The Evolution of Scottish Breeds of Sheep

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In marked contrast to England, Scotland has produced few modern breeds of sheep: in fact there still survives within the country a type which is probably the most primitive domestic sheep of Europe—the Soay. A slowness in the improvement of stock in the past, which was partly the result of the small size of flocks, coupled with poor communications, has allowed this apparently prehistoric sheep to survive for modern scientific study.

One must emphasise, however, that although the Soay sheep now runs wild on St Kilda, it represents an early type of domestic stock, and is not a truly wild sheep. The wild ancestors of domestic sheep died out early in north-west Europe, probably as a result of the spread of forest in post-glacial times, and although it is possible that survivors of the wild Mouflon contributed to domestic sheep in southern Europe, the main domestic stock reached Europe from the Near East, and the first domestic sheep of the British Isles arrived with Neolithic settlers who crossed the surrounding seas about 3000 B.C.

Ryder (1964a) reviewed evidence concerning the main types of sheep to reach Britain, and came to the following broad conclusions. During the whole of the prehistoric period the main, although not necessarily homogeneous, stock was probably small, horned, and brown, and the Soay sheep (Plate IVa) can perhaps be regarded as a survivor of this type.

The next main introduction is thought to have been made by the Romans, and their sheep were probably white, and horned only in the rams. This type on its own probably gave rise eventually on the one hand to the shortwool that grew the fine wool of medieval England, and on the other hand to the longwool that superseded it. The indigenous brown sheep of Britain probably persisted mainly in the west and north, and crosses between these and Roman (or later) sheep may have produced types that remain today as white- or tan-faced horned breeds, such as the Welsh Mountain and Cheviot (Plate IVd), Cheviot rams being horned in the past.

The modern Shetland breed (Plate IVc) can be regarded as intermediate between the earliest (Soay) type, and the modern Cheviot; it is probably a survivor of the Dunface or Old Scottish Shortwool that was the main, if not the only, type in Scotland until the eighteenth century. The third main British stock is the horned and hairy black-faced type (Plate IVf), and when this arrived in Britain is not known. It apparently did not reach Scotland from England, at any rate in numbers, until as late as the eighteenth century.

The history of sheep will be followed below in chronological sequence using different sources of evidence in successively later periods. The earliest archaeological evidence comes solely from skeletal remains, sculptural representations being few in Britain. Although wool textile remains from England go back to the Bronze Age, the earliest in Scotland are from the Roman period; these do, however, provide valuable evidence on fleece type right up to the eighteenth century. From the Middle Ages onwards wool fibre remains in parchments provide useful additional evidence. Historical sources begin about this time, but there are even fewer written records of sheep type than there are in England.

Evidence from Bones—from Prehistoric Times to the Middle Ages

The main source of evidence of livestock in prehistory is from excavated skeletal remains, and it should be mentioned that only from the skull is it readily possible to distinguish sheep from goats. It is thus the practice in archaeological reports, particularly if goat as well as sheep skulls are found, to regard the remaining bones of the skeleton as 'sheep/goat'. One can of course state the conclusions that could be drawn from the bones if they were in fact from sheep, and in dealing with remains from English Medieval sites (*e.g.* Ryder 1961) there is probably some justification in regarding all the remains as likely to be from sheep, particularly when no goat skulls are represented. As the goat is likely to have been more common in Scotland (Megaw 1964) this assumption should perhaps not be made on Scottish sites. Indeed, the goat was represented among remains from the seventh- or eighth-century monastic site of Abercorn, in the Lowlands (Ryder 1968a).

Early workers likened particular bone remains to those of different modern breeds on a general impression only, or at the best on a few measurements. Today it is realised that any such attempt must be made on many detailed measurements and their ratios, together with statistical treatment. Such an approach has already made it possible to distinguish bones of sheep from those of goats (Hildebrand 1955; Boessneck, Müller and Teichert 1964); but it is going to be an enormous task to distinguish differences in size due to breed from within-breed variation due to sex, nutritional status or genetic variation.

Single sites frequently yield no more than a few complete bones. A bone that is often well preserved and used in implements is the metapodial (cannon bone) and this can also be measured in life. This paper therefore concentrates on measurements of metapodials, and some new measurements (Table I) have been made for it.

This may be a convenient point to mention ideas concerning different types of prehistoric sheep and their ancestry, discussed by Ryder (1964a), which despite doubt and much discussion have tended to become established in the archaeological literature.

Archaeological remains of domestic sheep were first found in the Neolithic lake-dwellings of Switzerland, and were described by Rütimeyer in 1861. These were small

(a)

(b)

(c)

(d)

(e)

(f)

PLATE IV

Primitive and modern breeds of Scottish sheep: (a) Soay ewe and lambs on St Kilda; (b) Orkney ewe tethered on North Ronaldsay; (c) Black Shetland ram; (d) Cheviot sheep; (e) Border Leicester sheep and lambs; (f) Blackface ewe and lambs

((d) and (e) are International Wool Secretariat photographs, the remainder are by the author)

sheep with goat-like horns, which suggested that the breed had been derived from the Urial, thought to have been the main ancestor of domestic sheep in south-west Asia. This Urial-horned sheep was named *Ovis aries palustris* or the Turbary sheep, and rightly or wrongly since then there has been a tendency to describe any small sheep bones from European Neolithic sites as Turbary sheep bones. It has often been repeated (*e.g.* Piggott 1954) that the Dutch Heath sheep, because of its short tail, represents the Turbary today; but this is unlikely because it has a highly evolved hairy coat and a black face, suggesting an affinity with the Scottish Blackface.

In 1882 the Swiss lake-dwellings yielded some larger sheep remains with stouter horns, and these led to the belief that this sheep had affinities with the Mouflon (European) type of wild sheep. It was given the name *Ovis aries studeri*, after the discoverer, and was thought to belong to a later period, the Copper Age, at the beginning of the Bronze Age. Even though these sheep might be shown to be distinctive types, modern biology would regard them as breeds or varieties and not give them sub-specific names. It seems that all types of wild and domestic sheep will interbreed, and therefore on one view should be regarded as belonging to a single species.

Although the Turbary (*palustris*) and the Copper Age sheep (*studeri*) are still quoted as distinct types (*e.g.* Zeuner 1963) there is no conclusive evidence that they are. Some workers consider that both types belong to the same period, and that *studeri* is the ram, and *palustris* the ewe, of a single 'breed'. In all horned breeds the rams have larger horns than the ewes, and the stout horns of the Soay ram lead one to suggest that *studeri* sheep are merely rams of Soay type. Others regard them as a mixed Urial-Mouflon race, and the finding of hornless skulls among the remains with large horns suggests Mouflon influence, as Mouflon ewes often lack horns. Ewart (1913), for instance, considered that although Mouflon-type horns are still found in the Soay, this and other primitive breeds such as the Shetland sometimes have Urial-like horns, suggesting 'simple Turbary blood'. In the present author's experience, however, such horns occur only in the ewes of the Soay: these might therefore provide the identity of *palustris* sheep.

Clark (1947) considered that, owing to forest coverage, sheep played a minor role in the Neolithic husbandry of north-west Europe. As long as woodland prevailed pigs and cattle predominated, but as the amount of forest became reduced during the Bronze Age as a result of agriculture, so the sheep (or goat) became more important, and sometimes predominant. (Zeuner [1963] has since pointed out that the goat could have preceded the sheep before the woodland was cleared.) The limiting effect of woodland on sheep distribution in Scotland is likely to have been prolonged because considerable forest coverage probably persisted until as late as the seventeenth century (Ritchie 1920). Although the sheep in the wild state is a mountain animal, it prefers more open country to the rugged and wooded ground frequented by the goat. It fitted well into a settled farming pattern as it could graze stubble, and its droppings manured the soil.

Clark regarded this ecological interpretation of livestock changes as being supported by the increased numbers of sheep and the smaller proportion of pigs in Neolithic sites

in open areas such as Orkney. Pigs were absent from two Neolithic sites on Rousay that had sheep and goats (Platt 1934b; Childe and Grant 1939).

Watson (1931:202–4) found the Neolithic site of Skara Brae to be peculiar compared with English Neolithic sites in having abundant sheep bones and a rarity of pig bones. He thought the difficulty of keeping cattle on Orkney was emphasised by the high proportion of remains from animals killed before the first winter. There was no evidence for this with sheep, and Watson concluded that the natural forage for them was adequate throughout the year. It is possible that seaweed was already being eaten by sheep there, as it still is on North Ronaldsay. Higgs and White (1963) investigated the accuracy of determining the age of specimens from teeth, and re-examined the data from Skara Brae. They concluded that there is no evidence for the abnormal killing of young livestock in autumn at Skara Brae, or at any British prehistoric site. They merely claim, however, to have demonstrated the lack of seasonal killing: it is possible that tooth eruption was too variable to show it.

Skara Brae is unique in a number of respects, one being the relatively late date for Neolithic culture, and this must be borne in mind when interpreting the findings. Despite the large number of sheep, there was no evidence of textile manufacture, and the presence of awls suggests the sewing of skins for clothing. Watson noted that the limb bones of the sheep were long and slender 'like those of the Neolithic sheep or the sheep of Soya [sic]', although no measurements were given. The one complete metatarsal from Skara Brae I have been able to measure (Table I) was the longest in the table, but judging from the length/minimum-width ratios those from Iron Age sites on South Uist were more slender. Watson illustrates two incomplete skulls with large horn cores like those of Soay rams, and these have a tendency to project sideways (rather than backwards) as in the modern Soay. Protagonists of the 'two-type' theory would no doubt identify the Skara Brae sheep as *studeri*, but the available evidence suggests merely a ram of perhaps Soay type.

If *palustris* did in fact exist, its apparent absence from Scottish sites could be explained by Zeuner's suggestion (1963:193) that, whereas *palustris* spread across Europe via the Swiss lake-dwellings from the Danubian culture in the south-east, *studeri* reached western and northern Europe from the Mediterranean region, possibly with the Megalith-builders. Daniel (1962:39) regarded these Neolithic settlers as one of the main ethnic groups in Scotland. According to Atkinson (1962:21) the main impact took place in south-west Scotland before 2000 B.C., but there was a second possible route of Neolithic colonisation originating in Yorkshire and continuing up the east coast as far as Buchan, and a third introduction into the north-east, from Northern Ireland, possibly by way of the Great Glen. These suggested separate routes of entry, no doubt of different Neolithic peoples, mean that a variety of sheep could have been introduced, and it will be seen below that textile remains reveal differences in fleece type.

