Desert Nomad Extraordinaire

The Namaqua Sandgrouse

TEXT AND PHOTOGRAPHS BY PENN LLOYD

Twelve species of sandgrouse occur in Africa. In southern Africa, the Namaqua Sandgrouse (female **left**, *male* **above right**) *is the only species to sport long, pointed central tail feathers.*

Kelkiewyn! The call drifts in on the fresh morning breeze, faint but unmistakable, that characteristic sound of the desert.

Kelkiewyn! It is closer now. You hear the bird long before you see it, a single 'sentinel', a mere speck high up in the sky, heralding the start of a daily spectacle. Soon they are flying in from all directions, flocks wheeling in out of the vast, clear sky. They gather on the ground around the waterhole, first in their hundreds, then in their thousands.

Eventually, the first tentative birds approach the water, drink quickly, and take off ... *Kelkiewyn!* This is the signal the gathered multitude have been waiting for. The air is suddenly filled with the whirring wings of clamouring, thirsty birds, and the water's edge seethes. After drinking, the flocks fly up as puffs of smoke, to break up and disperse in different directions once again. Soon it is all over, the last *kelkiewyn!* fading into the haze as the sun warms the barren desert plains.

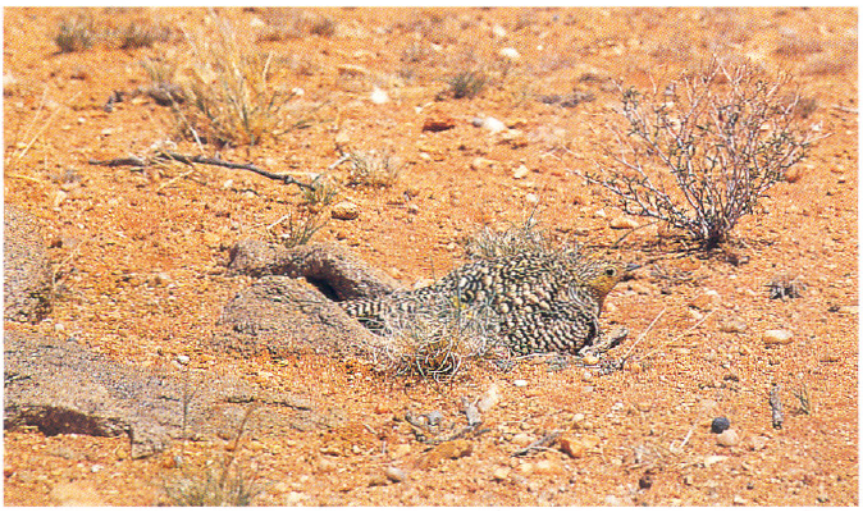
This is the magic of the Namaqua Sandgrouse *Pterocles namaqua*, that most remarkable inhabitant of southern Africa's arid zones. Superficially resembling a pigeon, the species is in fact more closely related to the plover family. A seed specialist, the Namaqua Sandgrouse spends most of the day on the ground, walking about on its stubby legs with head bent low, searching out the tiny, hard seeds of the ephemeral plants on which it feeds. Depending on the size of the seeds, each bird will consume between 5 000 and 80 000 seeds a day. Since each seed is pecked up individually, the bird resembles a little sewing machine when feeding. Some seeds are so small that it takes 5 000 to constitute one gram. As an added complication, many species of plants 'disguise' their seeds as the grains of sand or little pebbles that cover the ground.

But the sandgrouse is little fooled by this, and a full crop of more than 40 000 seeds may contain as few as 10 seed-sized grains of sand. Any pebbles pecked up are likely to have been done so on purpose; like an ostrich, the sandgrouse needs a certain quantity of pebbles and grit in its muscular stomach to aid the grinding up of the hard-coated seeds for efficient digestion. Because the seeds are so small, the sandgrouse may need to find several seeds for every second of the 6–8 hours of the day that it spends feeding. To sustain these feeding rates, it needs to exploit areas with super-abundant seed-banks.

