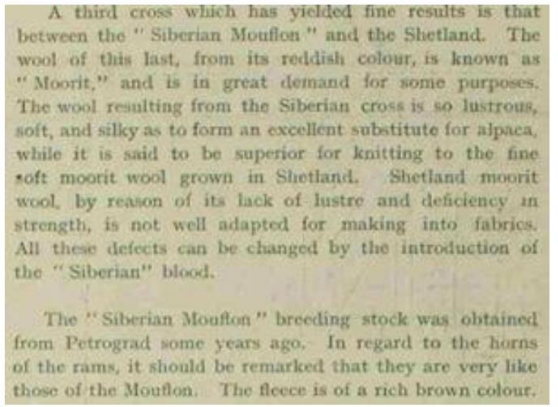
The History of the Castlemilk Moorit Breed

The 'Shetlands' flock at Castle Milk Park in 1964. One of the oldest known colour photographs of Castlemilk Moorits.
Copyright: dr. Alastair Cameron

Part 1 – the creation of the breed 1928 - 1970

Time of experiments

At the beginning of the 20th century breeders were looking to ‘improve’ their sheep and experimented with crossing primitive and more modern sheep breeds. One of the best known, and most successful among these breeders was Mr. Henry Elwes, in collaboration with Professor James Cossar Ewart of the University of Edinburgh, who aimed to develop new sheep varieties that could withstand all weather conditions, overwinter on just a diet of grass and wouldn’t need any shelter in lambing season. The aim was by eighteen months these breeds should yield good quality, lean meat and Ewart especially, wanted good quality, soft wool, suitable for clothing.



A third cross which has yielded fine results is that between the "Siberian Mouflon" and the Shetland. The wool of this last, from its reddish colour, is known as "Moorit," and is in great demand for some purposes. The wool resulting from the Siberian cross is so lustrous, soft, and silky as to form an excellent substitute for alpaca, while it is said to be superior for knitting to the fine soft moorit wool grown in Shetland. Shetland moorit wool, by reason of its lack of lustre and deficiency in strength, is not well adapted for making into fabrics. All these defects can be changed by the introduction of the "Siberian" blood.

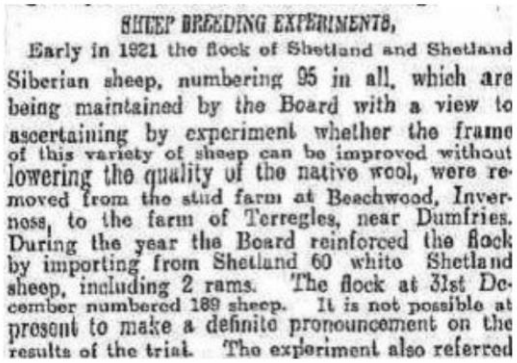
The "Siberian Mouflon" breeding stock was obtained from Petrograd some years ago. In regard to the horns of the rams, it should be remarked that they are very like those of the Mouflon. The fleece is of a rich brown colour.

The advantages of a cross between a 'Siberian Mouflon' and a Shetland. Copyright: http://www.britishnewspaperarchive.co.uk,The Illustrated London News, October 11,1919, p. 564

The records show Ewart crossed several breeds of sheep, including reddish-brown (Moorit) Shetlands, with (descendants of) brown 'Siberian Mouflon' sheep. This resulted in offspring he called 'Shetland-Siberian' sheep, which produced larger quantities, and also high-quality wool. It was so good, that it was seen as replacement for Alpaca wool and compared to the wool of the original moorit Shetlands, it seemed to be even better suited to be processed into items of clothing.

An example of a Siberian ram. Source: "Roslin glass slides", University of Edinburgh Collections , license CC BY-NC-SA 4.0

In early 1921, a flock of 95 'Moorit Shetland' and 'Shetland Siberian' sheep from these experiments were moved from Beechwood, Inverness, to Terregles estate in Dumfriesshire. At just 19 miles from the Castle Milk estate, the exchange of animals seems quite likely and is subject of further investigation.



SHEEP BREEDING EXPERIMENTS.

Early in 1921 the flock of Shetland and Shetland Siberian sheep, numbering 95 in all, which are being maintained by the Board with a view to ascertaining by experiment whether the frame of this variety of sheep can be improved without lowering the quality of the native wool, were removed from the stud farm at Beechwood, Inverness, to the farm of Terregles, near Dumfries. During the year the Board reinforced the flock by importing from Shetland 60 white Shetland sheep, including 2 rams. The flock at 31st December numbered 189 sheep. It is not possible at present to make a definite pronouncement on the results of the trial. The experiment also referred

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Meanwhile on the Castle Milk Estate Sir John ('Jock') Buchanan Jardine was working to create a similar, multifunctional sheep. These 'Shetlands' as he called them, were the ancestors of what would later be known as Castlemilk Moorit sheep.

The 'Shetlands'

Sir John Buchanan-Jardine, baronet of Castle Milk estate, was an expert on trees, a great lover of animals and well-known breeder of Galloway cattle and the Dumfriesshire black and tan Foxhound. The records imply he probably developed his 'Shetlands' from 1928 onwards. However in addition to these 'Shetlands' he, and his wife, kept other sheep on the estate such as South Country Cheviots, Dorset Horns, Wiltshire Horns, Lonks and the Black Welsh Mountain sheep.

