

FARMING PATTERNS IN CRAVEN

By D. S. F. WILLIAMS

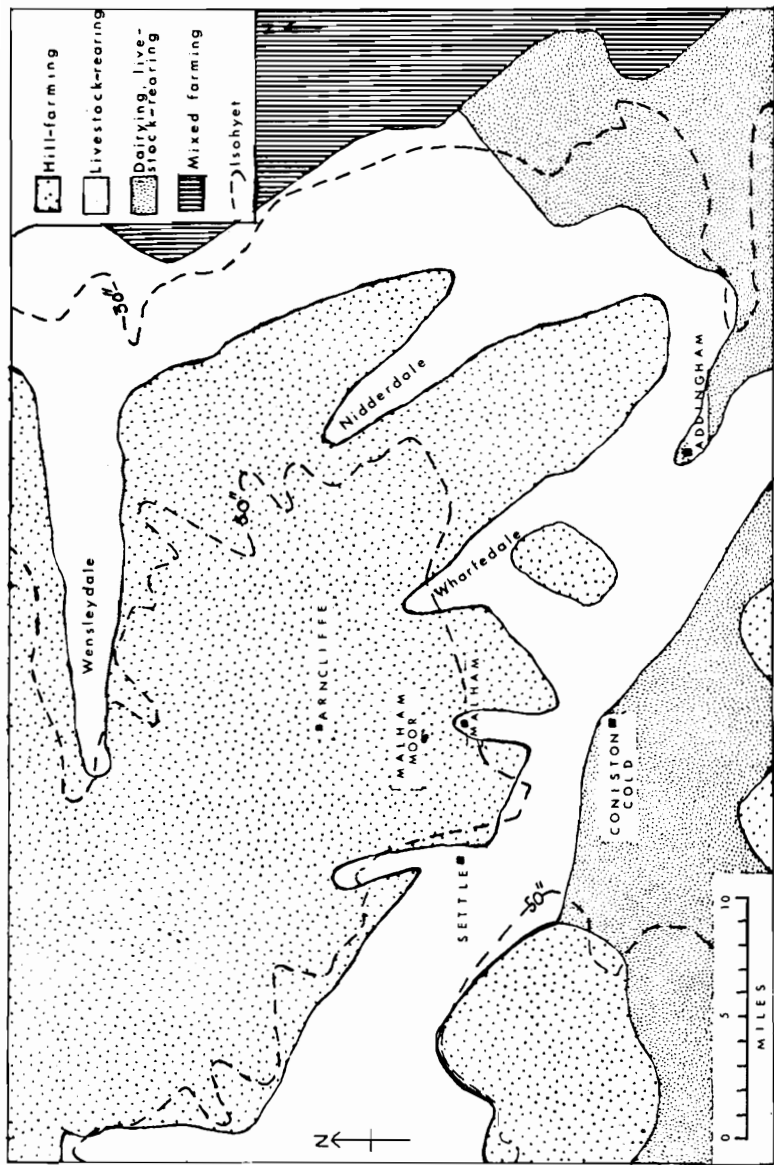
Malham Tarn Field Centre, Yorkshire

THE farming patterns in Craven* are basically similar to those found in any area transitional from mountains and moorlands, through uplands to the upper limit of the lowlands. Craven is a part of the Pennines with boundaries which are puzzling and elusive to define. A most interesting study could be made of the various definitions of this region since Domesday. For present purposes Craven has been taken as the upper valleys of the *Wharfe* and *Ribble* as far down as about Addingham and Gisburn, and all the hills between. Craven is made up of hills and uplands. The hill-lands are characterized by a high proportion of rough grazing, the uplands are the pastoral country between the hill-lands and the arable lowlands, and in N.W. Yorkshire include the upper dales and so-called Craven Lowlands. There is no mixed or partly arable farmland in Craven. The westerly limit of the land where arable types of farming superseded pasture types lies to the east of Harrogate.

The over-all farming pattern of hill-land and upland is a result of the physical background, the climate, the soils and the vegetation potential. It is a pasture type, one of stock-rearing based on permanent grasslands and rough grazings. The climate is the fundamental factor that controls the dominance of the stock-rearing and grassland economy. It is basically a product of latitude and, more significant here, of altitude. The uplands lie mostly between 400 and 1,000 feet and the hills rise to over 2,000 feet. On Map 1 two isohyets are shown and it can be seen that the rainfall of the uplands ranges from at least 30 inches to 50 inches, and the hill-land receives over 50 inches. Representative of the former are Skipton 34 inches and Giggleswick 43 inches, and of the latter, Malham Tarn 58 inches. The temperatures are also such that the highest monthly mean of the uplands is barely 60° F. and of the hill station is 56·7° F. Thus a combination of rather high rainfall and cool summers prohibits a dependence on corn crops. 42° F. can be taken as an average temperature below which there is little plant growth, and Fig. 1 shows the average accumulated temperatures above 42° F., measured in degree-days, for York and Malham Tarn. The ripening of cereals is closely related to the accumulated temperature and York is representative of a corn-growing area. It can be seen that the growing season at Malham Tarn is nearly two months shorter; it is however satisfactory for the growth of pasture grasses.