About 2000 B.C. Bronze Age Beaker-Folk began to arrive in Scotland from between the Elbe and the Rhine (Piggott 1962:82), and these could have brought yet another type

TABLE I

Measurements (in millimetres) of bone objects made from sheep metapodials
(in National Museum of Antiquities of Scotland)

		Length	*Proximal width*	*Minimum width at mid-point*	*Distal width*	*Length/ minimum width ratio*
NEOLITHIC						
Skara Brae (Childe 1931)						
L. 1933–2080	MT	140	19	12	22	11·67
L. 1933–202	MT	—	20	—	—	—
L. 1933–200	MP	—	—	—	22	—
L. 1933–203	MP	—	—	—	22	—
L. 1933–2075	MP(?MC)	—	—	—	24	—
Jarlshof (Hamilton 1956)						
HSA 3003	MP	—	—	—	21	—
HSA 3004	MP	—	—	10	21	—
LATE BRONZE AGE						
Jarlshof (Hamilton 1956)						
HSA 3061	MT	—	20	—	—	—
HSA 3058	MP	—	—	11	22	—
HSA 3053	MP(?MC)	—	—	—	25	—
IRON AGE						
Howmae, Orkney (Traill 1889)						
GO 49	MT	124	18	11	21	11·27
GO 50	MT	125	18	11	21	11·36
GO 51	MT	125	18	11	21	11·36
GO 48	MT	126	18	11	21	11·45
— —	MP	—	—	—	21	—
GO 52, 53 & 54	MC	115	20	12	22	9·58
GO 35	MP	—	—	—	22	—
GO 47	MC	126	21	13	24	9·69
GO 37, 40 & 177	MP	—	—	—	23	—
GO 178	MP	—	—	—	24	—
Elsay Broch, Caithness						
GA 804	MC	123	23	15	24	8·20
Burrian Broch, North Ronaldsay						
GB 215	MC	—	20	—	—	—
GB 253	MP	—	—	—	22	—
Midhowe, Orkney (Callander and Grant 1934)						
GAM 12	MP	—	—	—	20	—
GAM 18	MP	—	—	—	24	—
Ayre Broch, Orkney						
L. 1948–18	MP	—	—	—	21	—

TABLE I (*contd.*)

		Length	*Proximal width*	*Minimum width at mid-point*	*Distal width*	*Length/ minimum width ratio*
North Uist Earth House						
GNB 70	MC	*c.* 110	21	13	—	—
GNB 71	MC	*c.* 110	21	12	—	—
South Uist						
Clarke (mean)	MC	116	20	8	22·5	14·5
Borness Cave, Borgue, Kirkcudbright (Corrie 1878)						
HN 54	MC	115	17	12	22	9·58
ROMAN (not in Museum of Antiquities)						
Hadrian's Wall (Chaplin 1965)						
	MC	115	20	11·0	21·5	10·45
	MC	—	—	—	22	—
	MC	—	—	—	23·5	—
	MC	*c.* 120	20·5	13·3	24·5	9·02
	MT	*c.* 100	—	—	18·5	—
	MT	—	—	—	19	—
	MT	127	17·5	11·2	—	—
EARLY CHRISTIAN						
Jarlshof						
(a shuttle)	MC	118	20	13	22	9·08
B 178	MP	—	—	—	23	—
NORSE						
Jarlshof						
HSA 211	MT	—	20	—	—	—

MC = metacarpal MT = metatarsal MP = unidentified metapodial

of sheep. The Bronze Age is characterised by a nomadic pastoralism over the hills of northern Britain—which may have led to the beginning of transhumance to summer shielings. Although habitation sites are rare, it seems that this pastoral economy was based on sheep, and that the spinning and weaving of wool became well developed during the Bronze Age. Trow-Smith (1957:17) has suggested that the sheep of the Bronze Age provided the soil fertility on which the arable agriculture of the Iron Age was based.

The most complete Bronze Age site in Scotland is Jarlshof, in Shetland, a location which may have made it atypical. Two spindle-whorls provide the only evidence of textile manufacture there. Platt (1933 and 1934) found that the most numerous remains

were sheep bones, and that most of the jaws were from immature animals (*cf.* however, Higgs and White 1963). In 1933 she found bones 'of the typical slender Shetland sheep liberally represented at all levels'. There was also a larger sheep, with large horns, but this was not as large as that at Skara Brae. All the measurements that Platt was able to make compared well with the measurements of a modern Soay skeleton in the Royal Scottish Museum, with a tendency for the measurement to be longer and more slender than the Soay. The angle of attachment of the large horn cores was comparable with that in the Soay. A hornless skull found at a higher level has become established in the literature, but does not appear from the excavation report to be from a prehistoric level. In 1934 Platt regarded all the remains as representing the Soay type, and considered that the smaller bones were from immature animals. As no indication was given that growth of these bones was incomplete, they could have been from ewes, and the larger ones from rams. Neither of these possibilities gives support for Platt's interpretation (1956) that there were two types of sheep at Jarlshof.

Ryder (1968b) described some Bronze Age remains from Wetton Mill, Staffordshire, and at first sight these appeared to be similar in length to the larger ones from Jarlshof. Some were certainly longer than present-day Soay bones from St Kilda, and longer, but more slender, than those of the modern Blackface and Cheviot. More detailed investigation involving the plotting of length/minimum-width ratios of metapodials on a graph (Fig. 1) showed that the Wetton Mill bones were closer to the St Kilda Soay than to the Jarlshof remains. Surprisingly the Soay bones at the Royal Scottish Museum used by both Platt and Clarke (see below) are similar to the Jarlshof remains, but quite distinct from bones collected on St Kilda in recent years. The explanation for this discrepancy is not immediately obvious. Possibly the Soay bones at the Royal Scottish Museum were mainland sheep, or the Soays on St Kilda may have decreased in size in the last 50 to 100 years. Although not evident in Clarke's few measurements, the Mouflon is a relatively long-legged animal, and long limb bones may be a primitive feature. The one Mouflon measurement given by Ewart (1914) is greater than the same measurement in any of the domestic sheep examined (Table II).

A four-horned sheep was found in the Iron Age level at Jarlshof. This character is a mutant rather than a distinct type of sheep, and it keeps appearing right up to modern times. It has occurred in sheep in the Northern and Western Isles, Isle of Man, and as far south as Cornwall, suggesting an affinity between the sheep of these different parts. It was found at the Roman fort of Newstead, and Bishop Leslie noted multi-horned sheep in the Tweed valley in 1578. The recent occurrence in the Hebrides has led to the name 'St Kilda sheep' for this four-horned variety, but there appear to be no recent records of multiple-horned sheep from St Kilda (Boyd *et al.* 1964) and it does not appear to be a characteristic of the Soays on St Kilda today.

A group of Iron Age sites on South Uist in the Outer Hebrides has yielded an important group of sheep bones from which useful measurements have been made. Unfortunately the excavation report of only one site has been published (À Cheardach Mhor,

RELATIONSHIP OF LENGTH TO MINIMUM WIDTH IN SHEEP METAPODIALS (MM)

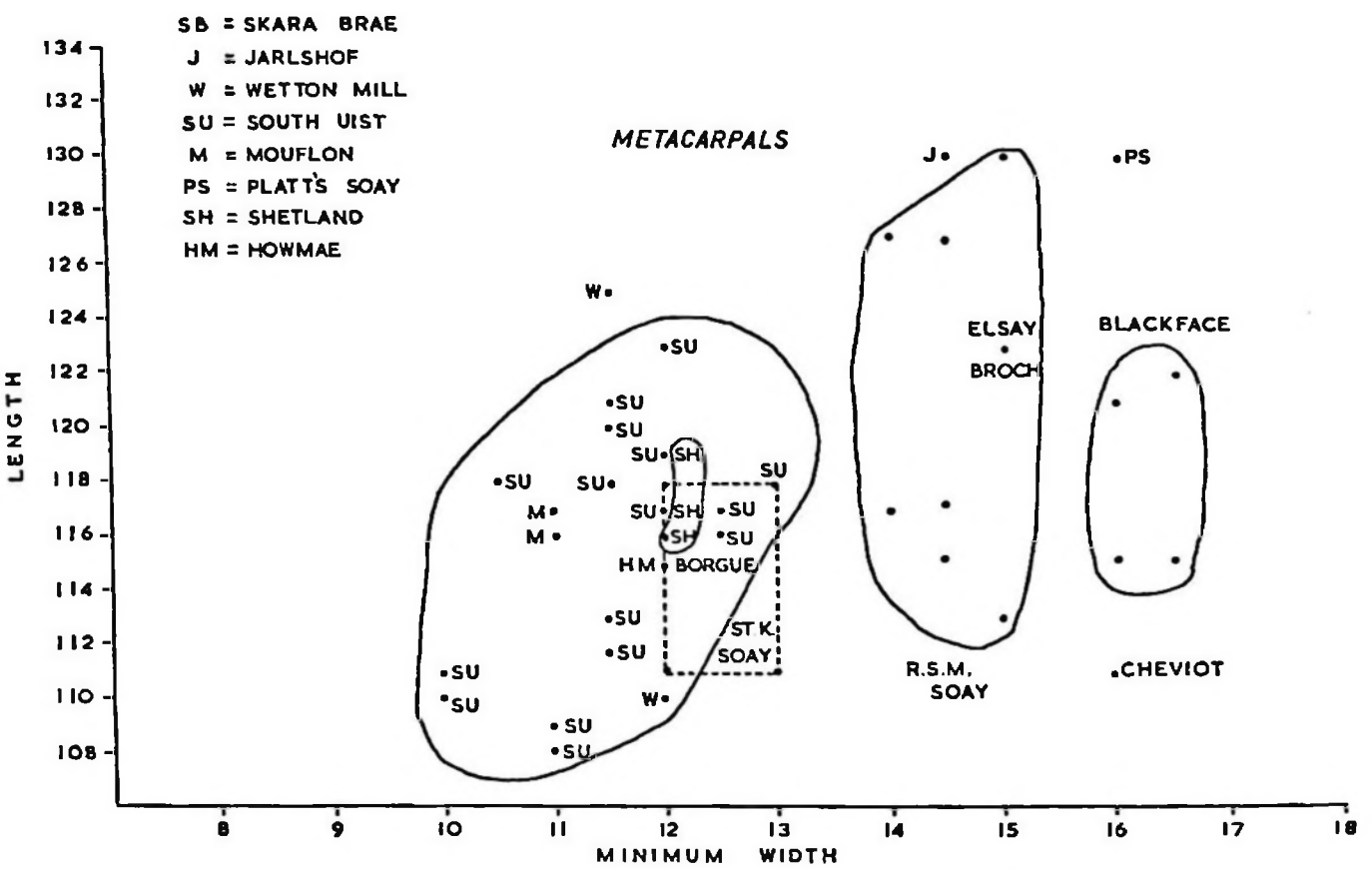

FIG. Ia

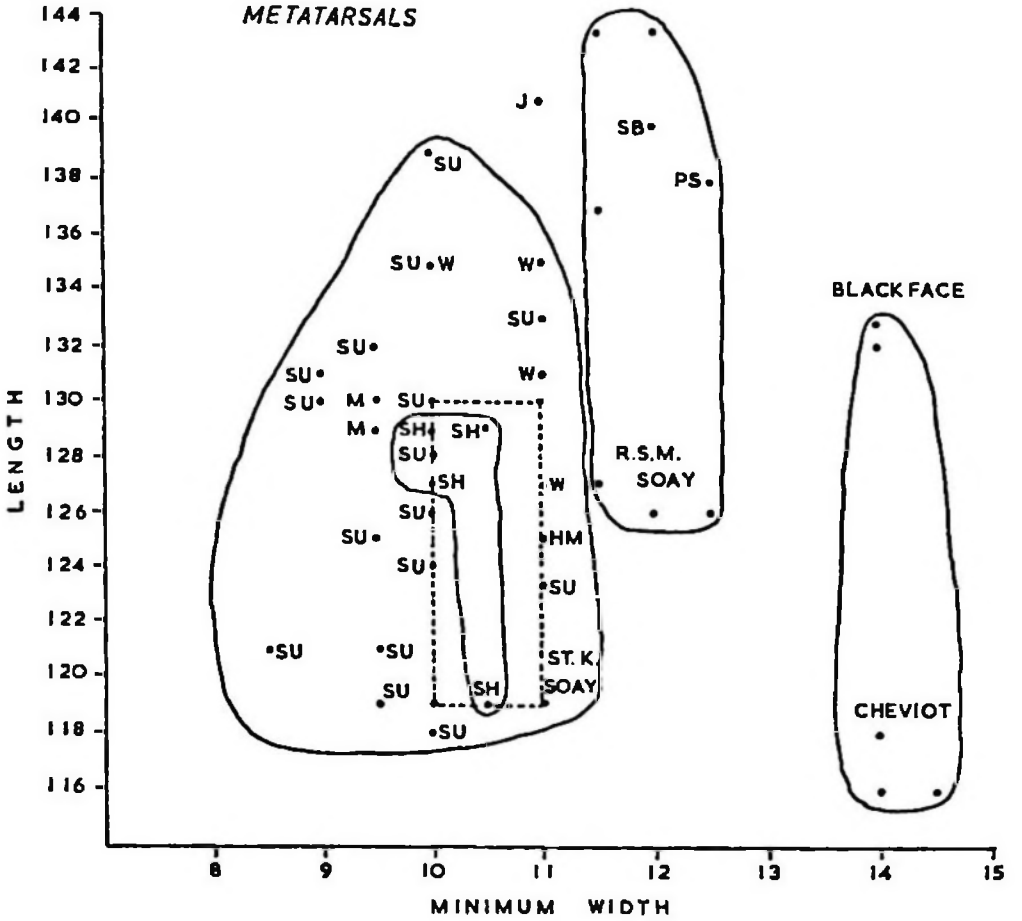

FIG. Ib

Drimore), and in this Clarke (1962) likened the sheep to the 'Old Highland breed now remaining in Shetland', and found them to be smaller than the Soays in the Royal Scottish Museum. He has kindly allowed me to use his figures (Table II) and graph (Fig. 1) which include bones from the remaining, unpublished sites. I have added other measurements to the graph, and from these L/M ratios it can be seen that the Mouflon, St Kilda

