A WILLOW-GROUSE SAGA

Why on earth should anyone want to go Karlsøy in April, a low wooded island not more than a mile across, in the remote fjord country two hours North of Tromsø by boat?

In my home country of Scotland, one would go to a small island in spring expecting to see hundreds of seabirds and, in any remote locality, to find a problem of human depopulation. But on Karlsøy, at 70° North, in sheltered waters surrounded by other islands and quite far from the open sea, the only sea-birds are a few Herring Gulls and a small colony of Arctic Terns, and in the small village of about 50 inhabitants that straggles down the east side of the island, there are new houses and goat-farms under construction, and there's a thriving commune in a large white house near the pier. So at least Karlsøy promised to be interestingly different.

But I had one very good reason why I was sitting drinking coffee in Oslo airport at the end of April last year with Frederik Aalerud, waiting for my flight to Tromsø, having already completed three others: Edinburgh-Aberdeen, Aberdeen-Stavanger, Stavanger-Oslo. And that was because, on my previous visit to Norway in March, we had between us failed miserably to secure any good film at all of the main subject of a documentary film we were making for his employer, Hans Rasmus Astrup of Oslo, on the subject of Willow Grouse. I had spent a week at Hemsedal in the central mountain area north-east of Oslo trying to pin down our elusive quarry within camera range. We had had everything else we wanted (in addition to superb hospitality and assistance from his dog-trainer friend Odd Sandaker and his super-cook wife Marianne) including a blizzard to emphasise the tough conditions under which the birds live, some glorious sunshine to set off the mountain scenery at 900m above sea-level, and plenty of soft snow in the birchwoods to show up the birds' footprints and tell us where they were feeding. We had even found, quite close to the Sandaker's guesthouse, clear signs of where the grouse had flown in and walked at snow level all round the young birch trees eating the buds and twigs which form their winter protein diet and, even better, had surprised a small party sheltering after a stormy night in the snow holes which they dig into the soft surface snow as shelter from the extreme cold – in the best traditions of mountain survival drill. But they were off in a flash as we approached and that was the closest I got to any grouse in the whole week. So Odd demonstrated with hand-movements for the camera how the birds had dug in, lain up under a roof of snow all night leaving a pile of droppings at the bottom of the 'dokk', and had then exploded out of cover at our approach on skis.

The idea of a film on Willow Grouse had arisen from a scheme, which we called the 'Sletthalen Project', where Herr Astrup had decided to experiment with Scottish methods of moorland management on his estate on the high plateau of central Norway. This experiment involved burning the moorland vegetation following the well-tried pattern of heather burning which is so successful in Scotland – if properly managed and controlled – in burning off the old rank heather which produces little food for grouse and replacing it with succulent young heather shoots, which are excellent food. If the burnt patches are kept small and only about 10% per annum is burnt i.e. burning the whole area on a ten-year cycle, then the grouse have a good variety of heather offering short, young plants for food and the longer, older plants for nesting cover and shelter.

The birds involved in both countries are the same species – Lagopus lagopus – but the Red Grouse in Scotland, due to the milder climate and their preference for the lower levels of moorland, have dark brown-coloured plumage all the year round and are therefore considered a sub-species of the much more numerous and widespread Willow Grouse of the continent which (like our Ptarmigan – Lagopus mutus) moult into a white winter plumage every autumn and then back into camouflage colours in late spring. But where Red Grouse are 90% heather-eaters and thrive where heather is the dominant plant, the Willow Grouse of Scandinavia have quite different food preferences based on their quite different habitat and life-style. Often they inhabit much higher ground, as at Sletthalen or Hemsedal, where they nest on high plateaux where all ground cover is buried under two metres of snow all winter. So they regularly migrate vertically down into the birchwoods of the valleys, where there is still deep snow but at least the trees protrude above snow level. There they shelter in the woods, living off the buds that are rich in stored protein. And as we saw rather dramatically at Hemsedal when blizzard conditions strike and temperatures drop (to -10° on our visit in March, but earlier that same winter as low as -30°c) they must use this rather specialised technique of survival which involves digging a snowhole overnight.

