The 'Wild' Sheep of Britain

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Primitive breeds of sheep and goats, such as the Ronaldsay sheep of Orkney, could be in danger of disappearing with the present rapid decline in pastoral farming. The authors, both members of the Department of Forestry and Natural Resources in Edinburgh University, point out that, quite apart from their historical and cultural interest, these breeds have an important part to play in modern livestock breeding, which needs a constant infusion of new genes from unimproved breeds to get the benefits of hybrid vigour. Moreover these primitive breeds are able to use the poor land and live in the harsh environment which no modern hybrid sheep can stand.

Recent work on primitive breeds of sheep and goats in Scotland has drawn attention not only to the necessity for conserving them, but also to the fact that there is no organisation taking a direct scientific interest in them. Primitive livestock strains are the jetsam of the Agricultural Revolution, and they tend to survive in Europe's peripheral regions. The sheep breeds are the best examples, such as the sheep of Ushant, off the Brittany coast, the Ronaldsay sheep of Orkney, the Shetland sheep, the Soay sheep of St Kilda, and the Manx Loaghtan breed. Presumably all have survived because of their isolation in these remote and usually infertile areas.

A 'primitive breed' is a livestock breed which has remained relatively unchanged through the last 200 years of modern animal-breeding techniques. The word 'primitive' is perhaps unfortunate, since it implies qualities which are obsolete or undeveloped. But while they are unimproved in the agricultural sense, primitive breeds may in fact be hardy, prolific, and finely adapted to their difficult environment. A primitive breed is therefore one which retains ancestral characters, many of which have been lost in the highly selective evolution of the present day commercial animal.

In Britain, intensive artificial livestock selection did not begin until the Agricultural Revolution, partly because of religious prejudice against close sib-breeding. Before that there were quite distinctive local strains of horses, cattle, sheep and goats which had evolved largely by natural selection; since the Agricultural Revolution, the standardisation of feeding, shelter, and other management techniques, as a result of economic pressures, has meant that these local variants are no longer needed, even though there are many valid arguments for their retention. But the primitive breeds that we are concerned with are the survivors of much earlier, mediaeval, animal husbandry. They are relics of an extensive pastoralism, which accounts for their unaided survival in remote, unimproved areas. Since such extensive husbandry is declining rapidly, the danger to those breeds still in use becomes more immediate, as

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flocks are not likely to be left to their own devices when there is ready cash available from the slaughter-house.

Although to the untrained eye primitive breeds may appear to be inferior in shape and size, they nevertheless contain a great deal of valuable genetic material which is no longer present in the 'improved' breeds. All the currently popular livestock breeds have been inbred deliberately at one time or another to fix the required characters, and this automatically reduces genetic variability. Continual selection for desirable qualities calls for more and more in breeding and may eventually become self-defeating as the choice of genes is reduced. Breeders are already finding the need to infuse new genetic material from unimproved breeds, and, now that the benefits of hybrid vigour are recognised, dissimilar genetic strains or breeds are essential for the production of the superior first generation hybrids. The Russians have even brought in 'wild' genetic material from the Siberian ibex *Capra ibex sibirica* to cross with the domestic goat *Capra hircus*, and the resulting crosses exhibit marked hybrid vigour.

The desirability of preserving genetic variability in primitive livestock has been recognised at international level. The recommendations of the 1968 UNESCO Biosphere Conference, in Paris, included a section on the preservation of genetic resources and exhorted member states to preserve 'the rich variety' of genes of long-domesticated kinds of plants and animals, because of the present tendencies in agriculture and animal husbandry to concentrate on 'a limited and highly selected array of strains' (*Biological Conservation*, 1969).

The reasons usually put forward for preserving primitive livestock are listed below. They have been discussed more fully by Ryder (1967, 1969).

a. Primitive breeds of livestock are sources of genetic variation which will become increasingly valuable when present trends towards uniformity and inbreeding in farm livestock are recognised to be causing a dangerous loss of potentially valuable genes.
b. Primitive breeds are necessary for scientific investigations into livestock evolution, physiology and archaeology.
c. Primitive strains should be kept as living historical examples of the livestock of our ancestors—perhaps a sentimental concept, but not thereby invalidated.

Two further reasons are:

d. Primitive breeds of pastoral livestock possess abilities, probably now absent in modern stock, to utilise poor vegetation in harsh environmental conditions. This means that, in an age of exploding human population and malnutrition, land at present described as 'uneconomic' or 'marginal' can be productive.
e. Primitive breeds of sheep and goat, and, possibly, local variants of native pony, such as those of Exmoor, may prove to be useful in diversifying the ungulate fauna of upland Britain, particularly as they are self-replenishing, easily controlled, and lay little extra burden on the upland management. Monoculture of both trees and animals is increasingly recognised to be ecologically unsound.