TABLE II

Metapodial measurements (in millimetres) from Iron Age sites on South Uist, and comparisons
(Clarke, unpublished)

South Uist	*Length*	*Proximal width*	*Minimum width*	*Distal width*	*Length/ minimum width*
Metacarpals (19)	108–123 mean 116	19–22 mean 20	7·5–9 mean 8	21–25 mean 22·5	14·50
Mouflon	116·5 (121)	19·5 (21)	(14)	22 (24)	(8·64)
Soay	124	23·5		24·5	
Shetland	117	22		24	
Blackface	115	27		29	
Mouflon (Ewart 1914)	114	—	16	—	9·0
South Uist					
Metatarsals (22)	118–139 mean 127	16·5–21 mean 18·5	8·5–11 mean 9·5	19–22 mean 21	13·37
Mouflon	129·5 (130)	17·5 (20)	(12)	21 (23)	(10·83)
Soay	135	20		23	
Shetland	125	20		23	
Blackface	116·5	23		27	

(Measurements in brackets are of an old female Mouflon; the left and right bones were identical in size.)

Soay, Wetton Mill, South Uist, and Shetland sheep form one group, that Skara Brae, Jarlshof and Elsey Broch, Caithness, form another, and the modern Cheviot and Blackface form a third. The vertical dispersion of measurements within a group indicates a variation in length which is probably partially a sex difference. The bones from the modern breeds are noticeably broader than, but no different in length from, those of ancient sheep and primitive breeds still in existence.

A change that has possibly taken place is first a reduction in length from that of the Mouflon, and then an increase in width towards that of modern breeds, but there is little to support this in the table. The main conclusions from Fig. 1 are that prehistoric sheep were similar in size to the modern Soay and Shetland, and that there may have been a longer-legged (more primitive) type in Caithness, Orkney and Shetland.

The extent to which the Romans influenced the agriculture of Scotland has not yet been fully determined. It is worth bearing in mind, however, that they had a camp as

far north as Auchterless, about 20 miles from the Moray Firth. There seems to be no conclusive evidence for the reasonable assumption of Ryder (1964a) that the Romans brought improved sheep to Britain. Indeed, Wild (1966) used evidence from the Roman writer Strabo to suggest that the Belgae may have introduced a sheep with an improved fleece into Britain before the arrival of the Romans.

A carving of a sheep associated with the Antonine Wall, and now in the National Museum of Antiquities of Scotland, shows a horned animal with what Ryder (1964a) described as 'rough' wool. This tells us little, and it could in any case be a completely exotic and traditional Roman representation. With Pictish native art, for instance, Thomas (1961) has shown that the basic animal designs passed into Celtic tradition from European sources about 200 B.C. A tile in the same museum from Camelon near the Wall has two imprints of a hoof made while the clay was still soft. These were identified as sheep by Anderson (1900). The leading, and deeper, imprint is 46 mm wide, and the other 40 mm wide. These measurements seemed to be too big for the hoof of a Romano-British sheep, but they in fact correspond to the proximal part. A cast of the hoof enabled the distal width of the prints to be measured and these were comparable with the width of the hooves of a modern Soay ram (Ryder 1968d).

The Romans had a well-developed wool manufacturing industry in England, and a small votive wool bale of Roman origin, found in a broch in Skye, was regarded by Clark (1947) as indicating trade with Scotland.

Bryce (1906) compared the sheep remains from the Roman forts on Bar Hill, Dunbartonshire, with the Soay, although there were a few bones which he regarded as comparable with those of modern sheep. The large number of sheep remains here, and at Corbridge, was attributed by Applebaum (1958) to Syrian army units with a liking for mutton. The fewer sheep remains from Newstead were compared by Ewart (1911) with the *studeri* type, and the Soay, and named the 'Celtic' sheep. Some four-horned skulls were also found there.

When measurements of sheep bones from Hadrian's Wall given by Chaplin (1965) were plotted on the graph in Fig. 1 with others of bones from the medieval village of Wharram Percy, Yorkshire (Ryder unpublished), these fell within the first of the three groups mentioned above. Platt (1956) gives no measurements of the bones of the Viking period from Jarlshof. There is thus nothing to substantiate her claim that there were two breeds of sheep. There appear to be no Viking measurements available, and the seventh–eighth-century bones from Abercorn (Ryder 1968a) were slender, but otherwise too fragmentary for measurement. The meagre evidence does, however, suggest that sheep were of small size in Britain right down to the Middle Ages.

Evidence from Wool Remains in Textiles and Parchment: Roman Times to the Eighteenth Century

Apparently no wool textiles older than those of the Bronze Age have been found in Europe. The wool in these invariably had a natural brown colour, and was frequently

hairy. By the time of the Roman Iron Age, however, many of the textiles were completely white.

The oldest dated textiles found in Scotland are of the Roman period (Henshall 1952), and Table III shows the wool-fibre measurements and apparent fleece types from the

TABLE III

Fibre Diameter Measurements (in microns) of Scottish Wools up to the Middle Ages

		Pigment	*Range*	*Mean*	*Mode*	*Distribution*	*Fleece type*
Roman							
Balmaclellan	(a)	—	16–30	21	18	skew-fine	generalised medium/fine
FA 14	(b)	—	10–34 (2 of 70)	21	16	skew fine	hairy medium
Falkirk	(a)	—	10–30	17	16	symmetrical	fine
FRA 483	(b)	++	10–36 (1 of 80)	18	14	skew-fine	hairy medium
	(c)	++	12–34	18	14	skew-fine	generalised medium/fine
Newstead	(a)	+	12–36 (1 of 80)	23	20	skew-fine	hairy medium
FRA 1180	(b)	+	12–50	28	30	symmetrical	medium
Viking							
Orkney Hood	1 (a)	++	16–40 (1 of 80)	25	20	skew-fine	hairy medium
NA 3	(b)	++	10–60	26	20	skew-fine	hairy medium
	2 (a)	+	10–114	28	22	skew-fine	hairy medium
	(b)	+	14–94	27	24	skew-fine	hairy medium
	3 (a)	+	16–100	30	20	skew-fine	hairy medium
	(b)	+	10–110	27	20	skew-fine	hairy medium
	4	++	14–44 (plus some hairs)	23	20	skew-fine	hairy medium
	5 (a)	+	12–42 (1 of 66)	25	20	skew-fine	hairy medium
	(b)	+	14–48 (1 of 60, 80)	25	20	skew-fine	hairy medium
Kildonan	1 (a)	+	18–56	28	24	skew-fine	hairy medium
IL 164	(b)	+	16–58	36	—	continuous	hairy medium
	2	+	14–60	25	20	skew-fine	hairy medium
	3	+	12–46	28	22	continuous	generalised medium
tuft	4	+	20–46	33	30	symmetrical	medium
Date unknown							
Greenigoe	1 (a)	+++	24–88	48	—	continuous	hairy
NA 307	(b)	+++	16–70	22	—	continuous	hairy
	2 (a)	+	8–46	22	14	skew-fine	generalised medium
	(b)	++	12–48	25	20	skew-fine	generalised medium
	3 (a)	+	12–46	25	24	skew fine	generalised medium
	(b)	+	16–64	32	—	continuous	hairy

TABLE III (*contd.*)

		Pigment	*Range*	*Mean*	*Mode*	*Distribution*	*Fleece type*
	4 (a)	++	16–100	37	—	continuous	hairy
	(b)	++	14–50	27	20	skew-fine	generalised medium
Medieval							
Closeburn	(a)	++	10–54	23	20	skew-fine	generalised medium
ME 327	(b)	+++	14–40	26	20	skew-fine	generalised medium
Loch Trieg	(a)	+	8–30	18	20*	symmetrical	fine
HT 170	(b)	+	12–34	20	20	symmetrical	generated medium
Caerlaverock	(a)	+++	10–46	23	20	skew-fine	generalised medium
	(b)	++	14–40 (1 of 98, 120)	27	20	skew-fine	hairy medium

* Ritchie (1942) reported these fibres as being 20–24 microns in diameter.

1 micron = 0·001 mm.

Catalogue numbers are those of the National Museum of Antiquities of Scotland

(a), (b) indicate the two yarns of the cloth

Mode = the most ftequent measurement

\+ = slight pigmentation

++ = moderate pigmentation

+++ = dense pigmentation

Romano-British to medieval textiles in the National Museum of Antiquities of Scotland (Ryder 1964b). Of the seven yarns from specimens of the Roman period, three were white, and four had slight to moderately-pigmented fibres, suggesting influence from a brown sheep possibly of Soay type. Two of the wools (from Balmaclellan (Dumfriesshire) and Falkirk) had the same 'skewed-to-fine' distribution of fibre diameter found in the Soay sheep, and in non-pigmented textiles from Palestine dated first century B.C.-A.D. This was termed a generalised medium wool because it appears to provide an evolutionary link between the more primitive, hairy type, and the more highly evolved true medium and fine wools.

Three of the wools (Balmaclellan, Falkirk and Newstead) had the generalised medium distribution, but with a few hairs. This was termed a hairy medium wool, and regarded as more primitive than the fleece of the Soay. Detailed observations since made on the fleeces of the Soay sheep remaining on St Kilda have shown that there is a hairy (more primitive) type as well as a woolly type (Ryder 1966a). In addition, only three-quarters of the animals have a dark brown coat, and the remainder are light brown in colour. The Soay sheep on the mainland which stem from stock removed from St Kilda about 50 years ago all have a dark, woolly coat.

The diameter distribution in the remaining two yarns (Newstead and Falkirk) was symmetrical on each side of the mean, indicating a more uniform fleece. The mean diameter of one (from Newstead) suggested a true medium wool (comparable in diameter with a modern longwool) and that of the other (from Falkirk) indicated a true

fine wool. It was dyed green and was so fine that the diameter range was more comparable with that of modern fine Merino wool than that of the modern British shortwool. The seven Roman yarns from Scotland therefore show a range of types from a slightly hairy medium wool (like the hairy Soay) through the generalised medium (like the woolly Soay) to a true medium wool and a true fine wool. Since these wools were first described (Ryder 1964b) it has been the custom to regard distributions like that of Balmaclellan (a) and Falkirk (c) (Table III) as true fine types.

There is evidence from textiles that about 2000 years ago the true fine wool had evolved in the Palestine region (Ryder 1964b; 1968c) and also in Roman areas of the continent (Ryder unpublished), and it is interesting to see this type in Scotland so early, along with a medium wool which might have been a forerunner of the longwool that became common among English sheep in the eighteenth century.

It is of course possible that these Roman cloths were imported, but Henshall (1966) considers that the Falkirk cloth, for instance, is likely to have been a native product. To what extent, however, this fleece type had evolved from the generalised medium wool in Scotland, or was the result of influence from importations of Roman sheep, is not clear.

