

SCIENTIFIC ENDEAVOUR: STORY OF NORTH RONALDSAY'S SHEEP

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SUSAN HAYWOOD and DAVID BRITT tell the history of a flock of sheep that clung to survival on one of the most remote parts of the British Isles, in the first of a two-part article

A FLOCK of primitive sheep of little commercial value located on a remote Scottish island has become a cause celebre in efforts to conserve rare domesticated animal breeds and in research important to human and animal health.

North Ronaldsay - less than 5km by 2km in size with an irregular coastline - is the most northerly of the islands making up the Orkney archipelago. Dominant features of the landscape are all man-made, including a dry-stone wall or dyke about 3m in height that divides the island into two zones: a coastal perimeter and the more tranquil and fertile hinterland.

This remarkable structure was built during the 1830s and is now a local monument of some distinction, although it has suffered depredation in recent times. The largest group of the North Ronaldsay sheep is found on the seaward side of this wall.

North Ronaldsay sheep are a remnant of a type that was once widespread in the Scottish islands and probably beyond. Small and hardy, they coped well with the less-than-ideal husbandry conditions, but were not very productive. Their origins are obscure, but they were probably present in the northern isles before the era of Viking domination that started at around 750AD.

Lost elsewhere through crossing with, or replacement by, improved breeds, they hang on in remote North Ronaldsay, which was, for a while, their only refuge. They are noted for a predilection for feeding on seaweed. They are best fed during the winter months, when heavy seas cast up large

quantities of the deep water kelps on the shore while, at other times, supplies are less abundant and there are only the few “links” areas of scrubby wasteland outside the wall as supplementary feed. Survival as a pure breed since the 19th century has been, paradoxically, dependent on the existence of the stone wall (or sheep dyke) erected specifically to restrict them to the foreshore. The fortunes of the sheep and the dyke have been inextricably linked.

Long-term aims

When the Rare Breeds Survival Trust (RBST) was established in 1973, one of its first actions was to organise long-term protection for this vulnerable and exceptional breed.

Orkney was becoming involved in the North Sea oil industry. Oil contamination of the island's shoreline and pollution of the kelp beds (on which the animals depended for the greater part of their sustenance) could have had disastrous consequences. Plus, there was the ever-present threat of an imported infectious disease decimating this unique flock.

The small, uninhabited island of Linga Holm, nearer the centre of the Orkney group, was purchased by the RBST and a nuclear breeding flock, comprising 114 ewes and seven rams, was transferred there. Smaller groups were dispersed elsewhere on the UK mainland. A primary motivation for setting up the RBST was the belief that the unique gene sets in different domestic animal breeds should be conserved because of potential commercial and academic significance. Already, many unfashionable breeds had become extinct.

On Linga Holm, the sheep fared well. They were in a habitat similar to that from which they had come - with one important difference: no dyke. They still fed preferentially on seaweed but, in addition, had access to the inland pasture throughout the year.

Although left largely to their own devices, expert supervision was provided by an annual working party from the RBST, which carried out essential management practices during a two week period in the summer months. The flock was allowed to increase for several years and then maintained at about 400 animals - well within the carrying capacity of Linga Holm.

Year after year, the working party reported positively on the health and well-being of the flock; some splendid animals were produced and the fertility rate was excellent.

Failing fortunes

The situation on North Ronaldsay was less satisfactory. On a short visit in 1982, David Britt was surprised by the poor general condition of the sheep and the number of carcasses strewn along the foreshore. This led to an investigation into morbidity causes and mortality supported by the Animal Health Trust and the Universities Federation for Animal Welfare.

Around the time of construction of the dyke, the human population of North Ronaldsay was relatively large, but numbers steadily declined during the 20th century. Census records¹ show 436 inhabitants in 1911, but only 121 in 1981, with the downward trend continuing.

