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Keeping and feeding wild animals in captivity

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Keeping and feeding wild animals in captivity are intensive tasks that are critical when in relocating animals. They can and must be carried out successfully. When feeding and keeping wild animals in captivity the following aspects must be considered.

1 SAFETY AND ADAPTATION

Wild animals that have been captured recently or are kept in captivity directly after having been transported suffer fear and anxiety and will attempt to escape. In these attempts, they may jump against the sides of the pen and sustain serious or even fatal injuries. It is always important to ensure the safety of the animals, and the first priority is to stop the animals from trying to escape. Once the animals realize that escape is impossible, they will accept their new limited living space, settle down and start to feel safe. The quieter the new environment, the quicker they will adapt. The holding facilities must be situated as far away as is practical from the homestead, cattle kraals, tourist lodges, barking dogs, main roads and railway lines so that all the possible strange and disturbing smells and noises are eliminated.

Holding pens and bomas were discussed and described in detail in Chapter 16. However, of necessity some salient points are repeated here briefly.

- The holding pens should not be built near fences and they should be strong enough to prevent the strongest animal that will be confined from escaping.
- The sides should be high enough to prevent jumping animals such as impala, waterbuck and kudu from jumping out or even attempting to do so.
- All objects and structures that could possibly injure the animals, such as pieces of wire and nails, should be removed from the pens before the animals are transferred to them.
- When posts or planks are used for the pens, the spaces between them should not exceed 10 to 15 mm, otherwise the animals may try to force their heads through the gaps in an attempt to escape.
- For the first few days of captivity the sides of the pens may be covered with thatch grass, reeds or hessian to restrict the view to the outside and to prevent the animals from being frightened by sudden movements outside the pen. This material should be secured so that it will not move or flap in the wind.
- The pens should be inspected and all the doors and locks should be in working order before any animals are offloaded into the pens.
- Fresh feed and water should be placed in the pens before the animals are offloaded.

2 VENTILATION

Since fresh air should continuously circulate through the pens, the sides should not be solid. If wooden posts are used there should always be gaps between adjacent wooden posts, but the gaps should not exceed 15 mm. If split poles are used and the gaps are too wide because of the irregularly shaped poles, cover the sides of the pen 100 mm to 2 m above the ground level with hessian or plastic sheeting *for the first few days* only.

3 SHELTER

Wild animals seek shade during the hottest part of the day. A roof offering adequate shade should be provided over a third of the pen (Figures 16.1 to 16.4). In areas where rain is expected during the confinement of the animals, the roof should provide adequate protection and the run-off of water be channelled to the outside of the pens. A wet animal in a cold, wet, muddy pen is susceptible to respiratory infection and foot-rot. Many animals have died of pneumonia in the past because of being soaked by rain in their pens. It is difficult to treat pneumonia in wild animals and they usually die even before they show clear symptoms of the disease.

4 FOOD AND WATER TROUGHS

Most animals feed from the ground, therefore it is unnecessary to provide feeding racks, except for the giraffe. Moreover, in the confined space of a holding pen feeding racks may get in the way of the animals. Feeding racks can be dangerous to any animal running into them or catching their horns in them. When feeding troughs have to be provided, they should preferably be made of wood, cement or concrete, but not of metal.

Free-standing water troughs are unsuitable because the animals can move them around. This will cause the water to spill and will injure the legs of the animals if they bump against the trough or run into it. It is better to have round cement water troughs sunk into the ground and placed against the outer wall of the pen. A portion of such a water trough can extend beyond the pen to facilitate cleaning and refilling it with fresh water. Food and water troughs should never have sharp edges or corners that can injure the animals in any way should they bump or run into them.

5 FOOD AND WATER PROVISION

Food and water should be replenished with the least possible noise and disturbance, especially during the first few days when the animals are still settling down. Because the animals have to adapt to a new environment, they will not eat or drink immediately after they have been released into a pen. It should be remembered that they are not used to the food and water given to them and that they will be unsettled for a while after their capture or transport.

Most herbivores will eat teff and dry lucerne in captivity. When the animals start to eat, ruminate, defecate and urinate normally it is a good sign that they are beginning to adapt. Feeding wild animals is discussed in detail below. Nutrition is discussed in detail in Chapter 22. The persons feeding the animals may talk and whistle softly while feeding them so that the animals become used to the presence of humans. Soft, gentle music in the background can help to create a peaceful atmosphere and soothe the animals. It will also blanket other noises.

6 SANITATION

Dung and urine accumulate during the confinement of wild animals in a limited space. Such accumulation is unnatural and it is undesirable for the animals to stand or lie in these excretions. Therefore, the pens must be cleaned regularly and if possible daily. The dung and soiled bedding must be removed without unnecessarily disturbing the animals. Additional pens and exercise camps must be available into which the animals can be moved while the dirty pens are being cleaned (Figure 16.2).

7 OBSERVATION

The animals should be inspected regularly without disturbing them unnecessarily. Inspection or observation windows with flaps may be built into the walls of the pens to allow observation. Any person approaching the holding pens should speak or whistle softly. This allows the animals to become slowly and restfully aware of the nearness and presence of humans. Sudden loud noises should always be avoided.

8 KEEPING ANIMALS IN PENS

The social behaviour of animals in captivity is important. Details on animal behaviour, including the role it plays when keeping animals captive, appear in Chapter 24. Briefly, social behaviour requires that sociable animals that usually live in groups naturally should be captured as a family unit and be held together. However, animals such as impala, red hartebeest, blue wildebeest, black wildebeest and Burchell's zebra tend to fight when they are kept together in a confined space.

Provision should therefore be made to separate aggressive and dominant male or female animals from the rest of the group and to keep them captive separately. Adult eland, nyala, tsessebe, waterbuck, sable antelope, roan antelope, kudu, buffalo, gemsbok, red hartebeest, blesbok and impala males can injure one another or any females and young fatally during captivity and have to be kept in separate pens from the start.