The nine yarns from the Orkney hood (Henshall 1952) all had slight or moderate pigmentation and are probably of Norse origin. Five of these were of hairy medium type like the Roman ones described above. A similar diameter distribution was found by Rosenqvist (1964) in textiles from the Viking boat found at Oseberg (Norway). The remaining four yarns had more hairs (or kemps) ranging to a greater diameter, but were probably not of true hairy type like the fleece of the Scottish Blackface or Herdwick. A sample from Early Christian Ireland was of true hairy type (Ryder 1964b). The four yarns certainly of Norse origin from Kildonan (Isle of Eigg) had similar slight to moderate pigmentation, and three seemed to be hairy medium wools, the remaining one being of generalised medium type. A tuft from the pile on the Kildonan cloth was of true medium wool. The general impression from the Norse wools is therefore one of greater hairiness, and perhaps less pigmentation.

Of the eight yarns of four cloths from Greenigoe (Orphir, Orkney) formerly claimed to be of the Viking period (Henshall 1966), three had slight, three moderate, and two dense pigmentation. There were four hairy wools, and four of generalised medium type, two of the cloths having one yarn of each type. Although the age of these cloths is uncertain, the wool types do not oppose a Viking date.

It is likely that much, if not all, wool at this time in Scotland was obtained by plucking, as is still done in Shetland. Plucking is necessary to ensure that the fleeces of sheep that moult are not lost. The practice is not cruel as many earlier writers have claimed, because most of the wool fibres have already been released from the skin in the natural shedding process. The writer observed on St Kilda that there was a tendency for the hairy fibres (kemps) to remain in the skin after the spring moult, and this suggested that some of the earlier textiles examined might, because of this, contain fewer hairy fibres than were actually present in the fleece. For example, an apparently generalised medium

wool might in fact be a hairy medium wool. This might be the explanation for an atypical diameter distribution found by Ryder (1964b) in some Danish Bronze Age cloth. This had such a high proportion of fine fibres that although there were hairs nearly 90 microns in diameter, the mean was less than 20 microns. The same distribution was found in Norwegian Bronze Age wool by Rosenqvist (1964). On the other hand the Scottish textiles examined all appear to be typical of known fleece types, and do not appear to have been altered to any great extent. At least some hairy fibres are likely to have got into the wool during plucking, and this probably explains why most of the hairy medium textiles have only one or two of them.

A true hairy fleece is less likely to be mistaken for a hairy medium wool because it has long, coarse hairs (heterotypes). Indeed these hairy fibres have a tendency towards continuous growth which would necessitate shearing. The origin of shearing might in fact be associated with the evolution of fleeces that do not shed, but as yet little is known about either.

Another way in which an artificial distribution could arise is from the blending of wool during manufacture, but it is assumed that in hand spinning the wool staples are kept intact, and that little mixing of fibres takes place. The carding of wool is thought not to have begun until the Middle Ages. Wool combs found in Viking graves, *e.g.* at Westness, Orkney (Henshall 1963) show that an attempt was made to straighten the fibres, but it is unlikely that the short, fine fibres were combed out, as in later worsted manufacture. The combs have only one row of teeth, as in flax hackles, unlike the several rows on the hand combs used for worsted combing. Combs of this type were used until the nineteenth century in Shetland (Ryder 1966a).

The two yarns from a medieval cloth from Closeburn (Dumfries-shire) had moderately to heavily pigmented wool with a generalised medium distribution suggesting a Soay type fleece. The yarns in another medieval specimen from Loch Trieg (Inverness-shire) had only slight pigmentation, and the diameter distribution of a short, fine wool. This was therefore like moorit Shetland, and not Soay wool, as suggested by Ritchie (1942). A third medieval fabric from Kelso had fine and medium wool fibres with slight pigmentation, but these were too degraded for accurate measurement (Henshall [1952] thought this was a vegetable fibre). Some cloth found in the silt of the ditch at Caerlaverock Castle (Dumfries-shire) and probably of medieval date (MacIvor 1963), had heavily pigmented yarn of generalised medium wool, and a moderately pigmented yarn of hairy medium wool.

The types of wool in these Scottish textiles up to the Middle Ages were regarded by Ryder (1964b) as supporting the hypothesis that a generalised medium-woolled sheep was found in Britain. The pigment in this wool, and the diameter distribution suggests a sheep of Soay type. The findings from the textiles support evidence from wool remaining in parchment (see below) that the Soay sheep persisted in Scotland until the mid-seventeenth century. The suggested divergence from this type towards the fine, shortwool on the one hand, and towards the longwool on the other, did, however,

seem to be taking place as early as Roman times, instead of in the Middle Ages as was previously thought likely.

Parchment evidence (Ryder 1960) suggests that the English medieval shortwool was of similar type to the short, fine wool of these Scottish textiles, and so those specimens from southern Scotland may possibly owe something, through monastic influence, to English medieval sheep, but the wool from Loch Trieg, because of its isolation, would appear to indicate local evolution towards the Old Scottish Shortwool.

There is an interesting predominance of hairy wool among the Norse specimens. This suggests that the Norse settlers of Scotland introduced a more hairy sheep that may persist today in the kempy strain of Orkney sheep (see below).

It has been suggested (*e.g.* Ryder 1964a) that the Danes who settled in eastern and northern England introduced the black-faced, horned and hairy sheep that later spread into Scotland to become the Scottish Blackface. Evidence for this comes from the emergence of this type in the Danelaw area, and from the existence of a similar sheep in Denmark in historical times, which persists today in Lower Saxony as the *Heidsnucke* breed, and in the Netherlands as the Dutch Heath sheep. The Saxon wool that has been examined (*e.g.* Sutton Hoo, Ryder [unpublished]) has been mainly of fine or generalised medium type, whereas some possibly Danish wool from York (Ryder 1964b) was hairy medium wool.

There appear to be no textile remains from the period between the Middle Ages and the seventeenth century, and the first from this century (Table IV) were some clothes from a skeleton found in the moss near Dava (Moray). Of the seven yarns, one was heavily pigmented, three moderately pigmented, two slightly pigmented and one non-pigmented. This had been dyed red, and the two slightly pigmented ones had been dyed green. Four of the wools were of hairy medium type, one was a generalised medium type and there was a true medium wool and a shortwool.

It is of interest that in each of these wools the coarser fibres had the densest pigmentation. This has been found in Irish wools of similar date (Emlough and Dungiven, Ryder 1966b) but is not a marked feature of the Soay, which often has pale kemps. It has, however, been observed in the native Shetland and Orkney sheep, and is comparable with the occurrence of 'red' kemp in otherwise white Welsh Mountain wool.

The Barrock (Caithness) breeches had three yarns which were all moderately pigmented. These were of typically hairy type, with hairs or kemps ranging up to 112 microns in diameter. Again these were more densely pigmented than the finer under-wool.

Clothing from the skeleton of a girl from Birsay (Orkney) yielded six yarns, four of which were slightly pigmented, and two moderately pigmented. There was one hairy type, two hairy medium wools, and three generalised medium wools that could be compared with the modern Shetland.

The clothing of the Gunnister (Shetland) man (Henshall and Maxwell 1952) had two slightly-pigmented yarns of hairy medium wool, and one moderately-pigmented yarn of generalised medium wool.

TABLE IV

Diameter measurements (in microns) of seventeenth-century Scottish Wools

		Pigment	*Range*	*Mean*	*Mode*	*Distribution*	*Fleece type*
Dava							
	(a)	++	16–52	27	20	skew-fine	hairy medium
NA 477–8			(1 of 54, 58)				
	(b)	++	16–52	31	30	symmetrical	medium
j. brown warp		++	12–64	26	22	skew-fine	hairy medium
			(1 of 74, 84)				
j. red weft		—	12–42	22	18	skew-fine	hairy medium
			(1 of 46, 58)				
j. black weft		+++	14–64	33	24	continuous	hairy medium
			(1 of 72, 76)				
j. green check	(a)	+	16–52	30	26	skew-fine	generalised medium
	(b)	+	16–44	27	26	symmetrical	short
Barrock							
NA 408e	(a)	++	16–70	31	26	skew-fine	hairy
f	(b)	++	16–106	31	20	skew-fine	hairy
		++	16–112	30	22	skew-fine	hairy
Birsay							
NA 2a	(a)	+	10–60	25	22	skew-fine	hairy medium
			(1 of 80, 92)				
	(b)	+	16–80	39	26	skew-fine	hairy
g	(a)	+	14–40	23	18	skew-fine	generalised medium
	(b)	+	12–44	25	24	skew-fine/	generalised medium
			(1 of 58)			symmetrical	
h	(a)	++	14–48	27	18 & 24	skew-fine	hairy medium
			(1 of 56, 66)				
Gunnister	(b)	++	14–50	28	26	skew-fine	generalised medium
NA 1037	(a)	+	12–62	27	22	skew-fine	hairy medium
	(b)	+	18–54	29	20	skew-fine	hairy medium
			(1 of 100)				
NA 1043		++	14–36	24	21	skew-fine	generalised medium
			(1 of 44, 48)				
Elgin							
1634	warp	—	14–44	27	30	symmetrical	medium
'mixt	purple weft	+	12–60	25	20	skew-fine	hairy medium
gray			(1 of 88, 90)				
parago'	white weft	—	12–60	32	—	continuous	hairy medium
1635							
brown	warp	—	14–44	26	18	skew-fine	generalised medium
cloth	weft	—	12–62	28	22	skew-fine	hairy medium
1637							
black	warp	—+	12–40	26	22	symmetrical	shortwool
parago	weft	—+	14–40	27	22	symmetrical	shortwool

(Key as for Table III)

TABLE IVa

Wool fibre diameter measurements (in microns) in Scottish textiles of unknown date
(in the National Museum of Antiquities of Scotland)

Source		*Pigment*	*Range*	*Mean*	*Mode*	*Distribution*	*Fleece type*
Culrain, Ross., NA 4C	(a)	++	10–40	20	14	skew-fine	generalised medium
	(b)	++	10–42	19	14	skew-fine	generalised medium
Lochlundie, Aberdeen NA 369		—	14–50	32	36	symmetrical	medium
Dallas, Moray NA 562	(a) green dye	+	16–50 (1 of 54, 64)	32	30	symmetrical	medium
	(b) green dye	+	16–46 (1 of 50, 54)	32	30	symmetrical	medium
Dunrossness, Shetland NA 297 found 1847	(a)	+	14–40 (3 of 48, 1 of 52)	23	18	skew-fine	generalised medium
	(b)	+	12–40 (1 of 76, 120)	23	18	skew-fine	hairy medium
Norsewick, Shetland	(a)	+	14–46 (1 of 56, 60)	23	21	skew-fine	hairy medium
NA 6 found 1849	(b)	+	14–46 (5 from 50–84)	32	26	skew-fine	hairy medium
Shetland felt cap NA 249 found 1884		++	16–54 (3 from 60–78)	36	34	symmetrical	? cow hair and wool
cloth patch		+++	14–36 (1 of 42, 52)	21	18	skew-fine	generalised medium

(Key as for Table III)

The last group of specimens of the seventeenth century are some dated samples of cloth, from a merchant in Elgin, found recently among the Seafield papers (GD248 Box 166, Scottish Record Office). It is likely that these were imported, but their source is unknown. A 'mixt gray parago' dated 1634 had a white warp of medium wool, a white and a purple weft of hairy medium wool, the purple one having naturally pigmented, in addition to dyed, fibres. A brown cloth dated 1635 had no natural pigmentation, one yarn being a general medium wool, and one a hairy medium type. A black parago dated 1637 had indications of slight natural pigmentation as well as dye, and both the

warp and weft were of shortwool type. Despite the presence of three hairy medium wools and a generalised medium wool among these yarns, they appear relatively better than contemporary Scottish wool, and this is emphasised by the presence of a medium wool and two shortwools of almost modern type.