The advantage of a granivorous diet in an arid environment is that seeds are produced predictably and in abundance by ephemeral plants after good rains. The strategy of the plants is to germinate and grow quickly during the short time when there is enough moisture in the soil, and then to shed enormous numbers of seeds before drying out and dying. The seeds remain dormant in the surface layer of soil, waiting for the next occasion when good rains fall.

In the desert, this can often be a wait of a year or more, so the plants produce a sufficient quantity of seed to ensure that enough survive to germinate, grow and repeat the cycle. Good rains are, however, unpredictable, and usually fall as highly localized thundershowers. The result is a regionally patchy food supply. The Namaqua Sandgrouse has responded to this by adopting a nomadic lifestyle, and it may wander over much of its southern African range in the course of its lifetime.

A drawback of a purely granivorous diet is that seeds have a low water content, so, unlike the insectivorous desert larks that manage to extract enough water from the insects they eat to meet their water requirements, sandgrouse need to drink regularly. But open water is a scarce commodity in the desert environment, and waterholes may be very far apart. Sandgrouse have overcome this problem through their excellent powers of flight. They are capable of accomplishing a round trip of more than 150 kilometres for their daily drink and, with a cruising speed of 80 kilometres an hour, they cover these distances effortlessly.



Top *A typical nest of three eggs in a shallow scrape in the ground. The nest is fully exposed on open ground, but usually sited in close proximity to one or more grass tufts or stones, which serve to break the outline of the incubating bird (female shown,* **above**).

DESERT MANNA

Namaqua Sandgrouse are gregarious birds, and are well known for their synchronized flights to water; all the birds in a region fly in to drink together 1–2 hours after sunrise. It is still possible to see up to 20 000 sandgrouse gathering at a single pan to drink together – a truly spectacular sight. It has even been speculated that sandgrouse were the super-abundant 'quail' provided for the wandering Israelites.

Certainly, sandgrouse have sustained rural communities in the Northern Cape since at least the turn of the century. 'Old-timers' in this region fondly recall the days, some 40 to 50 years ago, when these birds 'darkened' the skies. This was the time of the *trekboers*, when families were large. The folk in this marginal farming area were poor, jobs were scarce and the vast herds of springbok *Antidorcas marsupialis* that once roamed the Karoo had been decimated. These were hard times, and the people turned to the only thing of ▷

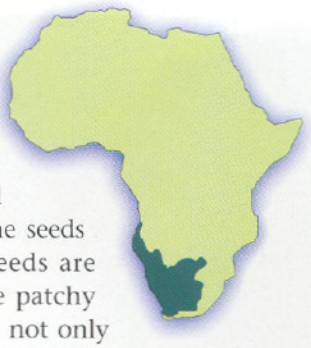
plenty around them – the sandgrouse. Hunters loaded their guns with fine shot and lay in wait at the waterholes until sandgrouse carpeted the ground in front of them. More than 50 birds could be killed with each blast.

Birds were also killed using a spring-wire: wire, running between two strong springs, was laid along the length of a furrow of water. When enough birds had lined up to drink at the water, the wire was released, to spring back with tremendous force at sandgrouse head-height. An elderly lady recalls that in their community of five households, approximately 500 birds were collected each week. The soft belly feathers were plucked to stuff pillows. The outer flight muscles were cut out and dried as biltong. The rest of the bird was cooked for several hours in a slow-simmering pot with salt and a few cloves, to provide a delicious meal.

Values and lifestyles have changed, and this shooting for the pot is now small-scale.

NETWORKING – SANDGROUSE STYLE

Sandgrouse don't congregate to drink simply because they enjoy socializing with their kin. This synchronized drinking fulfils two important functions. The first is that it provides a measure of protection against predators, such as falcons, that swoop in on the drinking birds. Not only do more birds mean more eyes to detect the approach of a predator, but the milling flocks also confuse an attacking falcon so that it finds it difficult to home in on a particular bird. The low rate of success of falcon strikes at waterholes attests to the efficiency of this strategy.