Within the major category of stock-rearing, there are important variations in the balance of stock enterprises and in the breeds of stock, as related to the local environment. Map 1 shows the main types of farming in and around Craven. Hill-farming land is the country where the breeding and rearing of sheep is dominant. As defined by the government in 1946 it is "mountain, hill and heathland suitable for use for the maintenance of hardy sheep, but not other kinds, or which by improvement could be made suitable". The flocks

* A glossary of Craven farming terms related to the text will be found in Appendix V.



MAP 1.
The major types of farming in and around Craven.

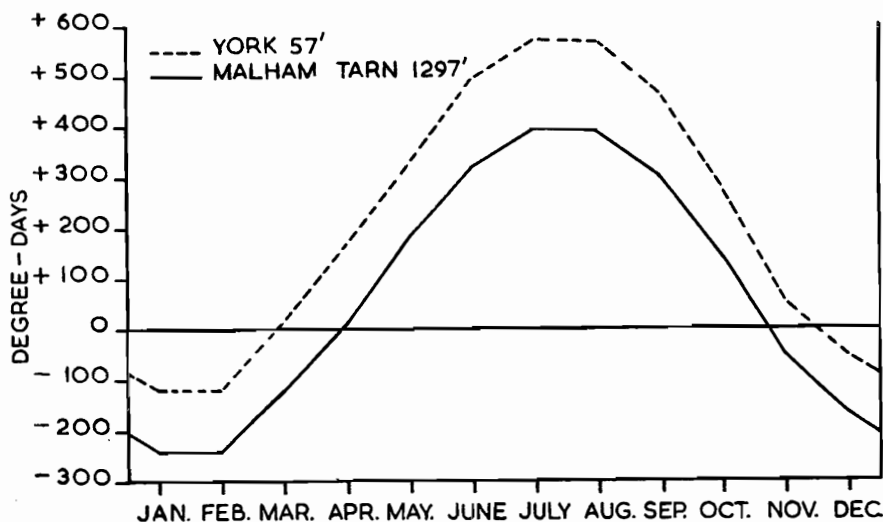


FIG. 1.

Accumulated temperatures above 42°F. Monthly averages for the ten years 1953-1962. One degree-day is 24 hours at an average temperature of 43°F., two degree-days is 24 hours at 44°F.

are pure and self-contained, breeding their own replacements. Cattle are also bred and reared on Craven hill farms. Livestock-rearing land, corresponding to the uplands, is that on which the flocks consist of ewes that are bought, not bred there, and the lambs reared are half-breds. An upper and a lower zone can be recognized. In the upper zone rearing is dominant over dairying, and in the lower zone rearing is subsidiary to dairying. In both, the rearing includes sheep and cattle.

The 50-inch isohyet coincides closely with the lower limit of hill-farming in the west, reflecting chiefly the abrupt junction of rough grazing with better quality grasslands, and an increase in rainfall, both associated with the faulted margin of the Pennines. In the east, where there is no such coincidence, the gentle dip slope gives a very broad upland area. The boundaries of hill-farm-land are determined more directly by the extent of rough grazing than by the rainfall. Map 1 shows how the zone of livestock-rearing surrounds the hill-farming zone, extending up the dales. The mixed farming, part arable zone in country with less than 30 inches is not considered further.

The relative importance of sheep and cattle in different parts of Craven is shown in Table 1. Certain parishes, shown on Map 1, were selected and the figures taken from the 1960 June Returns.

Malham Moor and Arncliffe both show over 80% sheep, and of the cattle less than 10% in milk. It should be remembered that the occurrence of cattle in milk does not necessarily mean the milk is being sold, but may be used for rearing calves. It is also true that hill and upland farms tend towards winter milking, so that June figures for cows in milk give a slightly inaccurate picture. Both parishes, with their high percentage of rough grazing, are typical of the

Table 1. *Figures of stock for Craven parishes taken from the 1960 June Returns.*