The wool in some eighteenth-century clothing found during peat cutting at Voe, Shetland, was described by Ryder (1966c). In one cloth which appeared brown to the naked eye, only the coarse fibres had natural pigment. The fine fibres had a blue-green

TABLE V

Summary of Wool Types

	Hairy	*Hairy medium*	*Generalised medium*	*Medium*	*Shortwool*	*Fine*
Roman	—	3	2	1	—	1
Viking (Greenigoe omitted)	4	8	1	1	—	—
Medieval	—	1	3	—	—	2
Seventeenth century (Elgin omitted)	4	8	5	1	1	—
Eighteenth century (W. and N. Isles)	—	13	5	—	—	1

Table V summarises the wool types found in the different periods. The basic type appears to have been the generalised medium (?Soay) type, which tended to be finer in Roman and medieval times, but more hairy in the Viking period and the seventeenth century, when it probably emerged as the Old Scottish Dunface typified by the modern Shetland breed.

dye. Another cloth, too, which appeared green to the naked eye, had pigmented coarse fibres, and dyed fine fibres. The four yarns from these cloths were of hairy medium type, and corresponded to the 'beaver' variety of Shetland sheep described by the Highland Society Committee (1790) as having long hairs projecting beyond the wool.

Some fine Shetland cloth associated with Sir John Sinclair (Ryder 1966c) had yarns of slightly pigmented, generalised medium wool, and were thus of typical Shetland type. The Highland Society (1790) referred to Shetland wool lacking hair as the 'kindly' variety. A staple of wool with Sinclair's cloth was, remarkably, of true fine type. This illustrates the range of variation found in a primitive type such as the Shetland before selective breeding tended to lead towards a uniform, intermediate type.

The various garments from the body of early eighteenth-century date found in 1964 on Arnish Moor, Lewis, yielded twelve yarns. One of these had dense pigment, four had moderate, four slight, and three no pigment at all. Nine of the yarns were of similar hairy medium type, and three were generalised medium wools. The shirts had less hairy wool than the jacket; the stocking had the finest wool (Ryder unpublished).

Evidence from Parchment

Ryder (1958) showed that it was possible to gain evidence on fleece type from the characteristic grouping of wool fibre remains in parchment, notably that of the Dead Sea Scrolls. In a further paper (Ryder 1960) the findings were given from a group of British parchments, among which were 21 from Scotland. These were from the ends of seal tags, and ranged from the fifteenth to seventeenth centuries in date. Parchment presents problems of sampling, the method of preparation and examination is laborious, and not until the examination is complete is it found that many lack wool fibres. Textiles provide a more useful material: the evidence that has been gained from them has already been detailed.

The original intention in using parchment was to attempt to link the type of sheep whose wool was indicated by the parchment, with the area in which the document had been written. Although this might be feasible in dealing with different countries, it was soon realised that even as early as the Middle Ages it could not be assumed that the parchment had been made in the place referred to in the document. Indeed, the Birrell parchment-making family of Kinnesswood, Kinross, claimed that this was the only place in Scotland in which parchment had ever been made (Ryder 1964c).

TABLE VI

Scottish Parchments Examined by Ryder (1960)

Date	*Owner of seal*	*Fleece type*
1519	Andrew Forman	? Soay
1574	George, Bishop of Moray	? Soay
1580	Great Seal of James VI	? Soay
1594	Alexander Creichton of Naughton	? Soay
1597 (a)	David Balfour of Bulledmonth	? Soay
(b)	David Balfour of Bulledmonth	medium wool
1603	David Lindsay of Balcarres	? Soay
1661	James (St Andrews)	? Soay
1664	James (St Andrews)	? Soay

Nearly all the Scottish parchments with wool remains (Table VI) had pigmented follicle bulbs. This, as with other parchments with pigmented remains, at first suggested calf, because, for instance, all the wool in the Dead Sea Scroll parchments was non-pigmented. Later, however, it was realised that the pigmented wool fibres in some other British parchments closely resembled those of the Soay sheep, and that those in the Scottish parchment could indicate the Soay, too.

Nine parchments out of twenty-one dating from 1406 had identifiable remains and Table VI shows the result of their examination. The only one with non-pigmented fibres was a medium wool, and the remainder indicated the persistence of brown sheep

in Scotland until the mid-seventeenth century. The support for this suggestion that was later obtained from textiles has already been given. Because these parchments had less easily identifiable follicles rather than fibres, the possibility cannot be ruled out that some, or all, were calf, but in the eighteenth century, at any rate, calf-skins were not used in making parchment in Scotland (Ryder 1964c).

Evidence of Sheep Type from Historical Records

Descriptions of sheep anywhere before the eighteenth century are rare. Celtic records apparently say little about them although the Welsh *Book of Taliesin* refers to white sheep in terms suggesting that they were unusual (Trow-Smith 1957:65). Although Norse sagas must be read with reserve, the Icelandic *Snorra Sturlusonar Edda* (Jonsson 1907) gives a good account of the farming year but no indication of sheep type.

During the Middle Ages the biggest influence on Scottish sheep probably came from the monks, the first abbey being established at Melrose in 1136. The Cistercians were the chief monastic sheep farmers, and it is possible that they introduced improved sheep from England. If they brought the famous English shortwool to Scotland it may have been more at this time, and less in the Roman period, that the native Soay type was crossed with a fine-woolled white sheep from the south, to contribute towards the Scottish shortwool or Dunface.

Franklin (1952:65-9) gives monastic livestock numbers and acreages, from which the relatively high stocking rate implies a sheep of small size. The fleece weight was apparently 1½ lb compared with 2 lb in England, and Scottish wool was towards the end of Pegolotti's (thirteenth-century) price list. This implies poor quality and, with the smaller fleece weight, indicates that Scottish sheep were more primitive than those of England.

The biggest monastic influence on agriculture took place on the Border; but it is also evident from the monasteries of the Central Lowlands, and since these had shielings as far north as Pitlochry, for instance, it is possible that some monastic influence reached the Highlands.

Franklin (*op. cit.*:111) considered that the peasants kept sheep in small numbers to provide wool and milk, so one would expect the 'immense flocks of sheep' which Don Pedro de Ayala observed 'especially in the savage portions of Scotland' at the end of the fifteenth century (Ritchie 1920:41) to be those of the monks. But James V (1513–42) is said to have had 10,000 sheep in Ettrick forest, and so other nobles may have had similar numbers. The large flocks mentioned by Bishop John Leslie in 1578 may, however, have been monastic flocks that had fallen into other hands after the Dissolution.

He referred to the excellence of wool grown in the Tweed Valley and said that here there are men with four, five, eight and even ten thousand sheep. Those sheep were described as small, short-tailed, horned in both sexes, and often having several horns. An early sixteenth-century account of Scottish sheep by Hector Boece describes them

as having 'such white, fine and excellent wool as the like of it is hardly to be found again in the whole island'.

The Border troubles of 1300 to 1603 held up land improvement, then in the seventeenth century there were clearances for sheep-farming on the Border, and it is possible that some English sheep (perhaps the Blackface) were introduced at this time. Smout and Fenton (1965) inferred increased production and therefore agricultural improvement from the increased number of markets in the seventeenth century. The Kelso market was primarily for wool, a distinction being made between coarse and fine qualities. Symson (1684) stated that there were three kinds of wool in Galloway: laid-wool, which was of poor quality because the sheep had been smeared with tar and butter, dale-wool, and moor-wool which was the best.

In the Central Lowlands in the eighteenth century the attention of the improvers was first paid to grain crops. But the enclosure of land associated with the abolition of run-rig (strip cultivation) would allow the controlled breeding of sheep through the segregation of inferior animals. It is necessary to stress that improvement could have taken place in this way, and that the absence of evidence of conscious selection does not necessarily mean that there was no improvement in sheep. Another source of improvement was the introduction of turnips for winter feed, and evidence that improvement did in fact take place comes from the fourfold increase in value of sheep during the eighteenth century. The ramifications of one change are illustrated by the introduction of the horse for ploughing. This released cows for milking so that ewes were no longer milked, and in consequence the lambs were better fed.

Of the new breeds that appeared during the eighteenth century, the Cheviot appears to have evolved entirely from the native Dunface or Old Scottish Shortwool, on the Border, and the Border Leicester which developed later seems to be the result of crossing the Cheviot and English Leicester. The Blackface, today the most numerous breed in the British Isles, came entirely from south of the Border. It did not begin to enter the Highlands until about 1750, however, and until the clearances its introduction would have been gradual, by a crossing with the native sheep. The influence of this indigenous sheep on the modern stock can still be seen in the Blackface sheep of the Western Isles (see below) and of Galloway where the fleeces still tend to be finer (Peart and Ryder 1954). The reputation of 'Galloway for woo' ', however, seems to go back at least to the seventeenth century, and may even date back to the monastic influence in that area. Anderson (1790) stated that the Old Shortwool still remained in remote parts of Galloway.

The Board of Agriculture surveys of the 1790s indicate changes in the type of sheep. Ure (1797) stated that in Kinross there were black-faced sheep on the Cleish hills, whereas those on the Lomond hills were white faced. Unfortunately this does not indicate whether they were of the new Cheviot breed or Old Shortwools.

Good descriptions of sheep do, however, begin to appear in the eighteenth century, and an excellent one of the Old Scottish Shortwool was given in the Old Statistical

Account (1797) by Mr Naismith of Hamilton, Lanarkshire (quoted by Mitchison 1962: 128) as follows:

> Every farmer formerly kept a few sheep, which were of a kind more domesticated and improved, than those now bred in the mountains. Their bodies were long and squat made, their heads erect, having either small horns, or no horns at all, their legs short, their faces and legs white, or slightly sprinkled with black or brown spots, their fleeces soft, and mostly of the longest kind of carding wool; their tails were not so short as those of the muirland sheep, but descended almost to the knee joint, and seldom below it. These sheep were constantly attended by a boy or girl during the day, whom they followed to and from the pasture, and penned at night in a house called the Bught, which had slits in the walls to admit the air, and was shut in with a hurdle door. . . . These little flocks were the peculiar care of their owners. The whole family was interested in the business; for every child claimed the property of a ewe lamb, and its future progeny, and an emulation prevailed among them, who should possess the handsomest and most valuable part of the flock, none being preserved for stock, but such as possessed all the characteristics of beauty and utility. In this manner were these sheep improved to such a degree, that their wool was preferred to any then known in the neighbouring markets. When inclosing with hedges became frequent, the farmers were obliged to part with these little stock, which injured the young fences, and gradually sold them off for slaughter; so that no remains of them can now be traced in this part of the country.

The sheep 'now bred in the mountains' would almost certainly be Blackfaces, but the reference to short-tailed 'muirland' sheep is of immense interest. It suggests first, that the shortwool to which he referred was already considerably improved, because of the length of the tail if nothing else, and second that a more primitive variety ('muirland' sheep) was still in existence.

Burns, in the elegy to his pet ewe, indicates the same difference when he says:

> She was nae get o' moorland tips [rams]
> wi' tawted ket and hairy hips,
> For her forbears were brought in ships
> Frae yont the Tweed:
> A bonnier fleesh ne'er cross'd the clips
> Than Mailie's dead.

Whether he means medieval or more recent 'forbears' is not clear.

Gray (1957:38) gave similar descriptions of the household sheep, and what he considered to be its haphazard husbandry. This does not accord with Naismith's illuminating account (above) of selection (albeit unconscious) for good wool. Gray's conclusion that the sheep provided little economic gain is surely exaggerated when one remembers that it provided virtually all the clothing worn, and much of the protein in the diet through its milk. The sheep has been (and still is) a valuable provider in many primitive communities.

At this point it will be better to continue with contemporary and recent descriptions of the more primitive sheep and the modern breeds that began to emerge in the eighteenth century. (Historical evidence is dealt with in greater detail in Ryder 1968e).