The Feral Goat

The 'wild' (or feral) goat, which exists in a surprisingly large number of localities in Scotland, with smaller numbers in Wales, Ulster and England, has received little attention from either scientists or amateur naturalists. The scanty literature on wild goats is frequently ill-informed; one recent newspaper article suggested that the feral goat herd on Ben Lomond was composed of sheep/goat hybrids. Modern goat-breeding, based on imported European and Middle Eastern breeds, is a 20th-century phenomenon, and it can be safely assumed that feral goat herds established before 1900 are of a primitive breed. It is quite certain that in Britain primitive goat forms are no longer found in domestic conditions, and it is equally certain that most of the sixty or so feral goat populations in Scotland were established before the turn of the century, or have been established since from primitive stock. Unfortunately, there has been some 'contamination' of a few herds, often the result of an owner bringing in a new domestic billy to counteract the supposed ill-effects of in-breeding. In our opinion, feral goat stocks should be kept genetically isolated wherever possible, and the total of approximately 4000 in Scotland today should not be allowed to diminish appreciably. If the owner is intent on an infusion of new 'blood', advice on the most suitable sources of primitive stock can only be given if the overall position is known. It is hoped to publish distributional data, with an assessment of population 'purity' (Greig, in preparation).

Like the primitive sheep, British feral goats also have marked regional characteristics; there is certainly a morphological difference between the herds of the southern uplands of Scotland and those of the Inner Hebrides. In addition, minor instances of artificial selection can still be found in some feral populations; for example, the goats of Holy Island (Arran), and Cara (off Kintyre) are largely white, and those of the College Valley in Northumberland are selected for the grey-blue coloration often found in Border herds. Despite their long history in Britain, the goats have not yet adapted to the daylight of northern latitudes. As light in some way affects the onset of the breeding season, the goats rut earlier in the north than in the south, and in some areas the kids are born in early January (Greig, 1969). Their ability to survive and multiply gives some indication of their hardy qualities.

Soay Sheep

The Soay sheep has survived because of the St. Kilda archipelago's isolation; it was virtually untouched by the sheep 'improvements' of the late 18th and early 19th centuries. Thanks to the efforts of the late Marquess of Bute, owner of the islands between 1931 and 1957, the value of the Soay sheep breed was appreciated when, in 1930, Hirta, the only settled island of the St. Kilda group, was evacuated, and the breed has been preserved as a genetic isolate ever since. It is now under the joint protection of the Nature Conservancy and the National Trust for Scotland.

The Boreray Blackface Sheep

A strain of the familiar blackface breed, which has evolved to suit the demanding environment of Lewis and other districts on the western sea-board, may be the next to lose its identity. The improvement schemes, which involve the use of mainland blackface rams, regard the animal's ability to use the poorest ground as less important than its productivity when compared with another strain, even though that strain restricts itself to the more fertile parts of the hills; and there has been considerable land reclamation on Lewis in recent years. One obvious character distinguishing the Lewis blackface from more improved strains is the 'dished' face; most modern breeds have a convex facial profile. A feral flock of blackface sheep isolated on Boreray, an almost inaccessible island in the St Kilda group, may represent the largest surviving unit of the Lewis strain. The last flock of relatively pure domesticated Lewis sheep is maintained for study by the Hill Farming Research Organisation, who find it very difficult to get typical Lewis blackface rams.

Manx Loaghtan Sheep

The Manx sheep survive only in small numbers; some are preserved as a living historical exhibit by the Manx Museum, Isle of Man, and those formerly kept at Whipsnade are now held by the Royal Agricultural Society of England (Ryder, 1970). The Manx is similar to the Soay breed but is four-horned and of uniform dark colour—the Soay sheep can be light brown or dark brown. Although the breed is secure it is living under artificial conditions, and, since natural selection is not allowed free rein, this may result in a loss of some primitive characters such as fitness for its original habitat.

Orkney Sheep of Ronaldsay

A primitive breed which has no organised protection at present is the Orkney sheep of North Ronaldsay. Over a thousand of these animals subsist almost entirely on seaweed because a wall encircling the island just above the shore-line prevents them getting at the grass. Dr. Michael Ryder of the Animal Breeding Research Organisation at Roslin, Midlothian, has pointed out that, with the declining human population on the island, breaches in the wall are not repaired immediately, resulting in some crop damage by the sheep, and this might eventually negate their commercial value. A further danger is that they will gradually become 'contaminated' by breeding with modern sheep kept *within* the perimeter wall. The only step needed to make them truly feral is the minor one of giving up the managerial restraints of rounding up and clipping. We do not know of any other ungulate which subsists and reproduces on an exclusive diet of seaweed.