Castle Milk, St Mungo, Dumfries and Galloway (photo: postcard)

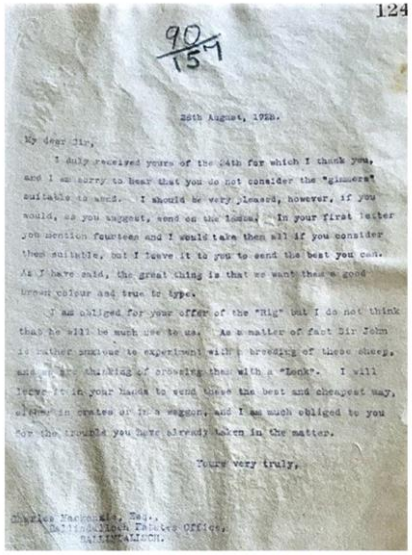
Sir John had a passion for reds and browns. All trees that he planted on the estate were characterised by beautiful autumn colours. After World War II he put much energy into breeding his inherited herd of black Galloways into the nearly extinct colour variety 'dun' (brown). His dairy cows and the hunting dogs he bred all had brown colours too.

This theme continued with the reddish-brown (moorit) ‘Shetlands’ which were kept as much to enhance his estate as for economic purposes, though the wool was made into water repellent garments for himself and his family. All details of his livestock and dogs were meticulously noted, except for his ‘Shetlands’. As such, the exact breeding decisions to produce his ‘Shetlands’ remain unclear, but it is certain that the ancestry is much broader than the Shetland sheep as we know them today. The size, mouflon markings, fleece type, shape of horns and the existence of horned ewes aren’t typically Shetland but can been seen in a number of other primitive breeds. The question remains: but which ones?

Luckily historic information can still be found in the estate’s vast archives – the Letterbooks. From those Letterbooks we know that in 1928 Sir John had fourteen ewe lambs brought in from Ballindaloch Estate in Banffshire. He didn’t know beforehand what breed he would be sent, but had specified that they should be brown and ‘true to type’.

In an earlier letter Sir John stated that he knew Ballindalloch estate had four-horned sheep, but had no knowledge of the breed. Sadly, the Ballindaloch estate archives were destroyed in a fire. We did find a 1913 newspaper article which suggests that St. Kilda sheep might have been the ones Sir John was referring to. Unfortunately, at that time ‘St Kilda’ was used for both Hebridean (often four-horned) and Soay sheep. The next page has an 1911 picture of St. Kilda (possibly Soay?) sheep.

Sir John Buchanan Jardine. Copyright http://www.britishnewspaperarchive.co.uk, The Sketch – 25 July 1928, p.169



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28th August, 1928.

My dear Sir,

I duly received yours of the 24th for which I thank you, and I am sorry to hear that you do not consider the "ginmers" suitable to send. I should be very pleased, however, if you would, as you suggest, send on the lookes. In your first letter you mention fourteen and I would take them all if you consider them suitable, but I leave it to you to send the best you can. As I have said, the great thing is that we want them a good brown colour and true to type.

I am obliged for your offer of the "Rig" but I do not think that he will be much use to us. As a matter of fact Sir John is rather anxious to experiment with a breeding of these sheep, and is thinking of crossing them with a "Lonk". I will leave it in your hands to send these the best and cheapest way, either in crates or in a waggon, and I am much obliged to you for the trouble you have already taken in the matter.

Yours very truly,

Charles Mackenzie, Esq.,
Ballindalloch Estate Office,
BALLINDALLOCH.

The letter ordering his first 14 sheep, August 28, 1928. (crediit: Sir John Christopher Buchanan-Jardine).Remarkably, he planned to cross breed these ewes with a Lonk ram.

ST. KILDA SHEEP. THE PROPERTY OF MR. D. MACPHERSON.

breeders of the district. There will be a number of entries of Aberdeen-Angus cattle by Sir John Macpherson Grant, including several prize-winners at the Highland and Agricultural Society's Show. A feature of interest will be one or two entries of St Kilda sheep from Ballindalloch Castle. An ex-

Copyright: http://www.britishnewspaperarchive.co.uk, The Dufftown news and Speyside advertiser, August 2, 1913. Picture of St Kilda sheep: Copyright: Shepherds of Britain, Gosset, 1911 p.68

FOR SALE, 12 Well-Bred SHETLAND EWE LAMBS, "Moorit" Variety. Apply John J. Simpson, Estate Office, Dupplin Castle, Perth.

In October 1928 Sir John also planned to buy a number of Shetland ewe lambs, offered for sale by Dupplin Castle Estate near Perth. Declining those for being too young, eventually he did find adult ewes with John Smith, of Berry Farm in Scalloway Shetland, cattle and fleece merchant and founder of Jamieson & Smith Shetland Wool Brokers. The first group of ewes arrived at Castle Milk Estate in November 1928, the second in January 1930 with the accompanying letters only mentioning 'Mourat' coloured Shetlands but not specifying any numbers. With this small Shetland flock he started his experiments, leading to his own breed of sheep.