Evidence from Sheep Remaining Today: The Soay Sheep of St Kilda

Skeletal evidence, and evidence from textiles, discussed above, suggests that the Soay (Plate IVa) or a similar sheep originally had a much wider distribution, but through lack of adequate archaeological evidence it is not known at what date Soay sheep reached St Kilda. The legend that the Viking colonist Calum was the first settler and therefore brought the first sheep to St Kilda is unlikely to be true because Celtic topographical names and archaeological finds indicate the presence of earlier settlers. However, the suggestion that the Norse name 'Soay' (= sheep island) for the island on which the Soay sheep have been feral for centuries indicates that the sheep were there when the Norse settlers arrived is not unequivocal, since it could equally be argued that the Norse named the island Soay because they put sheep on to it. Crawford (1966) thinks it possible that there was even prehistoric settlement from the Hebrides. Until proper archaeological excavation is carried out on St Kilda this very important question in the history of the Soay—when it arrived there—cannot be answered.

Ritchie (1920:38) quotes what is probably the first description of Soay sheep. This is by Boece (1527) who said that 'beyond Hirta [the main island of St Kilda] there is another, uninhabited, isle [Soay]. In it are certain wild beasts not very different from sheep. The hair is long and "tallie" [drab] neither like the wool of sheep nor goat.' Hirta, too, apparently then had Soay sheep, because Boece said that in this isle there is a great number of sheep with large horns and a long tail. Ritchie considered that the length of the tail was described erroneously because of course the Soay has a short tail. In 1578 Bishop Leslie (Ritchie 1920:39) referred to the sheep on St Kilda as 'large animals, neither sheep nor goat, neither have they wool like a sheep nor hair like a goat, but something between the two'.

Martin (1698:17) stated that 'the number of sheep commonly maintained in St Kilda, and the two adjacent isles [?Soay and Dun] does not exceed 2,000. Generally they are speckled, some white, some philamort [yellowish brown] and are of a common size; they do not resemble goats in any respect, as Buchanan was informed, except in their horns, which are extraordinary large, particularly those in the lesser isles.' Here we see evidence in the white colour of the introduction of improved sheep, but the characteristic large horns of the Soay remain. He went on to say that Soay feeds 500 sheep which are hunted by the St Kildans. Each ewe generally has 2–3 lambs at a birth, and they lamb at one year. He attributed this prolificacy, which had also been observed on small islands near Harris and North Uist, to the fact that these sheep were never milked. This is unlikely, of course, to have been the true reason.

Macaulay (1764:119), who visited St Kilda in 1758, stated that Soay supported 500 sheep which were the property of the steward and difficult to catch. He estimated (*op. cit*:129) that Hirta had 1,000 sheep, which were of the 'smallest kind' with short, coarse wool. It was, however, softer than that in the other isles but not so well mixed.

The meaning of this is not clear; perhaps he means a lack of uniformity in the fleeces. He said that many of the sheep had four horns, and that the ewes were very fruitful. He quoted an example of a ewe that had an increase of nine in 13 months. It had triplets one March, and triplets again the following March, and each of the first three lambs had a lamb each at one year. Boreray was said to support 400 cast ewes from Hirta, where they produced lambs for several more years.

Elwes (1912) quoted Donald Ferguson, who had been ground officer on St Kilda for 20 years, as saying that there had been no sheep with four horns during that time. According to Ferguson the laird used to claim every seventh ewe, and every second ram, and put them on Soay, his preserve, and they were hunted once a year for their wool. He stated that there were then not less than 300 sheep on Soay, and that half were dark brown, and half pale brown: accurate counts today show that only one quarter are pale (Boyd *et al.* 1964). Some of the light sheep had dark patches, and some of the dark ones had white marks, especially on the face: occasional light sheep with white facial marks are still found on St Kilda. Ferguson said that one third of the ewes had horns: counts today show that the proportion is about one half (Boyd *et al.* 1964). According to Ferguson the ewes lambed at one year, and the older ewes usually had twins. Twins are not common today. It was stated that 'a few rams of the race which preceded the introduction of the Black-faced rams (into St Kilda) were once introduced into Soay, but they did no good'. According to Steel (1965:60) the Blackface was introduced about 1872, and one assumes that the sheep kept before this would be the Old Scottish Shortwool, a hint of which is given by Martin (1698). MacInnes (1961) gave a folk tale from St Kilda which spoke of the St Kildans stealing sheep from the Flannan Isles. The paler type of Soay is unlikely, however, to be the result of this introduction of white sheep, since one would expect pure white animals to occur in the population, and not a dilution of the brown colour. Whereas most animals have a cream belly, like the Mouflon, the light animals sometimes are an overall fawn colour. The statement of Ferguson that the Soays were gradually becoming smaller is of interest in view of the large size mentioned by the sixteenth-century writers, and of the anomalous bone measurements given above.

Lydekker (1912:59) followed Fitzinger (1860) in associating the Soay with the Northern Short-tail type of Scandinavia, but he gave the collective term *Loaghtan** (Manx for 'mouse-coloured') to the more primitive members remaining on a range of islands along the western seaboard of Europe: Isle of Man, Outer Hebrides, Orkney, Shetland, Faeroe (also = 'sheep isle') and Iceland. Modern Icelandic sheep in particular have a similar horn angle to the Soay. This list can be extended to include Scandinavian islands

* The St Kildans called the dark Soays *lachdann* (Williamson and Boyd 1960).

such as Gotland, and the isle of Ushant off Brittany. The Ushant sheep the writer saw at the Jardin des Plantes, Paris, in 1965 had a similar appearance, (dark) colour and wool type to the Soay. All the 'breeds' of this group have a short tail, and some have a tendency to grow more than one pair of horns. The Manx sheep frequently has four horns (Elwes 1912), and has similar dark brown wool to the Soay (Ryder 1968g). The brown colour occurs throughout the group, although some have black, grey, white and piebald individuals that show them to be less primitive than those having only a brown colour. Shedding of the coat is universal so that plucking was necessary to obtain the wool. Lydekker (1912) thought the colour and horn shape indicated an affinity with the Mouflon rather than the Urial type of wild sheep.

The nineteenth-century life of the St Kildans, and their evacuation in 1930 has been described by many authors, the most recent ones being Macgregor (1960) and Steel (1965). A year after the evacuation, after making sure that no Blackface sheep remained on Hirta, about 100 Soay sheep were introduced from Soay. This feral population multiplied, and now fluctuates in cycles between 500 and 1,500 animals. In recent years the sheep have been subjected to a detailed study by a team of scientists (including the present author) organised by the Nature Conservancy.

The first results have been published by Boyd *et al.* (1964) and a brief description of the coat based on samples taken during a visit to St Kilda in 1964 has been given by Ryder (1966a). As indicated in the section on textile evidence there are two types of coat: in addition to the woolly type there is a hairy one, the hairy fibres being in fact kemps (Table VII). A full account will appear in a forthcoming monograph on the Soay sheep to be published by the Nature Conservancy.

Hebridean Sheep

Whereas the Soay can be regarded as a survival of a prehistoric sheep, the remaining primitive sheep to be described are perhaps those of the Middle Ages to the eighteenth century.

Martin (1698:48) mentioned the isle of Sellay near Pabbay which had excellent pasturage, and where sheep had the biggest horns he had ever seen. This can be regarded as indicating Soay influence. Anderson (1790) spoke of remnants of the Old Scottish Shortwool remaining in parts of the Western Isles.

Walker (1812) quoted by Elwes (1912) said that the Hebridean sheep was small, thin and lank, and had short, straight horns. The face and legs were white, the tail short, and the wool of various colours: black, white, grey, brown and russet, an individual being frequently blotched with two or three of these colours. He said that in the low islands the wool was often as fine as that of Shetland, whereas in the mountains the sheep was smallest, and had coarser wool, and often four and sometimes six horns.

This type of sheep appears to have been the origin of the piebald, so-called Jacob's sheep, which is frequently kept in parks (also known as Spanish sheep). Its wool today

is not unlike that of the Cheviot, and the tail is of medium length, suggesting that it is no longer a pure breed. It may also have been the origin of the so-called St Kilda sheep which is four-horned, dark brown and, apparently, short tailed.

Elwes (1912) found that the four-horned character was then infrequent in Hebridean sheep, which had already been considerably crossed with the Blackface. In fact the

TABLE VII

Some fibre diameter measurements (in microns) in the fleeces of primitive Scottish sheep

	Range	*Mean*	*Mode*	*Distribution*	*Fleece type*
Soay					
woolly	14–46 (1 of 50)	24	20	skew-fine	generalised medium
hairy	14–98 (1 of 100, 104)	32	20	skew-fine	hairy medium
Hebridean Blackface					
St Kilda yarn (a)	14–70 (1 of 90)	36	32	continuous	hairy
St Kilda yarn (b)	14–70 (1 of 78, 120, 128)	32	26	skew-fine	hairy/hairy medium
Boreray, white	10–46 (1 of 52, 60)	20	16	skew-fine	hairy medium
Boreray, brown	14–62	24	20	skew-fine	hairy medium
Orkney					
dark grey	14–84 (1 of 90, 118, 120)	33	20	skew-fine	hairy medium
white	14–40	23	18	skew-fine	generalised medium
Shetland					
18th-century hairy (Ryder 1966c)	14–54 (1 of 86)	27	20	skew-fine	hairy medium
Sinclair staple	10–30	20	20	symmetrical	fine
1871 (W 19)	10–36	25	26	symmetrical	fine
1871 (W 20)	10–66 (1 of 70, 82)	31	26	skew-fine	hairy medium

(Key as for Table III)

native Hebridean sheep remained on small islands near Barra and North Uist until about ten years ago (Scaton 1966).

Traces of the old Hebridean sheep persist today in the Hebridean (Lewis) type of Blackface, which has a primitive 'dished' nose and brown rather than black face; in addition, it occasionally has four horns. Doney (personal communication) saw one of these on Benbecula about 1960. He and Smith (1966) found that the Lewis Blackface had a shorter and finer fleece than other strains of Scottish Blackface. They found that

some wool from the Blackface sheep that have been feral since 1932 on Boreray (St Kilda) was indistinguishable from that of the Lewis Blackface. Some wool clearly of the Blackface type, from cloth woven on St Kilda in the 1920s, and now in Kingussie museum, was measured by the present author. Yarn (a) had 1 per cent pigmented fibres and a mean diameter of 36 microns, while yarn (b) had 25 per cent pigmented fibres and a mean diameter of 32 microns. In both yarns the main diameter range was from 14 to 70 microns, but whereas yarn (a) had one hairy fibre 90 microns in diameter, yarn (b) had hairy fibres 78, 120 and 128 microns in diameter, the smaller mean diameter resulting from a greater proportion of finer fibres. Although both yarns compare with the measurements of Lewis Blackface wool of Doney and Smith (1966), the pigment and diameter distribution of yarn (b) make it closer to the Old Hebridean sheep (Table VII). A white staple 160 mm long, and a dark brown staple 110 mm long picked up on Boreray by Doney in 1960 have been measured at the base of the staple for comparison. These samples were shed wool which probably explains the greater fineness, the wool being at its least diameter in winter before shedding.

The Keerie or Rocky Sheep of Caithness

This small, black, short-woolled and short-tailed sheep was 'discovered' on Duncansby Head in 1890 (Elwes 1912). The crofters who held them in common did not know their origin, but said that they had been in the area a long time. The fleece, and tail-length, suggest an affinity with the Orkney sheep, and ultimately with the Soay, rather than with the Blackface which was the suggestion made by Ewart based on a second spiral in the horns. The term 'keery' was also used for the native sheep of Orkney, and Fenton (1966) suggests that it is probably derived from the Gaelic *caora* (a sheep) or *ciora* (a pet sheep). Wheeler (1966) stated that most of the old 'Kerry' sheep of Sutherland died out in 1808 as a result of a bad winter and disease.

Orkney Sheep

Martin (1698) said that the sheep of Orkney, like those of the Western Isles, were very fruitful, many having two, or three, and some even four lambs at a time. This prolificacy is found today in other members of the Northern Short-tailed group, notably the Finnish Landrace. Martin also stated that the sheep of Orkney often died of a disease, known as 'sheep-dead', caused by little animals about half-an-inch long in the liver. This appears to be an interesting early reference to liver fluke.