From the 19th century, the population of North Ronaldsay sheep was overseen by an elected sheep court. The court's regulations allowed for 2,312 sheep to be kept outside the dyke, with specific allocations to individual crofts based on the grazing each had available for ewes brought inside the wall at lambing time.

Animals were identified by a system of lug marks, and it was the duty of crofters to collect their ewes around lambing time and to tether them on inland pasture until the lambs had been weaned. Then they would be returned together to the foreshore. Ewes frequently produced twins but were thought to have inadequate milk to successfully rear more than one young at a time, so one of the pair was usually sacrificed.

These practices acknowledged the rigours faced by the sheep outside the dyke. For the privilege of keeping sheep on the foreshore, each croft had responsibility for maintaining the integrity of a section of the dyke. This was of importance to the whole community in preserving the inland pastures intended for the island's chief commercial enterprise: the raising of beef cattle and a few sheep of improved breeds.

By the 1960s, the North Ronaldsay sheep population was almost double the total permitted under sheep court regulations. This was confirmed by two counts in 1973² and 1983³, both suggesting totals in excess of 4,000. The wellconceived management programme had broken down, so the sheep (and the dyke) were in jeopardy.

The results of the investigation into morbidity and mortality pointed to two conclusions: one, the sheep were not as well adapted to their unconventional habitat than had been previously thought, and two, the lack of management resulting from the depleted human workforce was largely responsible for the poor general condition and unnecessary deaths in both lambs and adult animals^{3,4}. The main causes of mortality in young animals were inadequate nutrition and heavy parasite burdens.

Older animals had starved, often because of severe dental disease resulting from heavy deposition of tartar on the cheek teeth, which extended to the gum margin. This caused inflammation and erosion of the gums, tooth loss and infection. This condition is almost unknown in other sheep and is clearly diet related⁵. The fondly imagined "adaptation" to feeding on seaweed was clearly less than perfect. Mineralisation of the renal medulla in mature sheep was another postmortem finding, indicative of metabolic problems associated with the seaweed diet.

The dyke had sustained minor damage over the years; some gaps had only been crudely filled with wooden stakes and wire netting. But in the winter of 1992/3, a crisis occurred when violent storms

destroyed a two mile stretch and the islanders had to call for external help to repair the breach.

Unique breed

The North Ronaldsay sheep possess unique characteristics, even if their adaptive capacities have been somewhat overstated. However, the extent of their uniqueness was only just becoming apparent.