	Sheep except lambs	Cattle	% Sheep	Cattle		% In milk	% Rough grazing	Height range (feet O.D.)
				In milk	Others			
Malham Moor ..	5,240	1,218	81	72	1,146	6.3	91	950-2,191
Arncliffe ..	2,483	463	84	41	422	8.8	87	700-1,750
Malham ..	2,628	765	77	87	678	11.4	61	625-1,815
Settle ..	2,526	813	75	159	654	19.6	38	415-1,794
Coniston Cold ..	1,350	831	62	220	611	26.5	6	400- 700
Addingham ..	1,261	1,270	50	352	918	27.7	14	300-1,250

hill-farming zone, though small-holdings in Arncliffe with valley-bottom land only fall into the livestock-rearing class. Malham village is in a similar position to Arncliffe, in a dale at about 700 feet, but the parish has a smaller proportion of rough grazing and shows a correspondingly lower percentage of sheep, and a higher percentage of cows in milk. Malham represents the upper zone of uplands, with livestock-rearing and subsidiary dairying. Settle, with 38% rough grazing and a somewhat higher percentage of cows in milk (a result of the good pastures of the *Ribble* flood-plain), is also representative of this zone.

Further down the dales the proportion of cattle increases and also of cows in milk, partly reflecting an increase of better quality land and of hay for wintering, and also easier access to the milk-consuming industrial towns. At the same time use of pastures for fattening increases, though this is not shown by the figures. Coniston Cold and Addingham, representing the lower zone of uplands, are characterized by dairying with subsidiary rearing. There is a marked decrease in rough grazings and sheep, and though the figures show only a little over a quarter of the cattle in milk the value of the milk sales is usually the main source of income. One of the main factors determining the balance of these stock enterprises is the amount of available winter keep for sheep and cattle respectively. Hill sheep spend much of the winter on the heather and cotton-grass moors, so that the proportion of this particular type of grazing largely determines the size of the flock. Cattle are wintered indoors on hay and "provven", so that, apart from the available barn space, the acreage of hay meadows and the yield determine the number of cattle that can be fed, unless extra hay is bought. Competition between sheep and cattle also arises from the practice of putting the ewes and their newly-born lambs on the meadows in spring; this reduces the hay crop and the wintering capacity for cattle. The process of ruddling the tups means that the ewes will be on the meadows for the least possible time. Hill farms can winter about one cow per acre of hay meadow, rearing farms about one and a half, and the dairying farms about two.

One of the main differences between hill farms and livestock-rearing farms is the size. Hill farms are often of the order of 1,000 acres, whereas livestock-rearing farms may be only a few hundred acres or even less than a hundred. The labour however is frequently the same, two men or a man and a boy, since cattle and especially milkers and indoor-wintered cattle require more labour than sheep. Another noticeable difference round Malham is the lay-out of the farms. The hill farm is a single block of land, but the smaller farms of

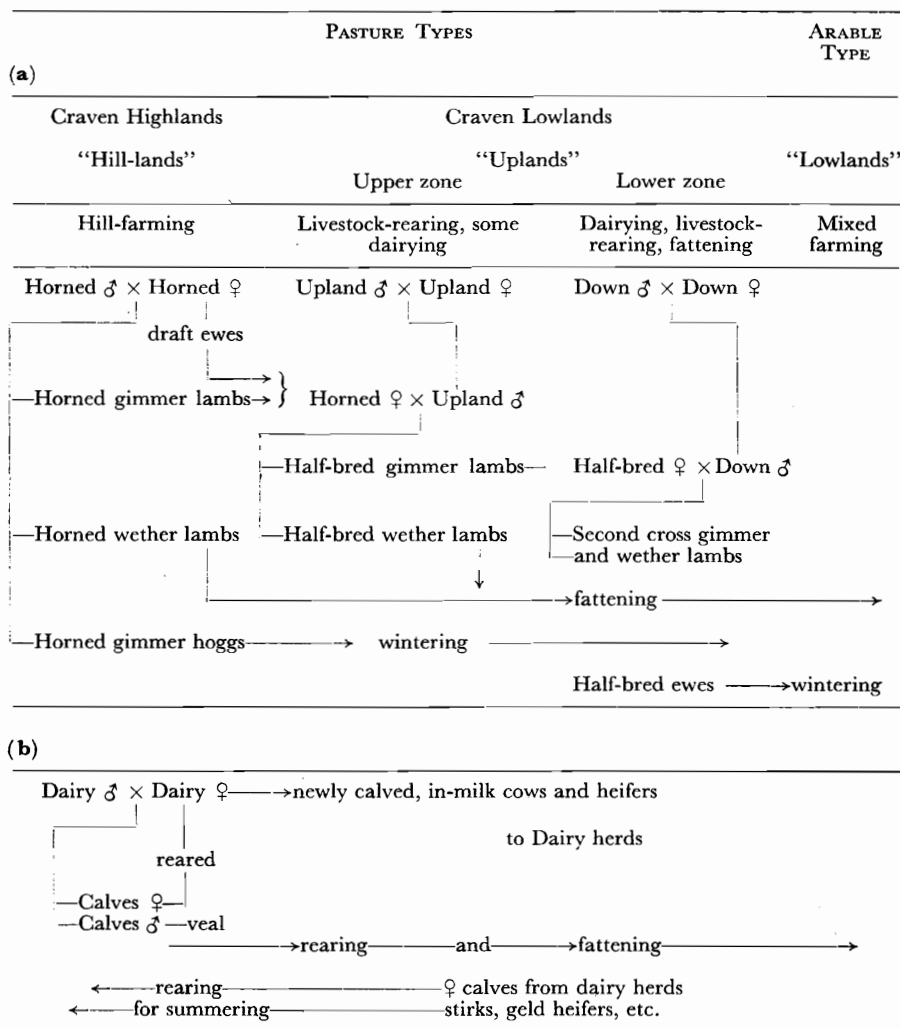
Malham are made up of smaller fields and are frequently split up, with fields rented from different landlords. Many farms are tenanted and relatively few are owner-occupied.