Special pens are required for white rhinoceroses and giraffe (Figures 16.6 to 16.10). Adult rhinoceroses should be kept in individual pens or camps because they tend to fight. Specifications for the construction of these pens are given in Chapter 16 (Figures 16.6 and 16.7). The handling of captive rhinoceroses has been discussed in greater detail in Chapter 18. Young giraffe can be kept together in an enclosure. Different types of animal should never be kept together in the same pen. The following guidelines for keeping various types of animal in captivity will ensure greater success:

Black wildebeest: Keep a single adult bull with the cows, or bulls in individual pens. Keep cows and calves together. Separate aggressive cows from the others if fighting occurs. Tranquillize when necessary.

Blesbok and bontebok: Adult blesbok rams can be kept with the ewes and lambs provided that the horns are covered with rubber or plastic piping, otherwise keep them in separate pens. Adult bontebok rams should preferably be kept individually in a pen. Tranquillize when necessary.

Blue wildebeest: Separate adult bulls and aggressive cows. Keep young bulls together with the cows and calves. Tranquillize when necessary.

Buffalo: Keep family groups together and adult bulls separate. Tranquillize when necessary.

Bushbuck: Keep adult rams in individual pens. Branches with leaves can be hung along the sides or suspended from the roof of the pen to provide cover and shelter.

Duiker: Keep pairs together. Bales of hay or lucerne piled in a corner of the pen will provide a hiding place and additional safety and shelter.

Eland: Keep adult and young bulls in individual pens. Cows and calves can be kept together. Tranquillize when necessary. Pipe the horns of adults.

Elephant: Keep small animals together in a camp but preferably in family groups.

Gemsbok: Keep only a few animals per pen. Keep aggressive adult bulls in individual pens. Tranquillize the animals. The horns of all adults must be piped when necessary.

Giraffe: Keep together in special high-walled pens.

Grey rhebok: Keep adult rams in individual pens.

Impala: Tranquillization for the first few days is essential. The sides of the pens should be at least 3 m high or the pen must have a solid roof. Hang branches from the roof for cover, shelter and food. Adult rams can be kept together, provided they are tranquillized and the horns are piped, otherwise they are kept in individual pens. An adult ram can be kept with the females, provided it is tranquillized and has pipes over its horns.

Kudu: The sides of the pens should be at least 3 m high. Branches can be hung from the roof or sides for cover, shelter and food. Cows, calves and young bulls can be kept together. Keep tranquillized adult and young bulls in individual pens.

Mountain zebra: See Zebra.

Nyala: Keep adult and young bulls in individual pens. A family group can be kept together. Tranquillize when necessary. Young bulls must have pipes on their horns.

Ostrich: Keep young birds together. Keep adult birds in pairs.

Red hartebeest: Keep the bulls separate from the cows in individual pens. Tranquillization is necessary for the adult animals.

Reedbuck: Keep the rams in individual pens.

Roan antelope: Keep adult bulls in individual pens. Young bulls can be kept with the cows and calves. Tranquillization is necessary for the adult animals.

Sable antelope: Keep adult bulls separate from the cows. Tranquillization is necessary for adult bulls and cows.

Springbok: The same sexes can be kept together, except during the mating season when the rams must be separated from one another. Piles of branches in the pen will help the rams to relieve some of their aggression on the branches. Tranquillization is always recommended.

Tsessebe: Adult bulls and adult cows should be kept in individual pens. Small camps are better than small pens. Tranquillize all the adults.

Waterbuck: Keep adult and young bulls separate in individual pens. The sides of the pens should be 3 m high and closed at the top with wire mesh or

netting to prevent the animals from jumping out and escaping. Tranquillize when necessary.

White rhinoceros: Keep each animal separately in a special pen. A female must be kept with her calf.

Zebra: Burchell's and mountain zebra stallions and some mares tend to fight. Stallions should be tranquillized and kept apart. Family groups should be tranquillized and kept together in a large enclosure. The animals should be fed at more than one point in the pen to limit fighting.

There should always be adequate space in the holding pen. Placing too many animals in a pen should be avoided, otherwise competition and fighting for food and space will occur, leading to injuries and possible death.

9 FEEDING AND CARE

Newly captured wild animals are excited, nervous and uncertain of themselves and subject to fear and stress because they suddenly find themselves in a new and unfamiliar environment. In this uneasy situation they will not start to eat immediately, particularly when the available food is unknown and unnatural to them. They need a period of adjustment that may last for several days to enable them to calm down and reach a certain degree of settledness. This will give them time to accept their captivity before they will touch any food.

Certain animals such as Burchell's zebra and most young animals accept their captivity fairly quickly and begin feeding within a few hours. However, kudu, impala, gemsbok, red hartebeest and giraffe may be agitated and ill at ease for several days. Aggressive or dominant bulls or rams that are captured with female and young animals should be kept apart from the rest from the outset, otherwise there will be constant fighting and uneasiness and the animals will not get an opportunity to feed. In such situations, the physical condition of the animals will deteriorate rapidly. If this continues they will weaken physically and eventually die. It is better to release any animals that do not adapt and still refuse to eat three or four days after capture.

Before the animals enter the pens, adequate and suitable food and water should be placed in the pens. Initially, the food should be placed in the centre of the pen because the animals tend to walk along the perimeter of the pen in the first few days and will trample any food placed along the perimeter. Providing food from the outset encourages the animals to accept food more quickly. It also prevents them from being disturbed during the first few days of captivity. It is only once the animals have started feeding well that they will accept disturbances such as the presence of humans, the provision and removal of food and litter, and the cleaning and replenishment of the water troughs.