The original film-script for the Sletthalen Project film emphasised the need to convey how vital to their survival was their ability almost to hibernate by lowering their body temperature and slowing up their whole metabolism in order to get through the long winter nights on a limited energy intake of food. Only healthy birds with the insulation effected by plumage in excellent condition and this unique ability to control their own heat losses, could expect to survive. And only birds with good food intake all the year could hope to achieve this. From these known facts had arisen the scheme to improve the food for the Sletthalen birds.

The adviser for the Sletthalen Project on the burning regime and the control of the vegetation is John Phillips, a Scottish Ecological Consultant on whose recommendation I took over the filming from a Norwegian producer. The early work on the botanical studies, the actual burning of the ground cover and the first re-growth been done of the young plants had all been done several years before so that my task was to show the life cycle of the main characters of the story, the Willow Grouse themselves. Just what shy and unapproachable birds they are had been all too clearly brought home to me from that first abortive week at Hemsedal. And that was precisely why, a month and several telephone calls later, I was heading for Tromsø in the far north and the island of Karlsøy even further north still. The question I had put to Professor Johann B Steen of Oslo University, expert on grouse behaviour with several current research projects going on in the mountains areas, was: How can I get close to these notoriously shy birds? They are hunted everywhere in Norway as the principal quarry of dozens of hunting clubs in a country where nearly every countryman has a gun, and where dog-training is a prestige hobby and pointers and English Setters are almost beyond price as the best means of pursuing their chosen method of shooting: walking up the birds on foot (Norwegians tend to regard shooting at driven grouse from butts as very poor sport and not quite cricket'). His answer, not surprisingly perhaps, was that I hadn't a hope in any area where the birds are regularly shot – which is of course most of Norway. But two areas share the two vital factors I needed, a high population of grouse and no shooting. Both were islands but about as different from each other as could be. The island on which Tromsø, a modern city of 50,000 people, is situated has a high density of Willow Grouse partly because most of them live almost in the suburbs where shooting is clearly not advisable for purely practical reasons of human safety. The other island was Karlsøy with only 50 people but plenty of birch-woods and a surprisingly high density of grouse, and where the owner for many years had forbidden any shooting and kept the island as a kind of private nature reserve.

And best of all from my point of view was the fact that on Karlsøy Professor Steen had conducted much of his research and the Arctic Biology Department of Tromsø University were also actively pursuing grouse studies which he thought I might find valuable and interesting. I did – and far more so than I had ever dreamed. In fact, I found their researches there spectacular and fascinating, enough to give the film study of Willow Grouse I hoped to complete an entirely new dimension, an element of the unexpected. For I found research breaking entirely new ground in the study of ground-nesting birds and their techniques of survival.

I finally got to Tromsø in late April and was met at the airport by Geir Gabrielsen, the research worker at the Arctic Biology station with whom I had been making my arrangements for visiting Karlsøy. For one thing he had obtained permission for me to use the accommodation on the island which he and other researchers used in the old doctor's house not far from the pier. It sounded Spartan but adequate, with electricity at least. It was clearly a case of taking one's own food and looking after oneself which always suits the erratic timetable of a wildlife photographer who must live by the light and the weather and the vicissitudes of his subjects. But at his suggestion I had planned to spend a few days in Tromsø itself so that I could see some of his research results first and visit the station where he worked in a suburb near the airport. Apparently the grouse round the airport were amongst the tamest and most numerous on the island as the birchwoods close to the runway were virtually unvisited by people and of course the birds there were never shot. To demonstrate his point Geir took me in his car, in the charming company of his six-year-old daughter Sigrid, to a spot not 400 yards from the airport terminal. As we drew in to the side of the road a cock Willow Grouse was displaying to his mate, strutting across the snow with his red wattles up and apparently oblivious of us or the passing traffic. After the week in the mountains when all one had were fleeting views of distant white shapes disappearing fast among the trees, it was a revelation. And the whole of the next week was spent watching the whole range of grouse activities and displays often at such close quarters that it was difficult to focus close enough with my longer telephoto lenses.