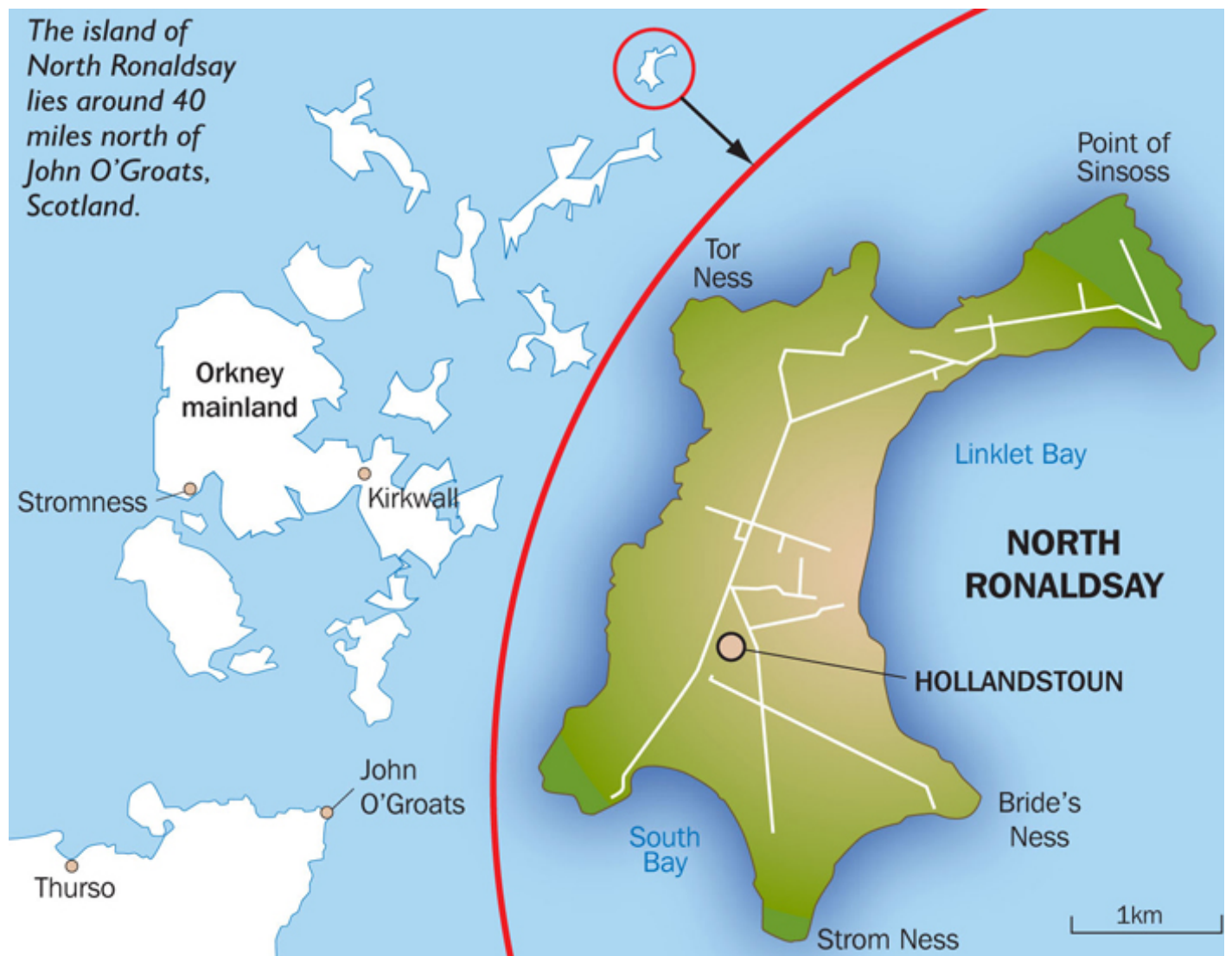
Dispersal of small groups to mainland Britain at the time of establishing the Linga Holm flock drew attention to an unforeseen problem. When feeding on conventional pasture, and even more so if on supplementary concentrate feed, the North Ronaldsay sheep developed copper toxicosis and died. This was attributed to an enhanced capacity to absorb copper, which is present in much lower concentrations in seaweed than in grass. There had been no clinical evidence of this problem with sheep on Linga Holm during 25 years of occupancy, where a diet of both grass and seaweed was satisfactory. Incidentally, a few of the older Linga Holm animals were seen to have mild tartar deposits but, again, the mixed diet prevented the serious pathological consequences of the condition seen on North Ronaldsay.

The Linga Holm project itself came to an abrupt end in 1998/9 when the European Commission introduced minimal standards of flock management that the RBST could not meet on the isolated holm. At that time, there was no doubt that the best examples of the breed were to be found on Linga Holm, not on North Ronaldsay. The RBST's flock was split up and sold, as was Linga Holm itself.

Legislation is a blunt tool at the best of times and, although well intentioned, the new regulations put paid to a system that had maintained a fit, healthy and representative population of this rare breed for a quarter of a century. Just how sustainable the system itself was, depending as it did on a skilled group of ageing volunteers, is another issue.

References and acknowledgements

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The island of North Ronaldsay lies around 40 miles north of John O'Groats, Scotland.



A diet of both grass and seaweed proved satisfactory for North Ronaldsay sheep on Linga Holm.



North Ronaldsay's wall (above), built in the 19th century, was the key to the survival of the island's sheep population. (right).



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