Ruminants are classified according to their natural feeding habits as grazers or bulk feeders; mixed grazers and browsers or intermediate feeders; and browsers or selective feeders. Browsers such as kudu and giraffe are fastidious feeders and should initially be fed fresh leaves from the indigenous trees or shrubs that occur in the vicinity. When they have to remain in the pen for longer than a few days, they can be offered green or dry lucerne mixed with cut leafy branches. In the wild these animals will prefer certain leaves to others, therefore strenuous efforts should be made to supply them with those plants for which they show a clear feeding preference. Old branches and leaves should be removed quietly and carefully from the pens so that the animals gradually lose their fear of humans. Elsewhere in this book, details are given of the habitat preference and main food (Table 17.1), feeding spectrum (Table 17.2) and diet composition (Table 17.3) of the southern African herbivores.

Grazers such as blue wildebeest, black wildebeest, springbok, blesbok, gemsbok and Burchell's zebra are usually found on the plains. These animals can initially be fed on cut grass hay from the veld, which is later mixed with lucerne and teff. If these animals have to remain in a pen for a long time, antelope pellets or cattle and sheep pellets may be given to them. The pellets may be mixed with hay or lucerne, or be strewn on top of the hay. Certain pellet-manufacturing companies produce a specially formulated antelope pellet that contains a minimum of 16% protein. These pellets are sold in bags of 50 kg each and are a convenient way of supplementing a balanced diet. Details appear in Chapter 22. However, should the animals in a pen develop diarrhoea on account of the pellets, fewer pellets should be given.

Where fresh green oats, lucerne or other leguminous plants are available, they may be chopped up and fed to the animals. As for cattle and sheep, care should be taken never to feed wilted lucerne because it can cause bloat. It is therefore advisable to provide fresh lucerne early in the morning and to remove any leftovers later in the day. Food

must be freely available during the first few days. After two or three days it will become clear how much and what is being eaten, allowing the exact quantity and quality of food to be provided. Vegetables such as sliced pumpkin, sweet potatoes, carrots and cabbage can be given in small quantities. Salt licks and feeding blocks can be provided for animals that are kept in pens for a long time. Details appear in Chapter 22. Constipated animals do not eat well and can be treated with molasses. One part of molasses to ten parts of water can be sprayed onto the hay or lucerne, and may be given safely for a few days. Too much molasses should not be used because it can cause diarrhoea.

There must always be fresh, clean water. Soluble vitamins and electrolytes can be mixed with the drinking water and may serve to stimulate the appetite. It is important to give all animals these vitamins and electrolytes for the first week of captivity. Since wild animals are not familiar with water troughs they will initially be hesitant to drink from them. For convenience, it should be possible to supply and replenish water with the least possible effort and inconvenience. Water pipes can be laid above or below the ground, with ball valves or taps to distribute the water to each pen. Since many animals prefer to drink water in the dark, the water troughs should always be clean and full at night.

As already stated, animals that do not feed after a few days in captivity will begin to lose physical condition rapidly. Whenever possible, it is advisable to move such animals to separate pens and to consult a veterinarian. These animals will have to receive special treatment and care. Should there be underlying infections such as pneumonia or inflammation of the intestinal tract, antibiotics, vitamins and cortisone injections should be given. Although there is insufficient scientific evidence on this matter, it does appear that animals that are translocated under tranquillization adapt easily and quickly to captivity, and begin to eat sooner than untranquillized ones.

It is important not to disturb the animals unduly during their first few days in captivity. It takes many hours for newly captured animals to calm down after having been frightened or disturbed. This does not mean that the human factor should or can be eliminated. On the contrary, the animals should be inspected regularly so that any problems can be discovered and addressed timeously. However, the inspection and observation should be done quietly and carefully twice a day without disturbing the animals unnecessarily. It is especially advisable that the same person or persons feed and care for the animals, and clean the pens according to a set daily routine. Remove any baling wire and cord before feeding the animals.

Incorrect feeding methods and poor quality or insufficient food will result in a noticeable loss of physical condition. Animals in poor physical condition are less resistant to disease and will die when transported over long distances. It is also essential that excessive noise be avoided during feeding. Any changes in the type of food should be introduced gradually so as not to upset the digestive system. Newly released wild herbivores may have to be inoculated with local strains of micro-organisms to allow them to develop the proper fermentation process. Such inoculation is discussed in detail in Chapter 22 on animal nutrition.

Visitors should be allowed near captive animals only under suitable supervision. All the staff involved in feeding and caring for the animals must be briefed on the proper care of the animals. They must especially know what they are expected to do both routinely and in the event of an emergency. At least one person present must be able to administer a tranquillizer and an antibiotic as explained above. Any problems that arise must also be reported immediately to the person who is ultimately in charge.

10 DAILY INSPECTION

It is essential to inspect all animals held in captivity daily. During such an inspection the following should be done:

- Check the health and physical condition of each animal.
- Establish whether each animal is drinking and eating, urinating and defecating.
- Remove any animal with diarrhoea to another pen and treat it.
- Check whether additional tranquillization is necessary.
- Check whether the animals are calm, aggressive or nervous. When necessary, separate the aggressive animals and tranquillize them. Tranquillize all nervous animals.
- Any injured animal must receive immediate treatment.
- Check that all the animals are being fed with the correct type of food, that they are watered twice daily, and that the branches with leaves