I quickly learnt that the Willow Grouse is just as aggressive in defence of his territory as his Scottish counterpart. In April the birds are still mostly white but the cock birds usually have brown heads and shoulders as they start to moult into their summer plumage. Many of the hens only had a few flecks of colour as yet, for the landscape was still largely white with deep snow in the shelter of the woods and ice everywhere that snow had melted by day and frozen again at night. Going was often hard and a silent approach on crunchy ice·or unstable snow impossible. Though the birds were tame, often fantastically so, they were still wary and often difficult to film behaving naturally. The best were those which displayed at me rather than at their rivals, for a cock grouse will tend to treat any intruder into his territory as an enemy to be met with an aggressive display. But as a measure of the difference in the birds, on my very first morning out with the camera I filmed a pair feeding quietly at the roadside and making the very footprints which had been all we had seen in the viewfinder at Hemsedal. They were alert and wary but unafraid and provided one observed all the normal rules of moving slowly and being inconspicuous it was possible to get big close-ups of normal feeding behaviour quite easily. Display was more difficult, especially the becking flight of the cock birds (when they fly up with the crowing call that is their normal display call on the ground, and then land and run with the famous 'go-back, go-back' call that everyone knows). The best pair were close to the airport radio station where a particularly aggressive cock tried to see me off as I stood on the road beside my car. (So, incidentally, did the security guard from the radio station who threatened to have me arrested for taking photos in a forbidden area – but gave me permission to go on filming in the meantime. The resulting inactivity from police or airport guards seemed to indicate that his threat, like the cock grouse's, was more of a show than a real fight.) This particular cock bird had at least three hens in tow; and my luck was in when, as he was displaying very vigorously at me (encouraged by a tape recording of a rather outspoken Scottish Red Grouse to stimulate a bit of fight in the Viking counterpart), a rival cock suddenly arrived, stimulated by all the fuss, landed alongside and I was treated to a complete performance of the 'parallel walk', when both cock birds with red wattles raised and in full battle order, strut alongside each other marking out the invisible boundary between their respective territories in a full-blooded threat display.

However threat is one thing and courtship is another. To see this, let alone film it, the birds need to be completely undisturbed and unaware of one's presence. I saw a few distant views of cocks spreading their wings or tails towards their mates but I felt the full courtship had not yet started and I needed a quieter location than the noisy surroundings of an international airport close by a busy main road. So I packed up all my gear and prepared for the journey by bus and ferry to Karlsøy. It took a couple of hours to the pier at Hansnes from which the local inter-island ferry departs connecting with islands like Vannøy on a daily basis, partly to enable island children to attend the Hansnes school; and three or four times a week with Karlsøy, which has its own tiny school with four pupils and a Danish teacher! My first Karlsøy contact was with Harald, one of those four pupils, aged 11, who at once appointed himself my natural history guide for the island in spite of my very limited Norwegian and his almost non-existent English (except for some very rude words I pretended not to know). He was later to prove an adept nest-finder and a very useful field assistant. His first act of welcome was to introduce me on the pier to the goat-farmer who owned the doctor's house,·who helped me wheel my gear up to the house in his barrow. On an island with virtually no motorised transport, this too was to prove useful for getting some of my heavier camera gear across to the birchwoods -where in the end I did most of my filming about a mile or more from the house.

At first, as at anynew location, I had everything to discover about Karlsøy. Geir Gabrielsen bad briefed me well in his office in Tromsø about the best areas for grouse and where I was most likely to find birds with adjoining territories at whose boundaries I would have the best chance of both seeing, and hopefully filming, the territorial disputes which stimulate the best display behaviour. But l needed also to find mated pairs already in their chosen territories and already beginning to show signs of courtship behaviour. As I walked up the bill from the shore where the large 100-year-old wooden house stood, with a quite spectacular view across the fjord to the snow-covered Lyngen Alps, it was quite clear there was an abundance of willow grouse. There were also black grouse, judging by the bubbling calls coming down from the high ground where the herring gulls were also settling into their breeding grounds. The birchwoods covered most of the hill slopes and, apart from some large areas of almost primeval marshland and tussocky bog, most of the flat ground between the hills as well. And it was in the birchwoods that the willow grouse held most of their territories, flying up as I walked through, 'becking' and calling and immediately stimulating their neighbours into similar demonstrations of their possession of a chosen territory. Several times on that first reconnaisance I watched disputes between

rival males including some chases with the two birds flying side by side much like an aerial version of the parallel walk display I had filmed on the ground at Tromsø airport.