It is significant that Low (1842) grouped Orkney and Shetland sheep together. He illustrated a black and white piebald ram, a fawn ewe, and a dark brown lamb. He said that the coat consisted of hairs and wool and that the grey colour was due to a mixture of black and white fibres. In his *Fauna Orcadensis* Low described the annual 'rowing' (plucking) of the shedding fleece about midsummer, which enabled the wool to be

obtained unmixed with hair. Fenton (1968) states that the term 'rooing' is still used on North Ronaldsay, although the sheep are now shorn (*cf.* the persistence of a similar term in Iceland, above). Low also mentioned that the sheep of Orkney and Shetland fed on seaweed.

Elwes (1912) quoted a description of the original Orkney sheep as being small, black and rough-woolled animals which then remained only on Flotta and North Ronaldsay. He said that they were only 18 in. at the shoulder, and had long, slender limbs and a short tail. The ram had a throat fringe like the Soay, but unlike the Soay, the horns were curved backwards between the ears. Elwes suggested that this character might indicate an affinity with the prehistoric *palustris* sheep. In another description Elwes states that the fleece was white, brown or spotted, but the wool, though fine, was very inferior to the best Shetland.

The unique husbandry of North Ronaldsay, to which island the native Orkney sheep is now virtually restricted, was only briefly mentioned by Elwes. There the sheep are confined to the shore, and away from the best land, by a high wall surrounding the island. Tribe and Tribe (1949) indicated the necessity of intensive cultivation when one quarter of this island of 4 square miles is shore. The wall extends around the entire 12-mile perimeter, and since there is practically no grass outside it, the sheep feed almost entirely on seaweed. This is more plentiful in winter than in summer, and so according to Tribe and Tribe the sheep are better fed during winter than in summer.

The communal husbandry, now in decline, was described by Fenton (1968), who said that the date of the wall, which is up to 6 feet high, is unknown. It was, however, associated with run-rig and corresponds to a head dyke, so that the shore is equivalent to a common hill grazing. Although part of the strip cultivation of run-rig was abolished in 1832, and the remainder in the 1880s, the communal sheep husbandry continued apparently unchanged. Fenton showed that the sheep numbers had remained fairly constant at about 2,000 head from 1790 until recently, through control by the twelve elected sheep men acting on the regulations laid down by the landlord. Lack of control of numbers has caused the present-day population to reach almost double this number (see below). The regulations of 1902, a revision of earlier ones, showed that the tenants of each of 71 holdings were allowed to keep between 10 and 60 sheep on the shore, and that the sheep men were allowed to keep 10 extra sheep for their trouble. Each tenant was responsible for the repair of a length of the enclosing wall; the only height specified was 'above leaping height'.

The sheep were (and still are) free to wander round the shore except for part enclosed for Holland farm. In fact, as with hill sheep, they keep to their own area, or 'clowgang', a term elsewhere given to the sheep pasture of a township. The only time any sheep come within the wall is after lambing, when the ewes are tethered on grass, but at one time they grazed within the wall in winter. Originally they were pounded three times a year in nine stone pounds situated along the wall. The first 'pundin' was in February for counting by the sheep men. The sheep were identified by the ear mark belonging to the owner, and if there were more than the allowed number, the excess had to be forfeited

from the hogs, *i.e.* the previous year's lambs. The sheep remaining on the shore were next pounded for shearing between June and August; and the final pounding was for killing in mid-winter, at New Year.

Tribe and Tribe (1949) described the North Ronaldsay sheep as small and taking three to four years to reach maturity, a mature wether having a carcase weight of only 30 lb. They have a 'dished' face and much variation in horn shape, and also in the presence and absence of horns, although my own observations suggest that the rams tend to be horned and the ewes polled. The horns tend to project sideways, as in the Soay. According to Tribe and Tribe the sheep, despite high mortality, are well-adapted to the exposed shore; crosses with the Cheviot, Blackface and even the Shetland, have not survived. Lambing takes place during the last two weeks of April, and the lambs, like those of the Soay, weigh only 3–4 lb. at birth. Excess lambs are killed to leave only one for each ewe. The ewes are (or were) tethered or enclosed on grass (Plate IVb) with their lambs and not returned to the shore until August. The ram lambs are castrated at 4–6 weeks of age—this is the only operation, other than shearing, that is carried out by the owner. One ram is left entire for every twenty ewes, or, I was told, one ram per croft each year. This is a high proportion of rams, even by medieval standards, and may be to allow for deaths on the shore. So far as I have been able to determine there is little or no selection, and although what are thought to be the 'best' ram lambs might be left entire, there is almost certainly no selection of the fleece. The rams run with the ewes all the time, so there is no control of mating.

The fleece weight of 2–3 lb quoted by Tribe and Tribe is confirmed by the weighing of 25 Orkney Native fleeces for me by Mr P. G. Coutts, Scottish Regional officer of the British Wool Marketing Board, Dunfermline. The average fleece weight of these was 2.4 lb. Owing to sand contamination, however, the yield of clean wool is as low as 50 per cent. The wool also suffers from salt impregnation.

There seem to be three main colours, white, black and grey, with a few pale brown (fawn or light moorit = moor-red) animals. A manuscript document in the Kirkwall library giving sheep numbers on the island of Sanday about the year 1730, also records the proportion of the different colours. I am indebted to Mr A. Fenton for allowing me to see the copy of this kindly supplied by Mr E. Macgillivary, the librarian. In one group of 1,181 sheep 57 per cent were white, 24 per cent black, 18 per cent grey and only 1 per cent 'tanay'. The proportions of the different colours appear to have changed since that date, however. During a visit to North Ronaldsay in July 1966 I gained the impression that grey animals (often with a black line along the backbone) predominated, with white animals (often with tan markings) coming second, and black animals third.

This was borne out by figures from the Wool Marketing Board. The five grades of Orkney Native Wool are based on colour as follows: No. 636, White and Near White; 637, Moorit and Fawn; 638, Light Grey; 639, Dark Grey; 640, Black. From the present day wool production figures kindly supplied by Mr Coutts, if the light and dark grey are grouped together, the following very approximate proportions are obtained:

38 per cent white, 7 per cent black, 54 per cent grey and 1 per cent fawn. This change from a predominance of white fleeces to a predominance of grey fleeces, could readily be explained by the observations being from different islands, but there is also the possibility that there was greater interest in selecting for white wool in the past. There is a suggestion that the different colours might be inherited in the same way as in Icelandic sheep (Aðalsteinsson and Ryder unpublished; Ryder 1968g).

From the total production of Orkney native wool of 9,531 lb in 1966, and an average fleece weight of 2.4 lb, one can calculate that the native sheep population is approaching 4000. But one must remember that one or two hundred native sheep are kept on small holms elsewhere than North Ronaldsay, notably near Westray.

A study of samples from the Wool Marketing Board, together with others obtained on North Ronaldsay, has shown that as with the Soay, there is a hairy and a woolly type of coat, the hairy fibres being in fact kemps up to 7 cm. in length (Table VII). Both black and white fleeces can be hairy, but because hairy fibres are more often black, black and grey fleeces are usually more hairy than white ones. (Grey fleeces are in fact the hairiest and consist of mainly white wool interspersed with black hairs.) A typical white fleece is woolly, and as fine as the best Shetland. The few moorit samples examined were woolly too. As with the Soay there was a tendency for the rams to have hairier fleeces than the ewes.

The Orkney sheep are inclined to shed the fleece in the spring, as in the Shetland breed. The matted mass of wool frequently formed at the base of the staple, and known locally as the 'lith', therefore seems to be formed by short, fine fibres shed into the fleece. Although this has been observed in other sheep, notably the Blackface, as a result of shedding, it seems to be less common in the Shetland. The 'lith' is a well-known feature of the Orkney fleece, however, and makes it almost impossible to clip the sheep until the new growth of wool in the spring causes the 'lith' to 'rise' from the skin. In addition, the tenacity of the 'lith' probably explains why few Orkney sheep actually cast the fleece. Another reason for waiting for the 'rise' is to allow sufficient new growth of wool for protection of the animal after shearing.

Shetland Sheep

Martin (1698) said that Shetland produced many sheep, which eat seaware during frost and snow. He stated that these had two or three lambs at a time (*cf.* his similar claims for Orkney and the Western Isles above). Fraser Darling (1945) referred to the commonness of triplets, and the ability to rear them, in the Shetland breed.

The report of the Highland Society Committee on Shetland sheep (1790) realised what has not always been believed since, that fineness is determined mainly by breed for it stated that 'on the same pasture, sheep with the finest and the coarsest wool are maintained'. Shetland sheep were described as being variable in colour, ranging from black (Plate IVc) to white, and there were also two fleece types: 'kindly' sheep with fine

wool, and 'beaver' sheep with long hairs among the wool. It is possible that the 'beaver' type corresponds to the 'hardback' remaining on Foula. These two types seem to be comparable with the hairy and woolly varieties of the Soay and Orkney sheep, discussed above. Their existence is confirmed by eighteenth-century textiles from Shetland in which the hairs were pigmented (Ryder 1966c and Table VII). In fact both Orkney and Shetland sheep must have been of similar type (Low 1842:7–8) before improvement (mainly during the last 40 years) made most Shetland sheep woolly and white. Thus it is most probable that the 'hairs' of the Shetland were in fact kemps as in Orkney sheep, and support for this conclusion is given below.

The Highland Society Report (1790) stated that the wool was plucked in June, but the 'hairs' remained and shed in September. Youatt (1840:298) gives a similar excellent description of the separation of the wool from the 'hair'. Gosset (1911:220) quoted an account of Iceland, Greenland and the Faeroe Islands dated 1840 in which plucking of sheep was described, the remaining 'long hairs' providing a protection that would be lacking if the animals were shorn. The 'hairs' were stated to occur *occasionally* in Shetland sheep, and were red (*cf.* the red kemp that sometimes occurs today in the Welsh Mountain breed). Evidence from the skin of the Soay sheep (Ryder 1966a) suggests that the 'hairs' have in fact stopped growing in the spring, so this appears to be delayed shedding and not continued growth, which is in keeping with the identification of these hairy fibres as kemps and not heterotype hairs.

Sinclair, whose ideas are conveyed in the Highland Society Report, advocated the separation of the two kinds of Shetland sheep in order to preserve the fineness of the wool. He regarded the Shetland as the last remnant of an ancient Scottish fine wool, but thought that a few similar sheep may also be found in remote areas of the Highlands and the Western Isles.

Sir Joseph Banks, smug southern critic of Sinclair's efforts to improve British wool, on the other hand regarded the Shetland as being a primitive type nearer to the wild sheep, and not a remnant of the medieval fine wool (Mitchison 1962:113). Measurements made by Ryder (1966c) of a fine staple belonging to Sinclair support the conclusion of Sinclair rather than that of Banks (Table VII).

Elwes (1912) repeated the traditional belief that the Shetland sheep were of Scandinavian origin, and it has already been suggested in the textile section (above) that the Vikings introduced a hairy strain. But although all the Norse sheep may indeed have been hairy, the range of fleece from hairy to woolly, as in the Soay, is likely to have been a common feature of primitive sheep, such variation of course providing the basis on which selective breeding could be practised. An affinity between Scandinavian sheep, and those of the Northern Isles, is supported by the suggestion of similar colour inheritance in Orkney and Icelandic sheep (see above). Elwes quoted a description by Edmonston (1840) of the Shetland as a small sheep, not often horned, with long legs and a short tail. It was stated to be generally white, although sometimes 'ferruginous', grey, black or piebald, the wool being soft, and often fine. Youatt (1840:299) gave a similar

description. Fraser Darling (1945) referred to similar colours, and noted that the grey fleece was of a different type, more akin to that of Orkney sheep.

Low (1842:8) said that the Shetland had been crossed with the Merino, but the progeny could not withstand the climate, and that it was being crossed with the Cheviot. According to Elwes (1912) during the nineteenth century the Cheviot and Blackface displaced the Shetland so that the only ones remaining were those of the crofters on the common grazings, and he considered that the only really pure Shetland sheep were those of Foula and Papa Stour.