John 'Sheepie' Smith ('Auld Sheepie'), Berry Farm Scalloway. His daughter on a Shetland pony and her friend on a Moorit Shetland ram. Early '30s. Copyright: Shetland Museum

From1930 onwards the ‘Shetlands’ were seen to be grazing the estate’s ‘golf course’ at the back of the house . This photo, taken by Sir Rupert (Sir John’s son) in the ‘30s, clearly shows that there was no such sheep as the ‘Castlemilk Moorit’ - yet.

‘Shetlands’ on Castle Milk estate, in the ‘30s. Copyright: Sir Rupert Buchanan-Jardine. A number of crossbreeds (with on the right a small horned sheep with Moufflon/Soay markings on head and legs)

A letter dated October 15,1930 to Mr. I. W. Parnell at the Animal Breeding Research Department of Edinburgh University, mentions a number of breeding experiments with this flock, amongst which crossbreeding a Moufflon ram with Lonk ewes. Other letters from the same time period show experiments with Dorset Horns, Wiltshire Horns and the ‘Shetlands’.

A 1930 newspaper article describing a visit of 130 agricultural students to the estate, mentions a Dorset Horn – Shetland crossbred ram:

Making their way to one of the fields adjoining the steading, the party next inspected Cheviot sheep, Dorset horned and Shetland sheep, and a ram which was a cross between a Shetland and a Dorset horned.

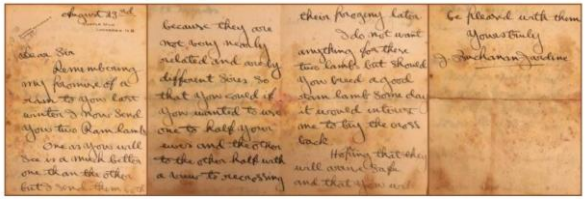
Copyright: http://www.britishnewspaperarchive.co.uk, The Scotsman, February 3, 1930

Based on his preference for brown animals, Sir John focused his breeding experiments on sheep in that colour too. The October 15,1930 letter is the only one mentioning a Mouflon ram on the estate. Sir John’s son Rupert later confirmed the existence of this ram. It is unclear whether this was indeed a Wild Mouflon, or perhaps a Soay ram as the latter were called ‘brown mouflons’ at the time. It may be this ram will have been responsible for the characteristic mouflon markings in what are now known as Castlemilk Moorit sheep.

AT CASTLEMILK: SIR JOHN BUCHANAN-JARDINE, M.F.H. (DUMFRIES HOUNDS)

1932 – Sir John with 2 ‘Shetland’ rams. Copyright: http://www.britishnewspaperarchive.co.uk, The Tatler, September 28, 1932, p.28

The next lead in our mystery is a 1934 letter to the secretary of the Wiltshire Horn Sheep Society mentioning Wiltshires being used to crossbreeding the ‘Shetlands’, resulting in a ‘very good fleece, according to the wishes of Sir John’. Using Wiltshire Horns for this experiment seems strange to us as we think of it as a shedding breed, but this was not the case in the 1920’s when the breed was described as ‘medium wool’ with no fleece on its belly, head or legs.

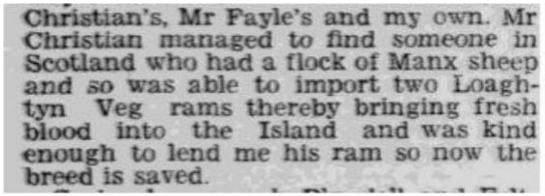


The letter from Sir John to Edward Christian about the 2 ram lambs sent. 1935 Copyright Manx Museum, Isle of Man.

We know from letters that Sir John and Edward Christian in Ballacallin, Isle of Man exchanged Manx Loghtan and 'Shetland' rams, after contacts having been established in 1934 by Edward Christian's sister from Carlisle, quite near to Sir John. In August 1935 Sir John donated two ram lambs to Edward Christian – stating one much better than the other - and hoped to be able to buy a good crossbred ram lamb in future, should the breeding be successful. Which it seems to have been, as after renewed contact in October 1936, Edward Christian sent a ram to Sir John. In a June 1937 newspaper article there is mention of one of Sir John's rams having been lent to Mrs L.F Lascelles on the Isle of Man, probably for the 1935/1936 tupping season.
In March 1936 Mrs Lascelles offered the Manx Museum a 4-5 days old ram lamb to be prepared. Although the mounted lamb doesn't show any Moufflon/Soay marking (with its colours being quite faded) it may well have been an early crossbred of a Manx Loghtan ewe of Mrs Lascelles with one of Sir John's 'Shetland 'rams.