A black or dark brown sheep, known as the Keerie sheep, is now extinct but existed in Caithness until fifty or sixty years ago. It was apparently related to the Orkney sheep of Ronaldsay (Ryder, 1968), and its disappearance this century underlines the immediacy of the danger to other primitive strains, particularly when the genetic isolation afforded

by an island refuge is not available. The term 'keerie' probably refers to its colour—'keir' was a word widely used in Scots and Manx until recently, especially in connection with livestock, to describe a brown or dark brown hue. White sheep were not always widespread in Britain.

Shetland, Jacob, and St Kilda Sheep

These three breeds are all relatively secure at present but there is still the underlying threat of 'improvement'. The Shetland sheep is still commercially important, is protected by a breed society, and exists in considerable numbers, but continued selection is standardising the colour to white and, consequently, overall genetic variability is continually diminishing. The dark brown or black, multi-horned St Kilda sheep (not to be confused with the Soay sheep), which has not been proved to have any connection with St Kilda, is kept for its curiosity value under completely artificial conditions in parks throughout Britain, but it may conceivably possess genes which are of use to man. The piebald Jacob sheep, also kept in parks for ornamental purposes and also possessing the character for the multi-horned condition, is of slightly more commercial value at present, to the extent that moves have been made (1969) to set up a Jacob Sheep Society with support from the British Wool Marketing Board. Progress in wool selection is perhaps necessary for satisfactory marketing of the 'speciality wool' of the Jacob sheep. But if the Society succeeds with two of its three main objects, namely the improvement of the wool and the drawing-up of a breed standard for show exhibitors, there will inevitably be a loss of genetic material and the Jacob sheep will no longer be a primitive breed. Improving the wool must involve either the culling of unsatisfactory animals or the introduction of foreign genes for wool quality. It would be interesting to maintain some stock of unimproved Jacob sheep in parallel with the 'improved' stock, in order not only to maintain the widest range of genetic variability possible, but also, by using the control stock, to trace changes in the breed brought about by artificial selection.

Of the breeds, strains, and species mentioned, only the feral goat and the Soay, Boreray, and Ronaldsay sheep are still living a feral or semi-feral life, while the Manx Loaghtan, Shetland, Jacob, and St. Kilda sheep are already preserved in one way or another. If conservationists had the choice, which system of preservation would be preferred? In our view, the ideal place for each primitive breed is in the environment which exploits its unique and useful qualities, where natural selection continues to operate, and the general fitness of the breed is maintained. The unnaturally good conditions of the lowland farm or zoo give weak individuals the opportunity to survive and breed, and the character of the strain is changed.

For more modern breeds, living in artificial conditions, the gene bank may be the answer. In 1960 the Zoological Society of London established a gene bank at Whipsnade for cattle, sheep and poultry, which was disbanded in 1967 and 1968 for lack of money. This emphasises the value of island reserves for the hardy feral breeds, where management is reduced to a minimum, risks of cross-breeding are slight, and the

animals can survive in larger numbers than any zoological park could afford. In a population left to fend for itself, random mating and natural selection for the fittest genotypes are assured. Since these primitive breeds are adapted to their various habitats, it would be a backward step to throw them together and allow indiscriminate cross-breeding—which is one method suggested for preserving genetic material. Segregation in remote areas also reduces the risk of epidemic diseases such as foot and mouth, which can be a very real threat, as was shown in the foot and mouth epidemic in England a few years ago when concern was expressed for the safety of the Chillingham wild cattle.

In Britain very few, if any, naturally 'wild' places have survived, and these primitive livestock types are part of the fauna which has shaped, and has been shaped by, our environment; their ancestors were part of our fauna before the fallow deer and rabbit were imported. The re-introduced capercaillie, the spruce and larch are less entitled to British nationality, and even the red deer with its infusions of foreign genes in the past, and the promise of artificial husbanding in the future, may have no more right to be called a British wild animal than the feral goats or sheep.

There is a pressing need for an organisation, such as the Fauna Preservation Society, to interest itself in primitive breed conservation. This might perhaps mean the creation of 'genetic reserves', the recognition of unique and endangered genetic stocks of sheep and goats, and the assumption of a 'watchdog' role, not necessarily by creating habitat reserves, but by entering into advisory agreements with landowners and farmers to achieve the most suitable management methods. There is always the danger of local uncoordinated conservation efforts failing through lack of finance or continuity; national responsibility should perhaps be the ultimate aim to safeguard these valuable genetic resources from the vagaries of economics and the whims of individuals. We need model management plans for herds, and a watch on possible sources of genetic contamination and artificial selection. Museums should also be persuaded and assisted to make study collections.

The immediate task is the purchase of a representative stock of the Ronaldsay sheep which could then be preserved, preferably on a west coast island, either by buying such an island, or by a reserve agreement with an island owner.