Elwes described two stuffed, pure white specimens of Shetland sheep that were presented to the Royal Scottish Museum by T. Edmonston of Balta Sound (Unst) in 1871. He thought the hornless one was a ewe, and the horned one a wether, and stated that their wool, which was $2\frac{1}{2}$ to 3 in. long at the shoulder, was finer than average. Mr Andrew Tait, founder member of the Shetland Breed Society, considered these good examples of Shetland sheep. They have been on loan to the Wool Industries Research Association, Leeds, since 1949. The present writer used skin from them to describe the follicle grouping of the Shetland (Ryder 1958). The wool from these skin samples has recently been measured, and the results are given in Table VII, in which it will be noted that one has some fine kemps.

Elwes (1912) said that there was then no selection of rams, and that the sheep ran wild all the year on common grazings (scattalds) being rounded up only in summer to pluck the wool. There were in fact other (communal) gatherings for smearing, and mating; ewes with young lambs were often tethered on the croft (Ryder 1966d). Elwes observed a distinct break in the wool like that occurring on the mainland owing to reduced wool growth during winter, but found no evidence of hairy fibres with fine wool beneath. He said that most ewes, and some rams, lacked horns, but he saw some rams with four horns, the horns being curved rather than straight. Ewart (1919) said that 'goat-horned' Shetlands were then rare; his illustrations of these in the Soay and in the Shetland show a reversed spiral in the horn.

It was stated in an appendix to the Highland Society Report (1790) that it was still possible to find pure, native Shetland sheep, and although the hairy type seems to have disappeared, there appear to have been no other great changes since then so that it is not true to say that the pure Shetland no longer exists. One feature which indicates an absence, or at least a minimum of crossing, is the short tail of only thirteen vertebrae compared with the twenty vertebrae of more highly evolved breeds. It is clear that when the breed society was established in 1926 it started with native Shetland sheep, and the improvement that has been carried out has been by selection towards a standard white, woolly type (Ryder 1966d). But although fleece weight has been increased by about $\frac{1}{2}$ lb, the average is still only about 2 lb, and the breed is uneconomic by modern standards. It thrives well on the poor grazing of the scattalds, but when pasture improvement takes place, Cheviot-cross-Shetland sheep are used. Pure Shetland sheep have, of course, to be kept to produce this cross.

Only a small proportion of Shetland sheep are coloured today, and of these the predominant colour is moorit, the only colour fostered by the breed society. There are also black, piebald, and grey sheep, and some interesting variations. One of these, known as 'shaila', is greyish-black, and said to resemble hoar frost on old, rain-sodden snow. Another colour variant is 'catmuggit', and in this the belly wool is black, but in the fleece area only the base of the staple is black, the tip being white. This is comparable with the Icelandic term *mögott* for a sheep with a black belly (Aðalsteinsson 1966). A rarer, blue-grey type has wool that is black at the tip, but white at the base. (Ryder [1966d] has reviewed Shetland sheep husbandry and wool manufacture.)

The Cheviot

The modern Cheviot (Plate IVd) was apparently derived from the Dunface. About 1800 it in fact still had a dun face and the rams were horned. About this time, too, Cheviots were termed 'long sheep', and Blackface sheep 'short sheep' suggesting that the Cheviot was already larger than the Blackface. Early nineteenth-century illustrations such as those of Youatt (1840) show an animal similar to that of today. The Cheviot occasionally throws a brown lamb which suggests an affinity ultimately with the Soay. One such lamb born in 1963 and belonging to Mr T. Walton of Capheaton, Northumberland was of interest in having white rump patches at the side of the tail like the Soay, but although wool examined from this throwback had a pale tip, and a dark brown base, as in the Soay, the fleece structure resembled that of the Cheviot rather than that of the Soay.

Trow-Smith (1957:225–9) follows Fitzinger in naming the Cheviot a heath sheep. This is an unfortunate term because all sheep so named are not necessarily related genetically. For instance, the German Heath sheep (Heidsnucke) appears similar to the Scottish Blackface. Trow-Smith (1957) quotes Lisle (1714) as stating that the sheep of the Borders were small, with good wool, and two to four horns, and the rams six. This is very similar to earlier descriptions, yet by 1746 the Cheviot was being improved with good English rams (Trow-Smith 1959). Robson of Belford improved his Cheviots by crossing with English Leicester and Lincoln rams, and increased fleece weight as well as making them earlier maturing, without losing hardiness. Sometimes, however, improvement was carried out at the expense of hardiness, and a 'blocky' type of Cheviot developed by James Brydon of Moorland in Eskdalemuir nearly died out in snow in 1860 (Symon 1952).

The Cheviot was taken from the Borders to Caithness about 1790. Although such movements are frequently attributed to one man, in this instance Sinclair, Kerr of Armadale also introduced the Cheviot into northern Scotland in 1791 (Trow-Smith 1959: 138). Here it developed into a larger type of sheep known as the North Country Cheviot.

Clearly much more can be written about individual breeds as more detailed records become available at the end of the eighteenth century, but this brief account must suffice in the present survey.

The Border Leicester

This breed (Plate IVe) almost certainly developed from a cross between the English Leicester and the Cheviot. The main use of the Border Leicester today is to provide rams for crossing with hill breeds in order to combine the maternal qualities of the hill breeds with the increased body size of the Border Leicester. The cross with the Cheviot is the Halfbred and that with the Blackface is the Greyface.

Franklin (1952:141) thought that these crosses dated back only to the middle of the nineteenth century, but Trow-Smith (1959:137) shows that the 'Culley' which he regards as being the embryo Border Leicester was being crossed with the Cheviot as early as the end of the eighteenth century. Franklin states that about 1875 on the Borders there was much crossing back to the Border Leicester, to give a $\frac{3}{4}$ Border Leicester. The modern second cross, with a Down ram (Suffolk or Oxford) to produce early fat lamb, does not seem to have started until the beginning of the present century.

The Scottish Blackface

We have already seen that the Blackface (Plate IVf) came originally from England, but the date at which it began to cross the Border is not known. Scott and Scott (1888) and Parnell (1939) draw attention to the opposition between the reference of Boece (1460) to Blackface sheep in the vale of Esk, and that which considered James IV to have imported the first flock to Ettrick in 1503. It is possible that the Blackface was confused with the Dunface because Scott and Scott said that Dunfaced was another name for Blackfaced. Ettrick does, however, appear to be the centre from which it spread to Tweeddale and Lammermuir. Trow-Smith (1959:138) regarded the statement of Johnston (1794) that the Blackface was the original breed of the country around Selkirk as indicating that it had been there a long time. Naismyth of Hamilton, writing in 1796, made a similar observation regarding Lammermuir. About the end of the eighteenth century the Blackface was known as the Linton breed, from the market—West Linton in Peebles-shire—from which the sheep were bought for the Highlands. The spread of the Blackface into Dunbartonshire, Argyll and Perthshire in the middle of the eighteenth century, reaching Ross-shire about 1775, is well chronicled.

The Scottish Blackface is now the most numerous breed in Britain, and different types have developed in different parts of Scotland. The fleece is quite distinct from that of other Scottish sheep in that it has long (heterotype) hairs in addition to kemp fibres and true wool. There are three main grades of fleece: 'Deep Strong', 'Medium' and 'Short Fine'. The 'Deep Strong' grade comes mainly from Lanark type Blackfaces kept mostly in central Scotland. This type of fleece has the longest and coarsest hairs, with little true wool, and is used in mattresses. The shorter and finer type of fleece, comprising the medium grade, is more widespread and is used in carpets. The Galloway type is shorter and finer, but the finest fleeces of all come from north west Scotland and the Western Isles, and are used in tweeds.

Sheep and the Clearances

One cannot write about sheep in Scotland without mentioning the Highland clearances. So complete was the introduction of new sheep and their shepherds in the eighteenth and nineteenth centuries that sheep traditions in the Highlands today merely reflect lowland influence.

The present author questions the much-repeated statement that the Highlands are cattle country, and not sheep country. The sheep is a mountain animal, whereas cattle have their natural home on the lowlands. Sheep can thrive on land that is too poor to support any other farm animal: a much better hill is needed for cattle, and they need a bigger lowland area for wintering.

Historical records suggest that the goat was as important as the sheep before the clearances, and that both out-numbered cattle. Dr Johnson in his *Journey to the Western Isles* (1773) gives the stock of one tacksman in the Highlands on the mainland as: '100 sheep, as many goats, 12 milk cows, and 28 beeves ready for the drovers.' Gray (1957) stated that before the clearances sheep were grazed with cattle in equal numbers. According to Franklin (1952:166) cattle only became an important export after the Union, and in order to develop cattle some chiefs restricted the number of sheep kept by their clansmen to one sheep for every head of cattle.

The spread of the Blackface and Cheviot sheep from the Southern Uplands into the Highlands began about 1760. According to MacLagan (1958) it started in 1752 when John Campbell took Blackface sheep from Ayrshire to Dunbartonshire. By 1800 they had reached the Great Glen, and by 1840 run-rig was almost extinct. The last county to receive sheep was Sutherland. Wheeler (1966) used old maps to give graphic illustration of the way in which settlements distributed throughout the country were swept to the coasts by the tide of sheep-farming. Here and in Caithness the Cheviot breed predominated and still does so. (The clearances are dealt with in greater detail in Ryder 1968f.)

Apart from the main breeds already discussed, other sheep have been brought into Scotland, such as the Down breeds now important in providing rams for fat lamb production. Even the Merino was introduced at the beginning of the nineteenth century, but its effect on the sheep of today was almost certainly negligible.

Sheep breeds, like human populations, are never static. The slow progress of earlier times was superseded by relatively quicker changes during the last 200 years. But if the sheep is to survive the economic demands of today it will have to be changed much faster still into a more productive animal.

Summary and Conclusions

1 Evidence from bones found during archaeological excavation suggests that the prehistoric sheep of Scotland were of Soay type; there is no conclusive skeletal evidence for more than one type of sheep. The difficulty of distinguishing differences in size due

to breed from within-breed differences due to sex, nutritional status or genetic variation, is regarded as being enormous.

2 Naturally-pigmented wool textile remains from the Roman period support the suggestion of Soay sheep and indicate fleece variation from a hairy to a woolly type, similar to that found in Soay sheep remaining on St Kilda today. There is evidence as early as Roman times of a native evolution towards modern white, fine and medium fleece types. Whereas medieval fleeces tended to be fine, those of the Norse period, and the seventeenth century, tended to be hairy.

3 There is little historical evidence of sheep type until the eighteenth century, but it seems likely that the monastic farmers introduced improved sheep from England in the Middle Ages. The native sheep of Scotland emerged into history as the Dunface, a term which suggests an affinity with the Soay; another term used was Old Scottish Shortwool, which suggests fine wool. Records indicate that these sheep were kept by each family in relatively small numbers and selected for fine, probably white, wool. Other 'muirland' sheep with a short tail, but of the same general type existed alongside these and probably had hairy, coloured fleeces.

4 The range of variation from the muirland sheep to the Old Scottish Shortwool was probably similar to that seen in the Orkney sheep now remaining only on North Ronaldsay. These are primitive in having a short tail, coloured fleeces and a tendency to moult, which in the past necessitated the collection of wool by plucking. The fleeces range in colour from black, through grey to white, with a few brown ones. The grey animals tend to have hairier fleeces than the white ones, which mostly have a white, woolly fleece like the modern Shetland.

5 The Dunface appears to have been the ancestor of the modern Cheviot breed which is first recorded in the eighteenth century, and the Border Leicester is the result of a cross between the Cheviot and the English Leicester, long-woolled breed. The Scottish Blackface came from England, although when it first crossed the border is not known. It was well established in southern Scotland and beginning to reach the Highlands by the middle of the eighteenth century.

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