An April 1939 news article shows the acceptance of an offer by Sir John to have a number of wild Shetland sheep be exhibited at the Highland Show. Eight 'Shetlands' are presented; amongst which three black and three moorit ewes. Opposite is the report in the exhibition catalogue:

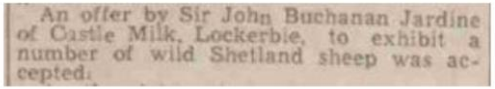
In 1946 another ram of Sir John's was sent to the Isle of Man, to Lady Collet, wife of the late Sir Mark Collet, Manx Loghtan breeder in Ballamanaugh,Sulby, who possibly had bought Edward Christian's Manx Loghtans A newspaper photograph (next page), taken in 1947, shows this quite impressive 'Shetland' ram amongst Lady Collet's flock.



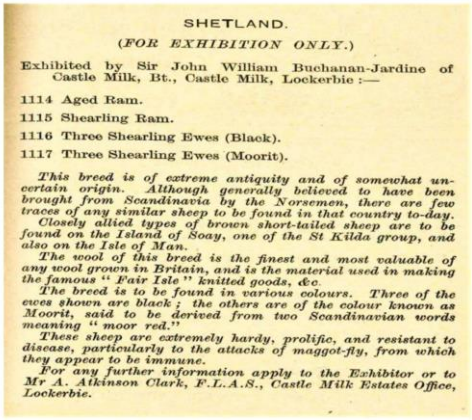
Christian's, Mr Fayle's and my own. Mr Christian managed to find someone in Scotland who had a flock of Manx sheep and so was able to import two Loaghtyn Veg rams thereby bringing fresh blood into the Island and was kind enough to lend me his ram so now the breed is saved.

Mrs Lascelles (author) mentioning 2 imported Loaghtyn rams from Scotland. Copyright: http://www.britishnewspaperarchive.co.uk, Ramsey Courier, June11, 1937

Mrs Lascelles' 4-5 days old ram lamb, possibly an early offspring of a Manx Loaghtan ewe and a 'Shetland' ram of Sir John. Copyright photo: Paul Spierings, with thanks to the Manx Museum.



An offer by Sir John Buchanan Jardine of Castle Milk, Lockerbie, to exhibit a number of wild Shetland sheep was accepted.



SHETLAND.

(*FOR EXHIBITION ONLY.*)

Exhibited by Sir John William Buchanan-Jardine of Castle Milk, Bt., Castle Milk, Lockerbie :—

1114 Aged Ram.
1115 Shearling Ram.
1116 Three Shearling Ewes (Black).
1117 Three Shearling Ewes (Moorit).

This breed is of extreme antiquity and of somewhat uncertain origin. Although generally believed to have been brought from Scandinavia by the Norsemen, there are few traces of any similar sheep to be found in that country to-day.

Closely allied types of brown short-tailed sheep are to be found on the Island of Soay, one of the St Kilda group, and also on the Isle of Man.

The wool of this breed is the finest and most valuable of any wool grown in Britain, and is the material used in making the famous "Fair Isle" knitted goods, &c.

The breed is to be found in various colours. Three of the ewes shown are black; the others are of the colour known as Moorit, said to be derived from two Scandinavian words meaning "moor red."

These sheep are extremely hardy, prolific, and resistant to disease, particularly to the attacks of maggot-fly, from which they appear to be immune.

For any further information apply to the Exhibitor or to Mr A. Atkinson Clark, F.L.A.S., Castle Milk Estates Office, Lockerbie.

Catalogue of Stock, Highland Show Edinburgh, 1939. Courtesy the RHASS

A May 1949 report by Mr J. F. Robinson of the Animal Breeding and Genetics Research Organisation indicates that this flock contained six 2nd year ewes, tupped by a 'Shetland' ram. These rams and ewes had the distinctive Mouflon/Soay markings, curved horns and grew faster and larger than Manx Loghtans. This ram was said to have been slaughtered at the end of 1947,because of its temperamental character (it killed two rams of a neighbour farmer in one blow…).

PRESERVATION.—Owned by Lady Collet, this flock of Loughtan sheep —a hardy Manx breed almost extinct—is pastured near Peel golf links, and is the only flock of this type of animal on the Island. Believed of Spanish descent the Loughtan sheep is unusual in having several horns.

Sir John's 'Shetland' ram in Lady Collet's flock, Copyright: http://www.britishnewspaperarchive.co.uk, Isle of Man Examiner, July 4, 1947, p.12.

In 1953, this Manx flock of crossbred animals was transferred to the Manx Museum. In the photos opposite, taken in 1953, the more elegant Castlemilk Moorit type can be clearly recognised in the crossbreds of this 'Shetland' ram and the Manx Loghtans.

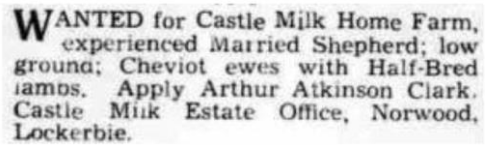
1953 picture of Sir John's 'Shetland' ram, crossbred with Manx Loghtans. Copyright: G. Kenneth Whitehead, Courtesy of the Manx Museum, Isle of Man.