given to browsers are fresh and are replaced daily.
- Check that no mouldy or wilted food is being fed or left lying around.
- Check that all the pens are being cleaned daily and that all litter, bedding and manure are removed some distance away from the pens. However, keep the period of confinement as short as possible
- When the pens are wet and muddy, move the animals to dry pens.
- Remove any dead animals in the pens with minimal disturbance to the other animals. Keep the carcass in a cool place to minimize post-mortem changes and decomposition.
- Immediately arrange for a post-mortem examination to determine the cause of any death. If no staff member present knows how to conduct a post-mortem and what samples to collect for histopathological examination, call in a veterinarian, preferably with wildlife experience, or take the carcass to the nearest veterinarian. If this cannot be done, the following procedure is advised:
  - Skin the carcass and look for any wounds or signs of bruising and bleeding under the skin.
  - Examine the neck, legs and ribs for fractures.
  - Cut into the muscles of the front and hind legs and look for signs of bleeding and discolouration of the muscles.
  - Open the chest and abdominal cavities and examine the heart, lungs, liver, kidneys, spleen, stomach and intestinal tract for any abnormalities.
  - Examine and open the urinary bladder and note the colour of the urine. In cases of capture myopathy the urine will be dark and almost coffee-coloured.
  - Collect samples of approximately 1 cc in size of the following organs in 10% formalin: the heart, lungs, liver, spleen, kidneys, adrenal glands and skeletal muscles. Sample bottles containing 10% formalin can be obtained from veterinarians, veterinary laboratories and chemists. The samples collected should be taken or sent to the nearest veterinarian or to the Onderstepoort Veterinary Institute at Onderstepoort, or to the Faculty of Veterinary Science, University of Pretoria, Onderstepoort. The name and address of the game ranch and the following additional information are essential and must be provided: a complete case history of the animal, its species, its sex, age, any previous illnesses, and the conditions under which the animal was being kept and died.
  - Cut open and examine the contents of the rumen and abomasum, stomach and small and large intestines except when anthrax is suspected.

11 REARING WILD ANIMALS BY HAND

A newborn animal is helpless without its mother because it is totally dependent on her for food, care and protection. In nature, it will either starve to death or fall prey to predators without its mother. Even an animal a few weeks old will battle to survive without the milk and care of its mother. On a game ranch a young herbivore may be rejected by its mother for the following reasons:
- Her udder has not developed and she has no milk.
- Her udder has dried up because of food shortages or drought.
- The mother has mastitis and will not allow her young to suckle because her udder is painful. In some savanna areas, ticks are known to damage the udder of eland cows to such an extent that they cannot feed their young.

Young animals may be separated from their mothers when they are disturbed during capture operations or hunts. A young animal may also lose its mother to death through poaching or hunting. The young of some bovids such as eland, gemsbok, roan antelope, sable antelope and kudu are hidden by their mothers for the first few days after birth. When these young animals are seen by chance in the veld, they may give the impression that they are orphans, and they are then often brought home to be reared by hand. This must not be done unless it is established *beyond reasonable doubt* that the mother is no longer around or is dead.

It is not difficult to rear wild animals by hand despite the process being beset by definite problems. Caring for and keeping orphaned animals alive requires considerable attention and devotion, especially during the first few weeks. An animal that has never suckled and did not get any colostrum is handicapped from the start because it lacks essential ingredients, for example anti-

bodies against diseases, and nutrients such as protein, carbohydrates, vitamins and minerals. Anyone who raises domestic livestock will know how important colostrum is for young animals. Animals that grow up without having had it suffer from all kinds of problems and disorders, and never progress as well as animals that received colostrum soon after birth.

The natural behaviour, suckling habits and milk composition vary from one species of animal to the next. It is therefore impossible to raise all wild animals in the same way by using the same milk formula. For example, an eland cow differs from a domestic cow in that the young eland is hidden and fed at irregular intervals. As the young eland has to remain without milk for long periods at a time, the fat content of the milk of an eland is high and provides enough energy to sustain the hidden calf. The fat content of eland milk is 10%, compared with 3.7% of a dairy cow (Table 34.1). It would therefore be wrong to feed the diluted milk of a dairy cow to a young eland calf because the fat content of the milk would be far too low. The milk of the dairy cow should rather be *enriched* with cream, butter or egg yolk instead of being *diluted*. In contrast, the milk of both the black and the white rhinoceros contains almost no fat at all and the milk of a dairy cow will be far too rich in fat for their calves. Therefore milk substitutes have to be used, as explained in Chapter 18. Generally, it may be accepted that the young of animals that hide their young during the first few weeks feed at irregular intervals and their diet has a richer milk fat content than the diet of those that stay with their mothers. An exception to this rule is the impala whose milk has a high fat content.

The data in Table 34.1 clearly indicate that the milk composition varies from one species to another, particularly with respect to fat and protein content. The fat and protein content of antelope milk is considerably higher than that of domestic goats and dairy cows. The table also shows that the milk of black and of white rhinoceroses hardly has any fat at all, much like that of zebras.

A common mistake many people make is to dilute dairy cow milk with water in a ratio of 1:1. The origin of this practice is not known, but the result often is that such animals show poor growth. Animals fed on diluted milk are small, pot-bellied and appear malnourished. They also always suffer from some stomach complaint or another. Furthermore, they are usually greedy and consume large quantities of milk without satisfying their hunger. By diluting dairy cow milk, its nutritional value and the fat, protein and carbohydrate content are all severely reduced.

Table 34.1 The percentage milk composition of a few South African wild animals, a dairy cow and a domestic goat

Animal	Fat content	Protein content	Carbohydrate content
Eland	10.0	6.0	4.0
Elephant	9.7	5.3	2.6
Giraffe	12.0	6.0	3.4
Impala	20.0	10.8	2.4
Kudu	10.0	12.0	4.6
Rhinoceros: black	Trace	1.5	6.0
Rhinoceros: white	0.3	1.7	6.7
Springbok	9.0	8.0	4.8
Wildebeest: black	10.0	8.0	2.6
Zebra: Burchell's	0.8	3.0	5.3
Dairy cow	3.7	3.3	4.8
Domestic goat	4.0	3.7	4.2

Note: The figures are rounded off to the nearest decimal.

Sources: Ben Shaul (1963); Smith (1970); Van Zyl & Wehmeyer (1970); Trendler (1993); Rogers (1998).