After many hours of watching and wondering, I finally decided to put up my hide well out into the marsh where I could have an uninterrupted view to follow birds in flight as well as a chance of seeing some courtship or displays at close range. Bird territories are, to human eyes, invisible, with unmarked boundaries. But to the birds the dividing lines are clear-cut and so I had to judge, by watching their behaviour, where the boundaries met and so where interaction was most likely to occur.

The next week of early morning watches proved my choice a fair one. Although I found that from the restricted viewpoint a hide offers it was almost impossible to follow flight movements, it was ideal for close-up observation of the pair on whose territory I was sitting, hidden in one square yard of green canvas in no little discomfort – not least from the cold – a pair which fed, crowed, displayed and finally indulged in a full courtship display quite close in front of the hide. One moment the cock bird was feeding quietly beside his hen, the next strutting past her, scraping the tips of both wings along the ground, his jet- black tail fully spread, bowing himself to the ground in an ecstasy of exhibitionism. In spite of hours of watching I never saw the full sexual display or its consummation, and that was the only courtship display I saw anywhere within camera range. Perhaps I was a little early, but both funds and time ran out and I had to call it a day. During that first visit to the island I watched the winter end and spring just start with the great ice sheets across the low ground beginning to break up and the streams of melt-water swelling daily as they ran to the sea, entering beside a pebble beach resplendent with the first dramatic flowering of purple saxifrage among the stones.

But my second visit in late June was far more dramatic in every way. In the first place it all started off with a frantic rush. After several delays for purely administrative reasons, when the future of the film hung in the balance, the decision to resume fieldwork came almost too late for the birds. Nature doesn't wait for production hitches. When I phoned Geir at Tromsø I was met with the news that he had 'a sensation' for me – two hen grouse sitting on 22 eggs on the same nest and due to hatch on Saturday afternoon. I was sure the situation was unique. And of course ground-nesting birds like grouse lead their chicks from the nest within hours of hatching. I received the news on Thursday and I didn't even have a flight booked. Moreover, he said that all the nests he was studying, due to the extraordinary degree of synchronisation that Arctic birds achieve due to their restricted breeding season, would be hatched and away within a week. Some chicks were already out; others like the double nest due this weekend. And of course we had agreed that the only possible chance of filming the family feeding together was on hatch day as the hen left the nest with her brood. After that, any grouse family is almost invisible and quite unapproachable, and no longer tied to the nest-site where hidework can make filming comparatively straightforward.

To cut a long story short, I was lucky with my flights, left Edinburgh early on Friday, just caught the mid-day flight to Tromsø from Oslo when Frederik arrived with ten minutes to spare with all the equipment I had left with him in May (Oslo traffic jams caused several such headaches), spent one night in Tromsø discussing plans and possibilities with Geir and next morning bought three weeks supplies and heaved my dozen items of luggage onto the bus to Hansnes. I reached Karlsøy pier at 4 pm having flown nearly 1,400 miles in six hops, followed by two taxis, two buses and two ferries, all in 32 hours. And the birds were still sitting!

By 6 pm, I was in my hide within 30 feet of the double nest, discovering much to Geir's amazement that the birds which appeared to be shy when approached soon became adjusted to my presence and were in fact so tied to the nest-site by their very strong maternal instincts, especially with the chicks now almost all hatched and all squeaking at once, that they paid little attention to me or the camera. So I was able to come out of my hide, creep forward, clear a view into the nest and film the whole excited family at close range. This experience was made possible of course by the long Artic day; I was still running colour film at 9 pm. For the next three weeks it was never remotely dark and my chief problem was adjusting to the constant daylight and avoiding total exhaustion. My day tended to start – as indeed it had done in May as courtship is an early morning subject – at 4.30 am and often I was still filming at 10 pm and seldom got back to start cooking a meal before 8 or 9, with the sun still high in the sky. Apart from the fascinating task of filming some of the other birchwood species like redwing, shy and elusive, and fieldfare, bold and aggressive, my main effort was concentrated on a single grouse nest carefully selected because I could look down on it from a bank and so follow the hen's movements

in either direction.