Interesting too, is a photo of a flock of 'Shetlands' (February 1950), at 'Lower House Farm' in Cranleigh. This farm was nicknamed 'The Buff Farm'. Where the owner Mr T.O Mills also preferred brown livestock, he only had light brown coloured (buff) geese, ducks, chickens, goats, sheep and cows. The 'Shetlands' flock at this farm bears a great resemblance to the later Castlemilk Moorit sheep. The Mouflon markings are clearly visible on all sheep in the photo below. They are all horned, evenly (and lighter) coloured and in terms of type, these sheep, despite being clearly smaller and less elegant, look a lot like the ultimate Castlemilk Moorit sheep. It is possible these came from ewes from Sir Jock which were crossbred with Soays but there is no direct evidence for this.

SHETLAND SHEEP *are among the Lower House Farm stock. Mr. T. O. Mills and two of his dogs steady a group for the camera.*

Copyright: http://www.britishnewspaperarchive.co.uk, Illustrated Sporting and Dramatic News, Sport & Country, February 8, 1950, p.92

Castle Milk Estate’s last shepherd was William (Willie) Morrison, who served from 1949 until his retirement in 1971. Kenneth Thompson, assistant shepherd, was also involved in the flock’s day-to-day management. In the late 1960s, the flock consisted of about 60 ewes and 2 to 3 rams. William Morrison recalled that Sir John always selected the animals for the breeding programme himself and that no other sheep were introduced into the 'Shetland' flock during his time as shepherd (despite the fact that in 1955 for example, a four-horned Manx Loghtan ram was sent over). Opinions differ as to whether or not this ram has been used. According to Willie he wasn’t, seeing that Sir John didn't want four-horned sheep.


WANTED for Castle Milk Home Farm, experienced Married Shepherd; low ground; Cheviot ewes with Half-Bred lambs. Apply Arthur Atkinson Clark. Castle Milk Estate Office, Norwood, Lockerbie.

A vacancy for a shepherd for Castle Milk Home Farm, August 1944

William Morrison, shepherd at Castle Milk Estate. Courtesy of Mrs. M. Mitford.

Kenneth Thompson, on the other hand, indicated that this ram was indeed part of the 'Shetland' flock. Ultimately, all those years it remained a closed flock, within which the later Castlemilk Moorit sheep developed its breed-typical characteristics and were able to pass these on in pure bloodlines. One last image remains for this time frame: a 1967 photo of 'Bleep', a bottle-fed lamb that was cared for at home by Kenneth's children and eventually rejoined the herd at Castle Milk estate.

‘Bleep’ the pet ram lamb with the children of Kenneth Thompson. Copyright Kenneth Thompson

Part 2 -Rescue and recovery 1970 – 2018

In the autumn of 1970, Joe Henson was busy expanding his collection of rare sheep breeds in preparation of the planned opening of Cotswold Farm Park. His eye fell on an advertisement in Farmers Weekly by Castle Milk estate, offering 'Moorit Shetland' sheep for sale. This, following the death of Sir John Buchanan-Jardine, a change in management of the estate, and, according to the family, possibly also because his son Rupert thought the 'Shetlands' to be less attractive. From the description Joe Henson assumed it to be moorit coloured Shetland sheep, although Shetland sheep were not rare the moorit colour was less common, and as he didn't have any, this would be a great opportunity to start a flock. Bob Furness, a friend from Lockerbie, would arrange the transport, and after a telephone consultation with the estate about the price, Bob set off with a small trailer. It was agreed that he would take a ram and six ewes. The animals were delivered a few days later. To Joe's surprise they were beautiful but in no way resembled Shetland sheep, looking more like 'blonde' Soays but bigger .with the ewes having beautifully splayed curved horns, and with their slender legs and white bellies they looked like roe deer!. The ram was about the size of a Manx Loghtan but had heavy outward-turning horns reminiscent of the horns of a mouflon. Bob, the transporter, indicated that all the 'Shetlands' on the estate, more than 100 in total, were very similar in colour and type. Unfortunately, the next morning one ewe was found dead with a broken neck. The animals had panicked and run into the fence. So then there were only six…

Joe assumed that local people in the estate's area would buy up Shetlands too, so he would be able to trade rams with them at a later time. Later, only four ewes were found to have been bought by someone else, Mr. A. Mundue of Northumberland. All other animals had been slaughtered… At that moment Joe truly regretted his small purchase. These 10 remaining sheep became the ancestors of all living Castlemilk Moorit sheep today.

SHETLAND

SHETLAND SHEEP for sale, self-contained flock of Moorit Shetland sheep. Ideal for parkland or deer park. —Inquiries FARM MANAGER, Castlemilk Estate Office, Lockerbie, Dumfriesshire.

The advertisement from the Farmers Weekly offering Moorit Shetland sheep for sale. Copyright: Farmers Weekly, p.14, Aug. 7, 1970

Sanctuary in hills for rare livestock

By ARTHUR SUTTON
Birmingham Post Agricultural Correspondent

Part of a big Cotswold farm has been made into a sanctuary for rare breeds of livestock and a campaign is being waged to ensure their survival.

An area of 25 acres has been set aside for this purpose at Bomborough Farm, Guiting Power, near Bourton-on-the-Water, where the public can see unusual breeds of cattle and sheep in natural surroundings.