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BRITAIN'S 'WILD' SHEEP: top, Lewis blackface and Soay; bottom, Jacob and Orkney. In the centre a modern Cheviot for comparison. *Drawing by Baxter Cooper.*

Plate 8

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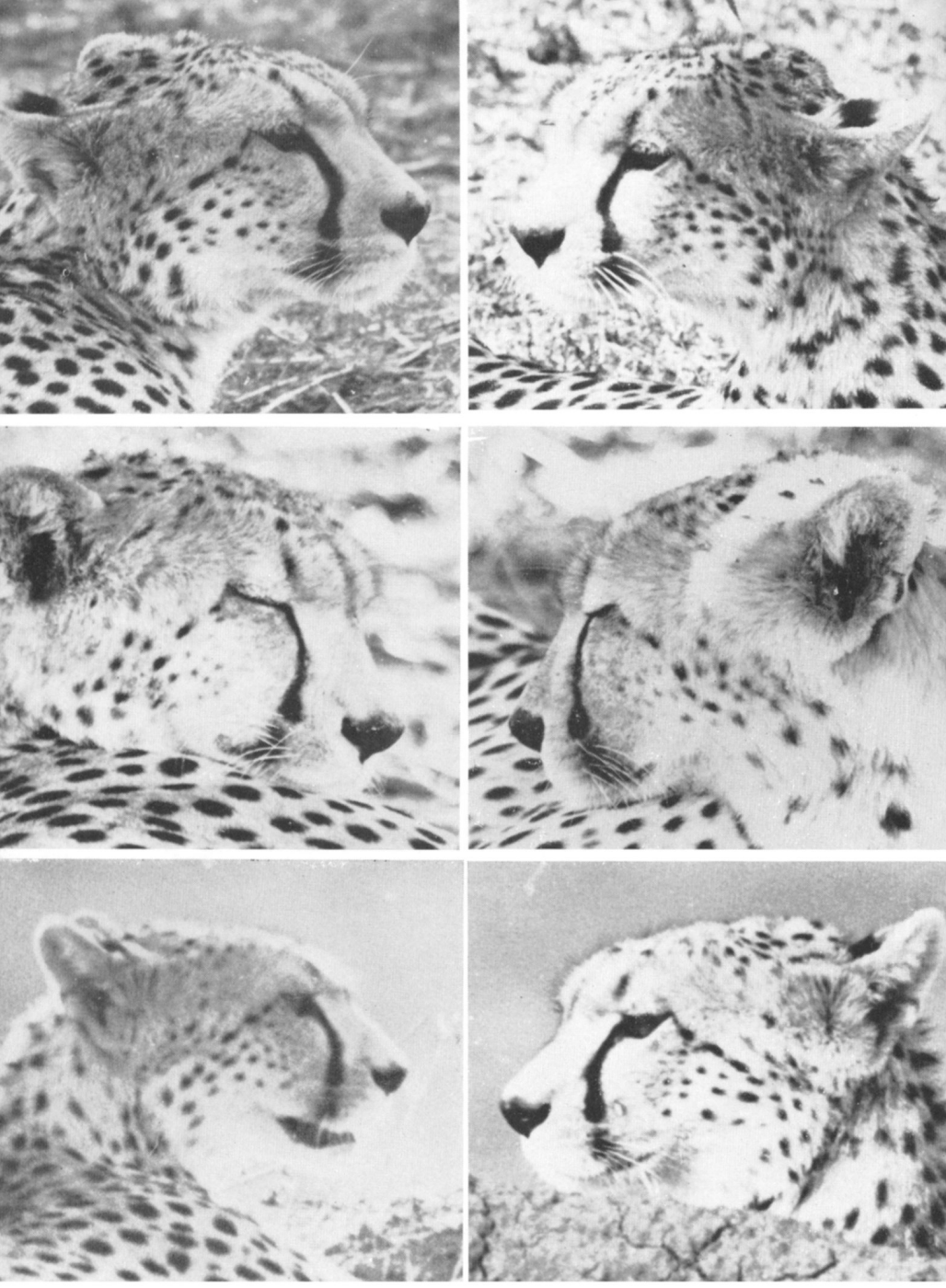

PROFILES OF THREE CHEETAHS. Scientists studying large predators at the Serengeti Research Institute, Tanzania, use these profile photographs to identify individual cheetahs by the difference in the cheek spots. Each pair of photographs shows the right and left sides of the face of one cheetah, revealing the difference in the spots both between individuals and between the two sides of one animal's face. This makes identification, which is necessary for population studies, quite easy. Similar photographs are being collected for leopards and lions. *B. C. R. Bertram*

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Plate 9

GOLDEN JACKAL CUBS answer their parents' calls in the Ngorongoro Crater, Tanzania, one of many outstanding photographs by Hugo and Jane van Lawick-Goodall in their book *Innocent Killers*, reviewed on page 395. Plate 10

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ORANG UTAN IN SEPILOK
G. S. de Silva

Plate 11

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