The fresh milk of a dairy cow can be fed to young antelope if the fat and protein content is supplemented. This may be done by adding 40 ml of cream and the yolks of two fresh hen's eggs per 500 ml of milk. Butter is 100% fat and may be used as a substitute for cream. To increase the fat content of the milk of a dairy cow to 10%, use 75 g of melted butter and mix it with 1 litre of cow's milk. When rhinoceroses are raised by hand, their milk is best made from milk substitutes, as explained in Chapter 18.

11.1 Colostrum

Colostrum is produced in the udder only during the first few days after birth. It is a thickish, milky substance that contains more fat, proteins and vitamins than ordinary milk. It also contains antibodies against most of the common diseases. The newly born animal is protected in this way for the first few weeks of its life against many of the diseases to which it is exposed. The intestinal tract of a young animal can absorb the antibodies only during the first 36 hours after birth and the young animal has to take in colostrum in this period. Colostrum also stimulates the intestinal tract and makes the first defecation easier.

A young orphaned animal that does not receive colostrum from its mother for some or other reason can be given colostrum from domestic cows, goats or sheep. A supply of domestic cow colostrum can be kept in 500 ml plastic bags in a freezer for emergencies. When it is required, it should be defrosted slowly and fed to the animal at body temperature. If no colostrum is available, the milk mixture suggested above can be supplemented with a multivitamin syrup such as Vidaylin, Mulgatol, Clusivol, Adamol or Combivite. Young zebras and rhinoceroses may be given artificial horse colostrum when it is available.

11.2 General hints

While the above points will help to rear young, orphaned wild animals by hand, the following general guidelines can also be applied.

11.2.1 Care

A young animal should be cared for as nearly as its own mother would have done. This can be done by applying the following guidelines:

- FEEDING MOTHER AND INCULCATION

The person who undertakes to care for the young animal in the beginning of its life is accepted as its surrogate mother or feeding mother. Therefore, it is important that only one person should be responsible for feeding and caring for a specific animal. No two persons will handle an animal in exactly the same way. The manner in which the milk bottle is held, the person's clothing, scent and voice, and the manner of expressing love and patience are imprinted at an early age on an animal. Any changes, such as using another person to feed the animal, may upset it and prevent it from drinking. Should the feeding mother not be able to feed the animal for a day or two, a second person should be trained in advance to do so. This person should observe the feeding for a few days in the company of the feeding mother to learn to follow the routine and method used as closely as possible.

- TEMPERATURE OF THE MILK

Milk must always be fed at a body temperature of 38°C. Milk that is too warm or too cold or differs from what the animal is used to, may upset it and it may refuse to drink.

- HOUSING

For the first few days, the young animal should be kept in a quiet, safe and warm place. A dark, outside room is ideal. To provide warmth the floor should be covered with a thick layer of straw. Bales of teff or lucerne, or a wooden crate in a corner can provide a hiding place where the animal will feel safe and warm.

Proper ventilation is necessary but the area must be free of draughts. Young animals have almost no fat to protect them against cold. They are highly susceptible to cold and easily develop pneumonia. Such animals will be feverish and refuse to drink. Advanced pneumonia in a young animal is difficult to diagnose and treat and is one of the main causes of mortality in these animals.

After a few days, the animal may be taken out of its shelter and placed in a small pen during the day. Shady places must be provided so that the animal can move out of the sun when it becomes too hot. In the late afternoon, the animal must be taken to its warm shelter where it must stay for the night.

■ WATER

Fresh, clean drinking water should be available at all times. The water container must be cleaned daily.

■ HYGIENE

Good hygiene is essential at all times. The bedding litter must be changed regularly and replaced with dry, fresh litter. Veld hay or straw and/or sawdust may be used as litter. The litter must be changed more often should diarrhoea occur, as the faeces attracts flies. Use warm water, soap and a mild disinfectant to wash the faeces off the tail and other soiled parts of the hindquarters of any animal that has diarrhoea.

■ UMBILICAL CORD

When the umbilical cord is still wet it must be treated a few times with tincture of iodine. Inflammation of the umbilical cord or the navel by bacteria may result in blood poisoning and inflammation of the liver and joints.

■ DOGS

Dogs should be kept away from a young animal because it may become frightened, run around, collide with the fence, injure itself or even break its neck or legs, especially when the dogs are barking.

11.2.2 Feeding

There are three important points that should be considered when feeding wild animals artificially:

- Use a teat that will be acceptable to the animal.
- Get the animal to drink.
- Feed the correct milk volume and composition at body temperature.

■ TEATS

It is sometimes difficult to get the right kind of rubber teat that will be similar to the form and size of the teat of the natural mother. For smaller animals such as springbok, impala and blesbok, an ordinary baby bottle teat some 40 to 50 mm long can be used on a plastic baby bottle. For larger animals such as kudu and eland, a 100 mm long teat that is used for domestic cattle calves is usually acceptable. The artificial teats are made of soft or hard rubber and the animal will choose one or the other. These teats usually fit onto a cold drink bottle. Eland and kudu calves drink up to 1.5 litres of milk at a time, and a two-litre plastic bottle is useful when feeding them. The size of the aperture in the teat is important. When the aperture is too small, the animal will struggle to drink and it will swallow substantial quantities of air. This will cause colic. When the aperture is too large, weaker animals may inhale some of the milk.

■ FORCE-FEEDING AND FEEDING TECHNIQUE

Initially it is difficult to persuade or force a frightened, nervous young animal to drink milk from a bottle. At first some animals refuse to swallow, in which case they have to be force-fed otherwise they will die of dehydration within two to three days. The correct procedure to get a young animal to drink is to insert a finger between its lips on one side of its mouth and to push the teat in after it. The gums are then massaged lightly and carefully with the finger. The milk is squeezed drop by drop out of the bottle. The teat opening may have to be enlarged somewhat so that the milk flows evenly from the bottle when it is squeezed. When it is feeding, the animal should be spoken to continuously and softly while its back and tail are stroked. With force-feeding care must be taken that the milk is not inhaled into the trachea or lungs because this may cause pneumonia. The nostrils should never be held shut to force the animal to drink, because this may result in suffocation or inhalation of milk. Even a small amount of milk inhaled into the lungs may cause pneumonia.