Mr. Joe Henson, who helps to run the 1,500-acre farm, is one of the partners in the project. He is also a member of a committee formed to promote rare breed survival.

"We are trying to find ways of raising money to support this work," he said. "I received planning permission to open part of my farm to the public and we had a good response on Whit Monday.

"We are getting more and more visitors in the Cotswolds but there are limited numbers of places where they are welcome. This enterprise, which we call the Cotswold Farm Park, is a place where they can see these rare animals and help to save them from extinction."

Animals on the farm park include Longhorn Old Gloucester, Dexter and Chartley cattle, and Shetland, Orkney, Soay, St. Kilda, Manx and Jacob sheep.

Mr. Henson, who is in partnership in this farm park with Mr. John Neave, is mainly an arable farmer, growing barley and wheat. But the 25 acres are devoted to the preservation of farm animals which might well die out without special aid.

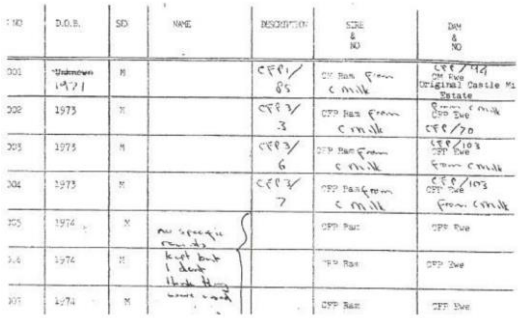
When Cotswold Farm Park opened, the Castlemilk Moorit sheep were still referred to as 'Shetlands'. Copyright: http://www.britishnewspaperarchive.co.uk, The Birmingham Post, 3-6-1971,

One of the few photos of the 'Moorit Shetlands' in Joe Henson's early days. Right on the photo 'Ram 1'. Striking are the strong mouflon markings in the ewe on the left. Copyright: Joe Henson. Courtesy of the Henson family

Joe's six sheep did well. He tried to get more information about their background and was told that a 'blonde' Soay ram had been used in the past. But was also told the offspring of this crossbred were found to be too small and had been slaughtered, together with the ram. He also discovered the possible use of a Mouflon ram; this could explain the Mouflon markings in both ewes and rams and the heavy horns of the rams. On the other hand, if only a Mouflon had been used, one would occasionally expect hornless ewes. No further information was available so It would need to wait for DNA testing before we knew which breeds of sheep were actually used.

The ancestors were not easy to handle… Copyright Joe Henson. Courtesy of the Henson family.

In the first lambing season, the 5 ewes gave birth to two twins, one triplets and two single lambs. A brilliant result! All breeding data, including those of later years, were meticulously recorded by Libby, Joe's daughter. In 1973, the Rare Breed Survival Trust (RBST) was established, with Joe Henson as chairman. At the same time, an acceptance procedure was set up to support pure, long-established rare breeds. Because there were no established breeding registers regarding the 'Moorit Shetlands', they were not immediately accepted as a breed. However, they were included in the first, 1974, edition in of the 'Combined Flock Book'.



Part of the first breeding register of the 'Moorit Shetlands' from Cotswold Farm Park

In 1976 Mr. Mundue's four ewes were purchased by Major Lindsay Wallace, member of the RBST. He bought a ram lamb from another flock originating from Joe Henson. This implies that all current Castlemilk Moorit sheep are descendants of Joe's ram 'Ram 1'. Meanwhile, the number of 'Moorit Shetlands' grew steadily and more flocks were established. On January 11, 1983, it was decided to set up a separate 'grading-up' breeding register to increase genetic diversity. These sheep would only be crossbred with pure bloodlines after a minimum of 4 generations. It was decided to cross a pair of two-horned Manx Loghtan ewes with a Moorit Shetland ram and keep eight ewe lambs to be used for future breeding. Descendants of these animals could

This photo in the Combined Flock Book 1974, titled "Moorit Shetlands" shows a progenitor ewe, her daughter, and (at the back on the left) a ram lamb. 1973, copyright Countrywide Livestock Ltd. Courtesy of the Henson family and the RBST

be used to a limited extent at a later date. At the same meeting it was decided to set up the Castlemilk Moorit Sheep Society, with Major Wallace as president and Libby Henson as secretary/administrator. One of her first tasks was to set up the breeding programme. In the same year it was decided to reapply the breed for acceptance by the RBST. Twelve breeders, eighty breeding animals and six generations had now been described. On November 4,1983, the Castlemilk Moorit sheep was nominated and accepted unanimously as separate breed. At the same time, the breed was classified in category '1', reserved for the rarest breeds.

One of only 100 Castlemilk Moorit ewes in the 1980s, a ewe from Briget Parke's Redoak flock . Copyright B Parke

Since this new start, the number of breeders and breeding animals has grown steadily. The Castlemilk Moorit sheep now sits in the At Risk category and has about 1500 ewes on the register.