This was also the site where Geir had conducted his experiments with radio transmitters fixed to the hen grouse's back, recording by a new technique of micro-probes the bird's heartbeat, so that he could sit with a radio receiver 100 yards away and monitor the bird's physiological condition – breathing rate, heartbeat and even temperature. The birds seemed completely unaware of the harness on their backs or the probes and carried on their normal life – which is half the point of such telemetry studies. The remarkable results of this study were that the birds were discovered to have an unexpected degree of control over their own body functions, especially the breathing rate. This slowed dramatically on the approach of danger from any ground predator, including man, and this brought the heartbeat down from the normal resting, rate 150 beats a minute to an almost unbelievable 20 beats, a tick-over that could only possibly provide enough blood for the brain, heart muscle and main wing muscle. Geir tested it out with a field assistant. The closer he got, the slower the heart thumped until he almost touched the bird. Then when she finally panicked, the heartrate could increase from 20 to 600 beats per minute in one second as she flew from the nest.

Geir Gabrielsen's work explains one facet of grouse behaviour which had mystified Norwegian researchers and caused great problems in finding grouse nests for study, even using the established Scottish technique of locating them with dogs.

Sitting hens seemed to be able to escape detection by dogs. Professor Steen told me of an incident where a dog walked right over a grouse before finding it. Most of his research is based on studies of nesting birds where it is essential to find the nests as early as possible. With their almost incredibly efficient camouflage this makes for a real problem when, as appears to happen, the birds seem able to suppress their scent. Geir's theory is that the very slow breathing rate resulting from the virtual suspension of the normal heartbeat is what enables the sitting birds to escape detection by ground predators.

All sorts of fascinating factors are emerging from this study. Aerial predators like crows do not cause the reduced heart-rate – which fits as of course bird predators have virtually no sense of smell anyway. Other factors cause an acceleration in the heartbeat as for instance the call of her mate nearby – like a 'flutter' of excitement which most of us could well understand. Strangely however the (to our ears) exactly similar call of a rival cock from a nearby territory produces no increase at all. lt's as though grouse 'ethics' don't allow for any excitement over another male apart from your own mate. Perhaps the most interesting result of the telemetry technique so far – because it points to several future lines of further research – is the discovery that a hen returning to her nest full of cooled eggs can 'deliberately' increase her heartrate to increase the bloodflow to her brood patch. This patch of bare skin on her belly, common to most incubating hen birds, bas a generous supply of blood vessels and Geir Gabrielsen has proved that by increasing her heartrate to 600 beats per minute, the grouse hen can achieve a far faster re-warming of her eggs. And the longer she is off the nest, perhaps on a feeding fray in ambient temperatures as low as 6°C, the longer she switches on this built-in heat pump to get back to that vital temperature which the embryos must have for survival.

We recorded all these features in the form of rapid or very slow bleeps from a bird's tiny transmitter which will form a unique sound-track for the pictures I finally secured of the hen sitting, returning to her nest, being approached by my field assistant (the island's only teenager!) and at the end of an almost continuous 36-hour session at the hide, leaving the nest with all twelve of her chicks in tow.

It is a good example of the hazards that face the wildlife film-maker that the day before this vital stage in our film story, the hen grouse seemed restless and an emergency examination of the nest revealed that seven of the twelve eggs had been stolen. It later transpired that one of Harald's friends whom he had brought to see the nest the Scotsman was filming had found it all too much of a temptation and had removed seven of the eggs overnight. Thanks to being well prepared and to Geir's intimate knowledge of several other pairs, we were able within an hour to find another nest with eggs due to hatch at exactly the same time and also with twelve eggs. So in the interests of our film story, 'our' grouse walked off the next evening with twelve chicks while her neighbour up the hill had to make do with only five. I salved my conscience by the sure knowledge that birds can't count.