■ PATIENCE

It is important to be patient. When a young animal initially refuses to drink, it should be left alone and allowed to rest for a short time. After a while, another attempt can be made to feed it. When the animal does start to drink, care should be taken that it does not drink too much or too rapidly. Overfeeding can be more dangerous than underfeeding.

■ BUCKETS

Once the young animal drinks well, it can be taught to drink from a bucket after ten to 14 days. However, some animals will refuse to drink from a bucket, in which case bottle-feeding must be continued.

■ HOW MUCH AND WHEN TO FEED

A young animal drinks milk equivalent to about 10 to 15% of its body weight per day. This is comparable to 1 litre of milk per 10 kg of live weight daily. This amount should be divided into at least four feeds per day. Young animals should be fed often and regularly with small quantities of milk. The amount of milk that is given initially must be in relation to the size and weight of the animal. A good starting point is to feed 60 ml of milk per 10 kg of body weight per feed initially. The increase in the animal's weight must be monitored weekly to ensure that it is receiving sufficient nutrition. Initially the animal should be fed five to six times a day. This is approximately once every four hours. Some animals may need to be fed more often, and others less frequently during the first few weeks. A minimum number of four feeds must be allocated per day.

■ MILK COMPOSITION

Milk consists of water, fat, protein, carbohydrates, and small quantities of vitamins and minerals. The fat and protein content of the milk varies from one species to another. An analysis of the milk composition for some animals is given in Table 34.1. The milk of a dairy cow obviously contains too little fat and protein for most antelope.

Powdered milk is specially formulated for human babies and is inadequate for most antelope. Thus, dairy cow milk and the milk powder used for human babies have to be enriched to increase the fat and protein content for use in antelope. This is done by adding cream and egg yolk or butter to the milk. A formula that has been used successfully is to mix the yolks of two fresh eggs and 40 ml of fresh or canned cream to 500 ml of dairy cow milk. The milk must be from cows that are free of bovine tuberculosis and mastitis. In case of any uncertainty, the milk should be boiled before use. However, vitamins A and D are destroyed in the boiling process. To supplement the vitamin content of dairy cow milk a few drops of any of the following vitamin syrups may be added: Vidaylin or Vidaylin with minerals (Abbot), Combivite (Lennon), Clusivol (Ayerst) or Mulgatol (Nattermann). Medifeed (Roussel Laboratories) is a milk substitute that contains 23% protein, 13.6% fat and all the necessary vitamins. This milk substitute is expensive but it may be used if dairy cow milk is not available.

All milk mixtures should preferably be prepared freshly for each feed. However, a supply for the day may be prepared in the morning and stored in the refrigerator. The milk should always be heated to body temperature at 35°C to 38°C before each feed, and should be fed at this temperature. A thermometer similar to that used in dairies should be used for measuring the temperature of the milk.

■ GOLDEN RULES FOR SUCCESSFUL FEEDING

Many problems will be overcome by keeping the following in mind when a young antelope is to be fed. Milk from the animal's mother is fresh, clean and warm, and must be fed to the calf or lamb in that state. The bottles and teats must be washed after each feed in clean, cold water. Before each feed the bottles must be sterilized in boiling water. The same disinfectants that are recommended for sterilizing baby bottles may be used. However, the disinfectant must be washed thoroughly from the bottle and teat with water, otherwise the odour may upset the young animal and it may refuse to drink. Milk that is too cold, too hot, or unhygienic may cause digestive problems that can only be treated at considerable trouble and cost.

■ SUPPLEMENTARY FEEDING

As the young animal gets older, food concentrates consisting of dairy calf meal and a good quality fresh and dried lucerne hay must be provided. Vegetables such as chopped pumpkin and cabbage, carrots, lettuce, spinach or any other vegetables that are available at the time of feeding may be fed in small quantities.

11.2.3 Urination and defecation

The mother of a young animal will lick its anal and genital areas to stimulate it to urinate and defecate. For the first few days, the mother also drinks the urine and eats the faeces of her young. This is an instinctive defence mechanism to prevent predators from smelling the offspring. When rearing a young animal by hand it is important to stimulate it to urinate and defecate, especially in the beginning. Considerable attention and time must be devoted to this. Defecation and urination may occur before, during or after feeding.

A warm, damp towel is used to massage the animal under its tail to simulate the licking of its mother. The penis sheath of young male animals should also be massaged lightly. A piece of cotton wool soaked in warm sunflower oil can be used

for this purpose. It also helps to stroke the back and tail of a young animal. This stimulation should be done during or just after feeding. It may take a while before the young animal will learn to urinate or defecate spontaneously.

11.2.4 Weaning

Most animals can be weaned from three months of age (Table 1.1), but eland calves may take longer. To wean a hand-reared animal can be a relatively traumatic and heart-rending experience. One has great sympathy for the animal when it searches for milk and attention as before. However, it is in the interest of all concerned to persevere with the weaning. To facilitate weaning, freshly chopped green lucerne or grass should always be left in the holding pen so that the animal will learn to eat solid foods from a young age. Most young animals will start nibbling at solid food spontaneously and may soon begin feeding on solid foods.

When the animal is close to being weaned and is eating solid food, the milk ration should be decreased gradually over a period of two to three weeks. A week or so before the animal is to be weaned completely, the number of feeds per day can be decreased until it is fed only once a day. It is better to adhere strictly to the final decision to wean the animal and to stop any additional and periodic feeding by bottle or bucket.

11.2.5 Diseases

The following disease conditions may be expected, especially if the person feeding and caring for the animal has had no previous experience in rearing young animals by hand: diarrhoea, pneumonia, infection of the navel and constipation. Contact the nearest veterinarian for help and advice.