Part 3 – The mystery finally solved! 2018 – to date

Having explored the historic evidence as much as possible the Society decided in 2018 to try and answer the question of how the breed was developed using science. Nowadays, modern DNA technology can come to the rescue in reconstructing unknown ancestry. In human genetics, several cases have made the headlines, such as the prehistoric *Neanderthal - Homo Sapiens* contacts, successive waves of immigration in Europe, the royal origins of bones, and criminals brought to justice. And if it works for humans, there is no reason to assume it wouldn't work for sheep!.

To look at the ancestry of sheep we need genome-wide SNP DNA profiles, which are based on thousands of single nucleotide polymorphisms (ie: variable positions, the different variants are called 'alleles') in the sheep genome. Since 2012 50K and 600K (50,000 and 600,000 SNPs, respectively) profiles have become available for many different breeds and have generated a wealth of information on the history of sheep, on breed origins and on genes involved in breed-specific traits. Sheep from most European countries have already been investigated. However, from the British sheep, only the Welsh breeds and a small minority of the English and Scottish breeds have been studied. This is all the more remarkable seeing that British breeds, in particular those in the southern parts of the UK, have been exported to many countries of the world and, together with the Spanish Merino, dominate sheep husbandry worldwide. Fortunately, for the purpose of our research into the ancestry of the Castlemilk Moorit breed specifically, several people and institutions were willing to collaborate to rectify this situation.

Stephen Hall (now at the Estonian University of Life Sciences) contacted the Rare Breed Survival Trust and the Sheep Trust, who in 2018 sent 345 samples from their semen archives to the AgResearch company in New Zealand. DNA was extracted and 8K profiles were generated. Combining these with previous data yielded a comprehensive 4263 SNP dataset of 58 British breeds. An additional 50K profiles are planned, including those generated from more recent CM blood samples, taken in both UK and NL flocks as well as a Manx Loaghtan flock in Belgium.
Bioinformatics has kept pace with the technical progress of modern genome science and delivered several methods of analysis. Broadly speaking, most methods rely on a comparison of the frequencies of the alleles. The principle is simple. Imagine that there is a breed, we will call it Jason Sheep, with a unique trait, a golden fleece. Finding golden hairs in the wool of other breeds would then be an indication of Jason in-crossing; the more golden hairs, the stronger the influence of the Jason sheep. Now replace golden hairs with breed-specific allele frequencies of 4263 SNPs, account for more than one ancestor and there you have it: modern genetic analysis - although the calculations are a bit more complex than counting hairs….

Professor Hans Lenstra from Utrecht University led the project using a number of methods, with each based on the allele frequencies in a different way: supervised model-based clustering and f3 as well as f4 statistics. Most of the results are pretty consistent and differences between the methods have reasonable explanations.
The outcome is rather surprising. Whereas Mouflons are often mentioned as ancestors of the CM, even by Sir Rupert Buchanan-Jardine (Sir Jock's son), we did not find influence of any wild or feral sheep species. Most British breeds, including almost all kept by Sir Jock and his father on their estate, can be excluded as well. Four ancestors of Castlemilk Moorit are indicated: Soay, Manx-Loaghtan, Shetland and, unexpected, Wiltshire Horn.

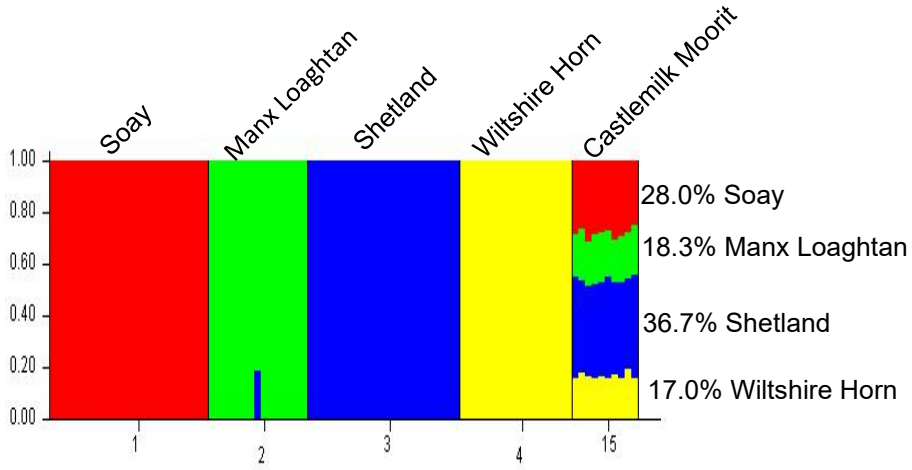


Figure 1. Supervised STRUCTURE analysis with prior population info set for Soay, Manx-Loaghtan, Shetland and Wilshire Horn .

Figure 1 shows the supervised model-based clustering implemented in the popular Structure program. The coloured blocks consist of many vertical lines, each representing an individual sheep from the four indicated ancestral breeds of the Castlemilk Moorit. Colours indicate the ancestry and more lines per colour shows a mixed breed composition. Adding other ancestors to this plot only generated either background or inconsistent signals. The percentages are only indicative, as our samples of the reference populations may only incompletely represent the animals used for breeding the CM and there may be unidentified (small) components from other breeds not taken into account.