To understand the second function of this synchronized drinking, we need to re-examine seeds as a food source. Although seeds are super-abundant after rains, the patchy seed-banks are rapidly depleted, not only by sandgrouse, but also by other granivorous birds, mice and harvester ants. And when it does rain, it really pours, in short, sharp thundershowers. The irony is that much of the water simply washes off the baked, stony soil, and the resultant flash-flood sweeps much of the seed-bank out of the system.

Many of the seeds that remain then germinate, suddenly presenting the sandgrouse with a critically short food supply for several weeks, before the new plants start to shed seed again. While many birds respond by nomadically moving to drier pastures, others stay put. Either way, the birds must find new feeding sites, and find them fast. This is where the daily gathering of all the birds in an area at the waterhole functions as an 'information centre', where the message being conveyed is the location of the good feeding areas.

Hungry birds can simply follow their more successful fellows to their feeding sites, after drinking together. ▷

Below *Namaqua Sandgrouse flocking at a waterhole. It is still possible to see up to 20 000 gathered at a single pan.*

NIGEL DENNIS

Above *The male hurrying off to dispose of an eggshell some 20–30 metres from the nest – a strategy to prevent predators from locating the chicks. The newly hatched chicks can be seen in the lower left foreground.*

Namaqua Sandgrouse are very vocal in the air, regularly uttering their *kelkiewyn!* contact call. Sometimes birds feeding on the ground will answer overflying birds, and thereby direct them to a feeding site. It is the gregarious nature of these birds, together with this 'networking', that is the key to their success.

BREEDING

The arid, windswept gravel plains of Bushmanland, in the Northern Cape Province, are the core breeding area for Namaqua Sandgrouse in South Africa. With a mean annual rainfall of approximately 110 millimetres, and vegetation cover of 5–10 per cent, this is an ideal habitat for a bird that prefers to nest in exposed situations. The pair select a nest site together, and scratch out a shallow scrape in the dirt. While the nest is usually fully exposed, it is always situated near one or more low grass tufts, herbs or stones. These serve to break the outline of the incubating bird, melting it into its environment. The normal clutch of three eggs is laid over five days, an egg every other day. During the egg-laying period, the male sits over the eggs during the day to protect them from the scorching sun, and to allow the female more time to feed while producing the three quite large eggs.

The first two eggs are left unattended overnight, causing them to cool down, and thus delaying their development until the clutch is complete. The importance of this becomes evident when they begin to hatch. Once the clutch is complete, the pair share incubation duties – the female incubating from two hours after sunrise to two hours before sunset, with the male doing duty for the night shift. The incubating birds rely on their superb camouflage to remain undetected. The female's barred patterning camouflages her very effectively in the harsh daylight. While the male is more striking to look at, the sandy-yellow tinge to his plumage provides equally effective camouflage in the softer early morning and late afternoon light when he is on the nest.

A HOSTILE WORLD

The incubation period is 21 days – if the eggs escape the attentions of a host of predators. In Bushmanland, only one in 10 clutches survives to hatch. Sandgrouse eggs are a rich source of food, and a host of predators, including at least eight species of small mammal and two snake species, take advantage of this. Even the lumbering aardvark *Orycteropus afer* cannot resist snacking on eggs if it happens upon a nest during its nocturnal wanderings in search of ants and termites.

When the little chick tumbles out of the egg, the parent in attendance immediately picks up the shell and hurries off with it, disposing of it 20–30 metres from the nest – yet another strategy to distract predators from the vulnerable chicks.

The chicks are precocial and, within an hour of hatching, they are popping out from under the feathers of the parent to stumble about, testing their legs. Now it becomes evident why it is so important to delay the ▷

Above *The male rocks in the water to saturate his belly feathers, before flying back to his chicks.*
Below *On his arrival, the chicks reach up and strip the moisture from his feathers.*

development of the eggs at the laying stage until the clutch is complete for, although the eggs are laid over five days, they hatch within hours of one another. The nest is placed in a very exposed situation, and the incautious exploratory movements of the chicks can easily attract the attention of a passing predator. It is thus vital for the eggs to hatch synchronously so that the chicks can be lead away to better cover as soon as possible. While they are exploring their new world just beyond the bounds of the parent's warm belly feathers, the chicks are shown for the first time how to start pecking up seeds, because they have to feed themselves on the same small seeds as the adults.