■ DIARRHOEA

Diarrhoea in young animals may have various causes, of which ignorance and poor management principles are the most obvious. From practical experience, it would appear that many cases of diarrhoea begin on weekends. This may possibly be related to the fact that the person appointed to feed the animal went away for the weekend, or that the same discipline was not maintained when feeding the animals. Certain people also have a better touch and more patience with small animals than others. Diarrhoea is usually caused by one or more of the following:

- Inadequate or incorrect milk composition
- Sudden changes in the composition of the milk, such as the addition of sugar and/or cream, or the sudden omission of certain ingredients
- Milk that is either too hot or too cold
- Overfeeding with milk
- Irregular feeding times
- Sour milk
- Dirty, unsterilized milk bottles, teats and milk buckets
- Milk from domestic cows that are infected with mastitis
- Specific bacteria such as *Escherichia coli* that cause gastroenteritis

As there are so many possible contributing causes, it is important that the *primary cause* of diarrhoea should always be determined and rectified; otherwise treatment of the symptoms may be ineffective. A young animal that has diarrhoea for a few days dehydrates rapidly and has little energy because even the milk that it is fed is not digested. The animal also has little resistance to infections. The following treatments can be applied to a young animal with diarrhoea:

- *Lime water:* When the diarrhoea has just begun, warm lime water may be used to bind the intestinal contents. The lime water must be administered every three to four hours instead of the milk, or diluted with equal quantities of the normal milk mixture. Lime water can be made up at a pharmacy, or it can be mixed according to the following recipe: one tablespoon of pharmaceutical lime powder shaken thoroughly in a bottle with 750 ml of water. Leave the mixture to stand for a few hours until it becomes clear. The powder eventually sinks to the bottom and the clear fluid is the lime water. Only the clear fluid should be used. A few bottles of lime water can be mixed in advance and kept in storage. The powder residue is discarded and not used again.
- *Biosol-M and other remedies:* When lime water is not effective, various other medicines for treating diarrhoea in domestic calves and lambs can be used. These medicines are available from pharmacists and agricultural stores and contain combinations of antibiotics, kaolin, pectin or other substances that bind the intestinal contents. Biosol-M fluid (Upjohn) yields good results; other medicines that can be used are

Curalaks (Agricura), Enteritis Syrup (Centaur) and Stoplaks (Millborrow). After the second day of treatment, one part of lime water mixed with five parts of milk can be administered until the diarrhoea has stopped completely. When the young animal is severely dehydrated, the following medicines can be prescribed and administered with the lime water and milk mixture: Lectade (Smithkline Beecham), Vitalyte (Truka Panvet) and Entersol (Millborrow).

A young animal suffering from diarrhoea and that loses its appetite can be fed often with small quantities of milk. Vitamins can be added to the milk and multivitamins containing the Vitamin B complex and Vitamins A, D and E may be injected to strengthen the animal and stimulate its appetite. Consult a veterinarian for suitable remedies and treatments. An excellent preventative remedy is the maintenance of proper hygiene. To achieve this, all soiled litter should be replaced more often than usual. The tail and hindquarters of the animal should also be washed regularly with warm water, a mild disinfectant and a mild soap.

■ PNEUMONIA

Pneumonia has various causes. It is difficult to treat, and prevention is better than cure. To prevent pneumonia from occurring in young animals, the following precautions are important:

- Maintain proper ventilation and good hygiene.
- Prevent exposure to cold.
- Prevent inhalation of milk or other fluids.
- Prevent navel infection.

Inhalation of milk during feeding is a common cause of pneumonia in young animals. The incorrect administering of medicines causing the medicine to end up in the lungs instead of in the stomach is also a major cause. Some people believe that the nostrils of the animal must be held shut to force it to drink the medicine or milk. This practice is undesirable and unscientific, and may cause the ingestion of fluids into the lungs and consequent pneumonia.

The symptoms of pneumonia appear quickly and the animal may become severely ill within a few hours. A high fever of up to 42°C, depression and loss of appetite are usually the first and only symptoms. Although the lungs are affected, coughing is not always a conspicuous symptom. In many cases, pneumonia can be diagnosed only by listening to the lungs with a stethoscope. The eyes sometimes water, and there may be a slimy or purulent discharge from the nose.

Advanced pneumonia is difficult to treat, particularly when it has been caused by milk or unnatural fluids ending up in the lungs. Antibiotic injections may help. Broad-spectrum antibiotics such as Terramycin and Vetramycin (Pfizer) and Streptopen (Centaur) can be prescribed by a veterinarian and used. While the animal is undergoing treatment, it should be kept warm and be encouraged to drink small quantities of milk at regular intervals.

■ NAVEL INFECTION

Navel infection occurs when the navel becomes infected with bacteria a few days after birth. It occurs especially when the area where the young animal is kept is unhygienic. The bacteria causing the inflammation spread through the blood to the liver, lungs and joints. Blood poisoning is a complication resulting from the condition not being diagnosed and treated timeously. The symptoms are an infected navel that is swollen and red, and high temperature. The knee, hock and knuckle joints are often also affected. These joints are swollen and the animal does not want to walk because it is painful and difficult to move. The skin over joints sometimes bursts open and discharges pus. Permanent arthritis accompanied by lameness may develop. The following treatment can be applied:

- The swollen navel should be cut open with a sterile blade and the pus and blood removed with cotton wool. The wound should be treated with a good disinfectant such as tincture of iodine or diluted hydroperoxide.
- The swollen joints should be bathed with a mixture of warm water and a disinfectant such as Dettol every three to four hours, and then bandaged.
- Antibiotics as prescribed by a veterinarian can be injected for at least five days or longer until the lesions have healed.

The navel should be treated regularly with tincture of iodine during the first two days of life as a preventative measure.