The contributions of Soay, Manx-Loaghtan and the Wiltshire Horn to CM were unambiguously confirmed by f4 analysis (Figure 2), which is based on a correlation of the allele frequencies of the donor breed and the recipient (Castlemilk Moorit). However, according to the supervised Structure the Shetland is the most important contributor of the Castlemilk Moorit, but has the lowest *f*4 signal of all four mentioned breeds. This might be explained by the inbreeding of Soay, Manx-Loaghtan and Wiltshire Horn, which caused many SNPs in these three breeds to become homozygous (ie with the same allele inherited from both parents) and generate relatively high f4 values (see Figure 3). However, we will need 50K data for more definite conclusions about the Shetland component of the Castlemilk Moorit.

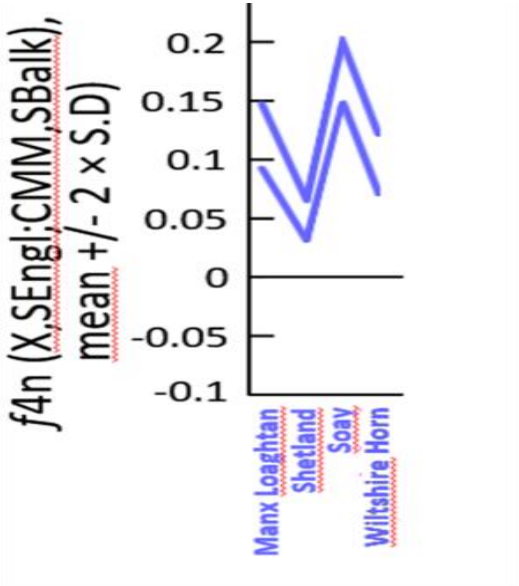
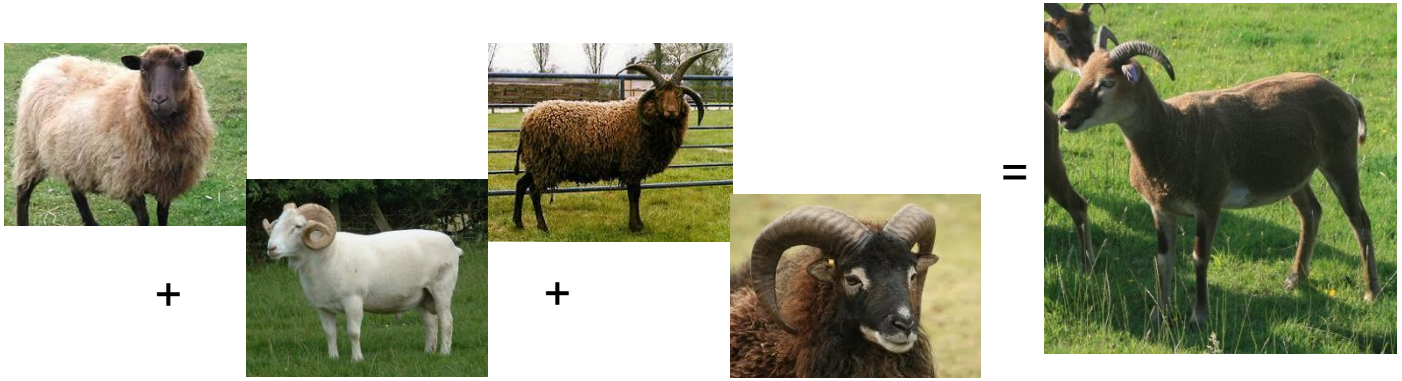


Figure 2. *f4* analysis for Manx Loaghtan, Shetland, Soay and Wiltshire Horn (partial results). The 2 lines demarcate the confidence interval, with 0 indicating a breed not having been incrossed into the CM

As said, early breed descriptions often mention the Mouflon, Manx Loaghtan and Shetland, sometimes also the Soay, but rarely the Wiltshire Horn as likely ancestors of the CM (though we know they were present on the estate). We excluded a substantial contribution of the Mouflon and other breeds present. But all analyses consistently indicate an ancestral component of Wiltshire Horn, which may have passed on its size and possibly other characteristics to the CM. Considering the history of the Wiltshire Horn, we should bear in mind that it was a very different sheep in 1920s. It was then described as 'medium wool', yielding about a 2lb fleece but having no wool on the belly – both attributes match the CM with about 1 kg in fleece and for the majority no wool on the belly.

So until we can do further research we have the nearest thing to an answer to our mystery. The breed is made up from : Shetland (c37%), Soay (c28%) Manx (c18%) and Wiltshire Horn (c17%).



The information above is based on archive research conducted by Paul Spierings, Iberthe Papma and Lucinda Reeves plus the invaluable support of Hans Lenstra for DNA research. We'd also like to acknowledge Peter Wade-Martins, author of 'The Origin of Castlemilk Moorits' from 'The Manx Loghtan Story, The Decline and Revival of a Primitive Breed', and The Rare Breeds Survival Trust', for "The Puzzle of the Castlemilks Finally Solved," The Ark (1st series) Volume XIX No. 6 June 1992.