NATURE'S MARVEL

Namaqua Sandgrouse usually nest many kilometres away from water, so how do the flightless chicks manage to get their daily, life-sustaining drink? The answer lies with another of those wonders of nature. Gordon Maclean and Tom Cade were the first to really document the special adaptations required. If you have ever watched sandgrouse at a waterhole, you will have seen males walk into the water, crouch down with fluffed-out belly feathers, and rock vigorously to and fro in the water. What they are doing is saturating their specially adapted belly feathers. These feathers have thousands of tiny filaments that, when dry, are tightly spiralled around one another. When the feathers come into contact with water, the filaments uncoil and, through capillary action, trap water in the narrow spaces between them. The feathers therefore ▷

act like blotting paper, and can absorb up to 20 millilitres of water. After bellywetting, the male flies back to his chicks, and there follows a scene that few people have been privileged to witness.

On his approach, the chicks instinctively scurry over to him, crouch down in front of his belly, and reach up to strip the water from his feathers, looking rather like a litter of puppies. The chicks are dependent on the male for their daily drink of water for their first two months, until they are almost fully grown, before they start making the flight to the waterhole themselves.

Once the chicks have finished drinking, the male rubs his belly in the dust to dry the feathers again. A dry sandgrouse feather smells dusty, but a wet feather smells strongly of bird. This explains why sandgrouse can frequently be seen dust-bathing, but will never bathe in water. Many predators hunt on scent, so it is imperative for sandgrouse, particularly those sitting tight on a nest, to disguise their smell to blend into their sandy environment.

Until they can fly, the chicks have to rely on their superb camouflage to escape detection. On observing approaching danger, the parents give a soft alarm call and walk rapidly away from the chicks who scuttle in different directions to the nearest grass tuft, stone or shrublet, and crouch motionless next to it. If you have ever tried to find a sandgrouse chick, you will appreciate just how effective their camouflage can be. Nonetheless, predators can exact a heavy toll: in some years, fewer than 10 per cent of the chicks survive to adulthood.

LETHAL TELEPHONE LINES

Fortunately, adult sandgrouse can outfly most natural predators. Telephone lines are, however, their undoing. The birds fail to see the lines and fly into them at speeds of 70–100 kilometres per hour, either beheading themselves or breaking a wing. Sandgrouse are particularly vulnerable if a line runs close to a waterhole; in 1996, for example, a single line running near a pan in the Kalahari resulted in the deaths of an estimated 200–300 birds. A pair of Secretary Birds *Sagittarius serpentarius* even took to regular patrols of this stretch of line, and the puffs of feathers scattered all around told their own story.

Farmers across the Northern Cape relate stories of picking up bagsful of sandgrouse from under telephone lines running near open water. Telkom have expressed their concern at this state of affairs, and negotiations are now underway in conjunction with Northern Cape Nature Conservation Services to seek solutions to the problem.

So, the next time you visit the Kalahari, Bushmanland, Namaqualand or Namibia, take the time to sit at a waterhole a couple of hours after sunrise and reflect on a bird so successfully in tune with the rigours of life in a harsh desert environment. □

Author's acknowledgements

The current research project would not have been possible without the generous support of the African Gamebird Research, Education and Development Trust (AGRED), De Beers Consolidated Mining, the FitzPatrick Institute of African Ornithology at the University of Cape Town, the Foundation for Research Development, and the National Parks Board.

I would also like to extend sincere thanks to the many farmers I have met in my travels in the Northern Cape for their warm hospitality, and in particular, to Dekker and Sikkie Stadler, my 'adoptive family'.

Below *From day one the male parent encourages the chicks to start pecking up seeds to feed themselves.*