. It occurs sporadically in any age and at any season.

Rieny
This is similar to same disease in cattle although it appears to start in the back and then involves the legs. It mainly occurs after castration and, therefore this is mainly carried out in the season of *yom* when the cool wind dries up the wound. All affected goats die.

Tuntun* or *matuntun
The author was completely perplexed by this term: it seemed to be used to refer to a number of different conditions by both Nuer and Dinka. One group in Juaibor said there was a sudden onset, the stomach is swollen and hard, there is a watery discharge from the eyes, nose and mouth and the breath smells bad. Passage of dung and urine ceases. There is emaciation and a tendency to bend the back so the spine of an affected animal sticks out above the others. The goat may cry out. Death may occur in 1-2 days. It occurs in all ages and at any season, both in the toic and luak. It spreads to other goats.

Dangdang
The animal shows ataxia, falls over, stands wobbling on its legs under a tree. It appears sleepy and shaking and shows no response when brought near to a fire, it cannot graze or drink and loses weight: death usually occurs in 2 days. It mainly occurs in adults.

***Look* or *nook* (these are the names in different dialects in Bor county)**
The affected goat falls over suddenly and then becomes normal again. It was said to resemble epilepsy in humans.

Ater nhom (D)
As in cattle, the application of this name was not clear. It was said by a group in Panyagor to describe a disease in which the head is shaken from side to side with the eyes held closed.

***Ateric* (D)**
This refers to bloat.

Liet
The animal eats soil and this becomes compacted between the leaves of the abomasum.

Tuiny
As with cattle, this term is applied to diarrhoea in all ages of goats. It spreads slowly, mainly in the wet season. There are a few deaths. At post mortem, the intestine appears damaged and contains much fluid.

Jok jiery
This term apparently described a loss of condition with deaths after a course of 2-3 months. There is no diarrhoea. At post mortem, fluid filled cysts are found in the abdomen.

***Tak or nguat tak* (N), *weth* (BEG)**
Similar to that in cattle: hard, painful swelling of the udder, perhaps more pronounced on one side: there may be pus formation. Teats become blocked and the animal may be sold because it is unable to suckle again. There may be some differences between *weth* and *tak*.

***Kiir* (N), *rap* (D)**
This term refers to the over-eating of maize or sorghum, with bloating and death.

Nuang
The goat appears off-colour one day, then ataxia occurs progressin to paralysis.
It appears to involve the hips and the hind limbs seem to die. It occurs sporadically in adults: there is no seasonal incidence.

***Nyintok* (D)**
This is similar to the same disease in cattle, with fever, eye and nose discharge, corneal opacity and blindness.

PROGENY HISTORIES

Progeny history taking is a way of obtaining information about cattle fertility, mortality and abortion rates. It relies completely on the recall ability of cattle owners. Cows are 'interviewed' in turn by standing next to them with the owner (or other individual who knows their history) and asking for details of all the successive pregnancies of that particular animal (did abortion occur?, did the calve die and, if so, at what age and of which disease?). In this way, a general picture of herd dynamics can be built up fairly quickly, always supposing that the information is accurate. One of the difficulties is that many cattle are acquired through marriage and their full history is not known. Results from the progeny history taking exercise are shown in the first part of this report (see appendix 3).

USES OF CATTLE

These were obtained through progeny history taking and by brain-storming at various meetings and training courses. The list is shown below and demonstrates the extraordinary degree of dependence of people on their cattle in southern Sudan:

- Source of food: milk (especially for children), ghee, butter, blood and meat
- Marriage settlements
- Exchange for grain
- Sold for cash
- Exchange for goods such as clothes and medicines
- Payment of fines or as compensation
- Payment of fees in court cases eg a divorce settlement
- Used as collateral in obtaining a loan or credit or to repay a loan
- Lending to relatives in hard times
- Hides used for mats, tethering ropes, drums, collecting grain, gathering dung, making thongs for chairs, baby baskets and beds, tobacco bags, headrests.
- Tail skin used in pipe making
- Ribs used for scraping up dung and stirring porridge
- Hooves used for smoothing dung covered floors
- Dung used as fertiliser and making smoke fires to repel insects
- Dung ash used as toothpaste
- Dung ash used for decorating the skin at dances and other occasions
- Urine used to flavour milk and to treat indigestion and wounds
- Horn used to make spoons and suction cups
- Tail tuft used as fly-whisk and adornment of girls
- Vertebra mounted on stick and used as stirrer

LOCAL ANIMAL HUSBANDRY PRACTICES

During the wet season, cattle, goats and sheep are housed a night in circular, domed thatched structures known by both the Nuer and Dinka as luaks. When newly constructed these are beautiful. First a low wall of mud laid on stakes is made and an arch prepared with a specially shaped lintel of wood for the doorway. Long sticks are then arranged radially meeting high up at the centre. Progressively smaller hoops of smaller sticks bound together are then tied around the scaffolding and further support is provided by large posts erected on the inside. Long grass, mainly Hyparrhenia rufa, is then used to thatch the whole structure leaving a perfectly smooth finish. The only opening is the single doorway, which is closed at night. A dung fire is usually lit inside.

The reason for housing livestock in this way is to protect them from mosquitoes and other biting insects rather than the heavy rain. Within the luak, each animal knows its own place and is individually tethered. Since some 30-40 cattle may be placed in one luak, this provides an ideal opportunity for the spread of respiratory diseases such as CBPP and TB.

During the dry season, large groups of cattle are herded together during the day and brought back to a circular, unenclosed area known as a cattle camp, at night. Within the camp, each family arranges its cattle in a particular order around a central dung fire. Each animal is tethered to a peg. The smoke from the dung fires pervades the camp and helps to repel the attacks of mosquitoes, Stomoxys and tabanids. Ash is also rubbed in to the skin of people and cattle to further discourage insects.

Cattle tend to be released surprisingly late, often not till 1000 or 1100 hrs, for grazing. The reason usually given for this practice is that the animals are thought to acquire more parasites from the grass in the early morning, especially if the pasture is wet with dew or rain. Often cattle owners would express the opinion that snails (acom) would be eaten along with the damp grass. However, when requested to show these snails, people would often bring Pila specimens which are of no significance in trematode transmission for livestock. Season also affects the time of release because cattle have to walk much greater distances to grazing in the dry season.

Milking of cattle is carried out also late in the morning just prior to release. In the evening, the cattle return usually of their own volition, between 5 and 6 pm and are allowed to rest and settle down to chew their cud for at least one hour before being milked. This means that the evening milking is often carried out in the dark.

Milk let-down is normally achieved by allowing the calf to suckle first for about half a minute. The milker, usually a girl or a woman, then ties the calf to a peg near to the head of the cow so that it can be licked. She then milks as much as the cow lets down by pulling on the teats and collecting the milk into a gourd by means of a small hole made at the end of the neck. The process is repeated before the calf is finally allowed to suckle freely.

If the cow has aborted or if the calf has died, there is a problem of getting milk let-down. The usual solution with both the Nuer and Dinka is for the milker to apply her lips to the vulva and blow hard several times into the vagina of the cow. At the same time she feels between the hind legs to ascertain when let-down has been achieved. Brucellosis must be easily transmitted in this procedure but in the circumstances, it is hard to find a practical alternative. Another approach used occasionally is to induce the cow to accept another calf.

If a calf continues to steal milk from its dam long after weaning, a circlet of acacia thorns is placed around its muzzle.

THE WORK OF ATET (DINKA) AND KUR (NUER)

The involvement of local healers was a subject for discussion within the OLS livestock programme. On the one hand, it was suggested that they should be recruited as CAHWs and thus combine their particular skills and knowledge with the more modern methods taught by the programme. However, it was also felt that this might be undermining a traditional institution and lead to the loss of EVK. It might be better to let the two systems operate separately but with links: for example, atet and kur might be supplied with scalpels and cotton wool to help them to carry out their practices more efficiently.