■ CONSTIPATION

Constipation is characterized by continual pressing movements and attempts to defecate, signs of stomach ache, loss of appetite and listlessness.

The faeces are hard and dry and are passed with pain and difficulty. An enema of 2 to 3 litres of warm, soapy water or 0.5 to 1 litre of liquid paraffin can be administered. The quantity used must correspond to the size of the animal. The enema is administered with a pipe of about 1 m in length and 10 mm thick. One end is lubricated with soap or liquid paraffin and is inserted carefully about 100 mm, or as far as is practicable, into the rectum. By connecting a small funnel to the other end of the pipe, the soapy water or liquid paraffin can be administered down the pipe. Animals that tend to be constipated can be fed 20 to 30 ml of olive oil or liquid paraffin with their milk every second day.

12 FEEDING THE YOUNG OF SOME SPECIFIC ANIMALS

As has already been indicated above, the milk composition and parental care of various animals differ. When rearing young animals by hand, the following specific approaches will help to attain better success.

12.1 Burchell's zebra

The milk of Burchell's zebra and horses contains little butterfat. The milk of a dairy cow that is diluted by half with water may be used for feeding zebra foals. Zebra foals are sensitive to intestinal inflammation and therefore maintaining the proper hygiene of the bottles and teats is important. Because they are always with their mothers, the foals drink small quantities frequently at irregular intervals. Zebra foals are sociable animals and seek the company of other animals. A tame domestic sheep or goat can fulfil this requirement.

12.2 Rhinoceroses

Rhinoceros milk contains only a trace of butterfat. A special milk powder ration that contains little fat but many natural sugars can be made up for feeding a young rhinoceros. Feed milk equivalent to 10 to 15% of the body weight daily. Various milk substitutes can be used. They must be modified to resemble rhinoceros milk as closely as possible, especially in terms of fat and lactose. As the calf gets older, it will need additional energy in the form of high-energy food, such as Nestum and Pronutro. More details on feeding rhinoceros calves appear in Chapter 18 and in Rogers (1998).

12.3 Elephant

A word of warning to any person who is brave enough to attempt to rear a baby elephant by hand: it requires extraordinary effort and dedication, especially when the animal is still an infant. The following information was obtained from Mrs V. Brooker of Broederstroom, who has considerable experience of raising elephants.

Each young elephant is unique and has its own character. In nature, young elephants are always in the company of their mothers who take care of them. Therefore, when rearing young elephants by hand, it is important that they have other animals with them all the time. A sheep or two are probably the easiest and the most patient animals for this task. Small elephants must be kept warm at night, especially in winter. The room in which they stay must be kept warm with a heater, and the floor must be covered with a thick layer of straw or sawdust. Electric cables and plugs must be well hidden. Elephants are scared of the dark and a soft, red light must be kept on all night. During the day, they can be kept in a large camp with many trees and a mud hole.

Elephants drink milk from birth until they are about two years old. The milk of a dairy cow and many of the commercial milk mixtures for human babies are unsuitable for elephants. This may be related to the butterfat quality or the size of the fat globules of the milk of dairy cows and humans. The digestive system of the elephant is unable to handle such milk.

A suitable diet for young elephants consists of rice, barley, skimmed milk powder, brewer's yeast powder, cod liver oil, vitamin C, Biorem and salt. Cook the rice until it is soft. Cook a similar amount of barley until it breaks up and keep the water to mix with the milk. Mix the rice and barley to a smooth paste. Mix the other ingredients to a watery pulp. The mixture must be lukewarm when fed to the elephant. Supply a piece of pipe with which the elephant can suck up the mixture from a bucket. Small elephants can be taught to drink from a two-litre plastic bottle.

From birth to three months of age, elephants must be fed every few hours. From three to six months of age, they are fed every four hours, including at night. They will then eat 5 to 8 litres of food per feed. From six to 15 months of age, they are fed four times per day. At this stage, they receive 10 to 15 litres of food per feed. From six months of age, they will begin nibbling on solid food. They can be given the following as supple-

ments: horse cubes, lucerne, cut oranges, sweet potatoes, potatoes, carrots, chopped pumpkin and other vegetables. From 15 months to two years of age, the elephants can be given food that is made into a thick porridge. This porridge can be eaten with the trunk. They can be weaned at two years of age and be fed teff, lucerne, veld hay and the branches and leaves of indigenous trees.

Try not to rear the elephant as a pet, as this may cause problems and heartache later when the animal has difficulty in learning to be independent. Such a pet elephant will always want to be with people or the person who reared it. Try to maintain a strict discipline from the beginning. Young elephants are sensitive animals and one must not shout at them loudly. Too much noise and rough handling may make them aggressive and unmanageable. They must be taught from a young age not to bump people. When they arrive at a new place, most elephants will feel frightened and timid and will tend to charge people.

12.4 Predators and primates

In South Africa, wild carnivores and primates such as baboons and vervet monkeys may not be kept in captivity without special permits from the provincial conservation authorities. Permits are issued to private individuals only in exceptional circumstances. These animals usually become dangerous when they are fully grown.

The first and most important step is to stabilize the orphaned animal. When the animal is chilled and dehydrated, warm it immediately and rehydrate it with an electrolyte solution containing 5 to 10% of dextrose or glucose given orally. An intravenous transfusion may have to be given to weak animals by a veterinarian. Carnivore milk is higher in protein and fat, but lower in lactose than that of a dairy cow. It is best to contact qualified people for help, such as the staff of the various zoos and animal rehabilitation centres. Trendler (1998) is a good source of information.

12.5 Ostriches

In the veld, ostrich chicks are easy prey for small predators and birds of prey. Chicks can be caught shortly after they have hatched and then raised by hand. The necessary facilities and rearing methods are discussed briefly in Chapter 21 on ostriches. *The capture and care manual* by McKenzie (1993) is also a useful aid.

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