A small workshop for atet was held jointly by SCF and VSF (Ch) at Malual Kon in northern Bahr el Ghazal with the object of gaining a better understanding of their work. It became apparent at this workshop, and at other meetings, that the work of the local healers mainly concerned conditions which were not being addressed by the OLS programme, such as castration and lancing abscessess. Where herbal treatments might have competed with modern drugs, it was felt that herders should be able to exercise a choice between cheap traditional methods or the more expensive imported medicines. As it happened, quite a large proportion of CAHW trainees were local healers anyway either by design or coincidence.

In Bor County the author was informed that the terms atet and atir are used for people who have a skill, such as digging wells, building houses, setting bones or doing metal work. The healing atet usually work with people rather than cattle. The principle procedures carried out by atet in relation to cattle are dystocia, bonesetting, lancing abscesses, castration and the treatment of kec (horn cancer).

Castration
In Bor county, bulls and male goats are usually castrated at about one year old. The reasons given for castration were that it prevents indiscriminate mating and results in the animals becoming fat. The best-coloured bulls tend to be castrated, presumably on account of their becoming suitable song bulls (really oxen) for marriage. Breeding bulls are selected for the following criteria: good looks, dam having good milk supply, large size, from a line of fertile dams producing female offspring. If there is no bull meeting these criteria one will be acquired by exchanging females (possibly 10 cows would be needed in south Bor and 3 in the north).

Although some training in the use of the Burdizzo bloodless castrator was given, it was on the whole felt that local practices should continue. The following method were described:

1 an elbow-shaped piece of wood is used to hammer the cord. This is mainly used in bull calves of under a year. (N)
2 with a spearhead a cut is made with the testicle held at the bottom of the scrotum. Traction is applied to the testicle to expose the cord which is severed by scraping rather than a straight cut to minimise haemorrhage. This is used in cattle, goats and sheep.(N)
3 Restrain animal in standing position by holding the horns, pull down the testicles with the scrotum, cut the scrotal skin, apply traction to each testicle in turn until the cord breaks. Squeeze out any blood clot, which may form.(D)

Problems connected with local castration were stated to occur: quite severe swellings developed and complaints of tetanus (rieny) were also heard.

Horn shaping
This is a common practice particularly in calves destined to become songbulls. Particular people have the skill to cut the tip of the growing horn so that develops in a particular way: usually the left horn turns down and forward to simulate a shield holding arm whereas the right turns up and back as if launching a spear.

Cutting hygromata (cual, kuem)
Fluid filled swellings on the front of the carpus are often associated with brucellosis infection. These are cut with a specially made small knife which are an essential item of the atet's stock in trade. The fluid is released and the cavity cleaned with water or urine.

Lancing abscesses (liir, muol, dheng)
The same knife is used as with hygromata. The pus is squeezed out and the cavity cleaned.

Blackquarter (banyjaar)
The skin over the swelling is cut with the same knife as above. Informants described the removal or cutting open of a bloodvessel and removal of blood clots.

Yam
This is an unknown disease described in Bahr el ghazal in which the skin becomes hard and adherent to the underlying muscle. Several cuts are made and a stick poked through and used to lift up the skin.

Bleeding cattle
There are particular people who do this both for food and for treating bovine ephemeral fever (dony or adony or donydony) and FMD. The same small knife is used to cut down onto the vein, which is then incised and the blood collected into a gourd. Blood is usually taken from adult animals during the period April to June (early wet season). The same animal may be bled at intervals of 2 weeks but it depends on the number of suitable animals available. A typical amount would be a full bowl made by cutting a gourd in half. Blood is not consumed by children.

Bone setting
A series of sticks are placed on the ground and tied with cord of local fibre. This is then arranged as a cradle around the fracture site. If there is much swelling, the fracture site maybe incised and blood clot removed.