(1) *Sheep*

In examining the actual differences of these regions it is helpful to consider the sheep separately from the cattle. The hill farms are well represented on Malham Moor, for example Tennant Gill (884696), Darnbrook House (899706) and Middle House (908676). They all have self-contained breeding flocks, more or less pure, of a hardy breed of sheep. Tups are bought from other hill farms to avoid in-breeding but replacement ewes are bred on the farm. A proportion of ewes is drafted out and sold each autumn at four or five years old, that is, after three or four crops of lambs. A slightly higher proportion of female lambs or gimmers is kept, to allow for losses by death, and these produce their first lambs at two years old. The male lambs, or wethers, and the rest of the gimmers are sold before the winter, from August onwards. By putting them on the meadows after hay-time, some may be sold as fatstock, but probably rather more than half will go as stores. The store gimmers of the Craven Highlands are sold in the markets such as Hellfield and Skipton and are bought by farmers and dealers from many parts of the country. Those of better quality may go for breeding in the production of half-bred lambs, and large numbers are improved to fatstock standard with the store wethers. The draft ewes of the hill farms are bought by farmers of the upper uplands to be crossed with an upland ram for a further two or three years in less rigorous conditions. The lambs; though not quite so hardy, are heavier. The half-bred gimmers are in their turn bought by farmers with still better land and this includes the lower uplands and the arable country. There they are crossed with a Down ram, giving heavier, earlier-maturing lambs which are sold fat. The required characters of sheep such as milkiness, early maturity and fleshiness are never all found in one breed but each breed develops some characters better than others. Hence there is everything to be gained by selective crossing. Another aspect of the sheep management is the seasonal movement of stock. The gimmer hogs selected for flock replacement are often sent to upland pastures for the months November to April for their first winter, mostly within a 15-mile radius and rarely more than 30. The rent for this is normally about 30s. per head. The half-bred ewes are more usually sent to the turnip fields of arable farms, for instance towards Penrith in the Vale of Eden. Table 2(a) summarizes the management of sheep in the hills and uplands. The main activities through the year on hill farms on Malham Moor are shown in Appendix I.

Each part of the country has its own breeds. In the Craven Pennines the mountain breeds are the Swaledale and Dales-bred, the upland breeds are the Teeswater and Wensleydale and the Down breed is invariably the Suffolk. Similarly in Wales and Northern England, Welsh Mountain and Cheviot respectively are the mountain breeds, and Kerry Hill and Border Leicester the upland breeds. The resulting half-breds are just as distinct. In Craven the offspring of a Swaledale or a Dales-bred crossed with a Wensleydale or a Teeswater is known as a Masham and these can be seen in many a field in the Craven Lowlands and dales.

Table 2. Diagrammatic representation of (a) sheep management and (b) movement of cattle, in the hills and uplands. Arrows indicate movement of stock.



Swaledale and Dales-bred are both recognized as distinct breeds. It is claimed that Dales-bred sheep are one of the original types of hill sheep, indigenous to the upper reaches of the dales on the borders of the North and West Ridings, North Lancashire and Westmorland (Dales-bred Flock Book 1960-1961), but others say they have been derived from a Swaledale-Scottish

Blackface cross. In 1930 a group of breeders in the upper Wharfedale area formed the Dales-bred Sheep Breeders' Association with the object of fixing the type. The Swaledale Sheep Breeders' Association was founded in 1919. Table 3 summarizes the characteristics of the two breeds, which are rather similar, and crosses grading from one to the other are common. One of the most

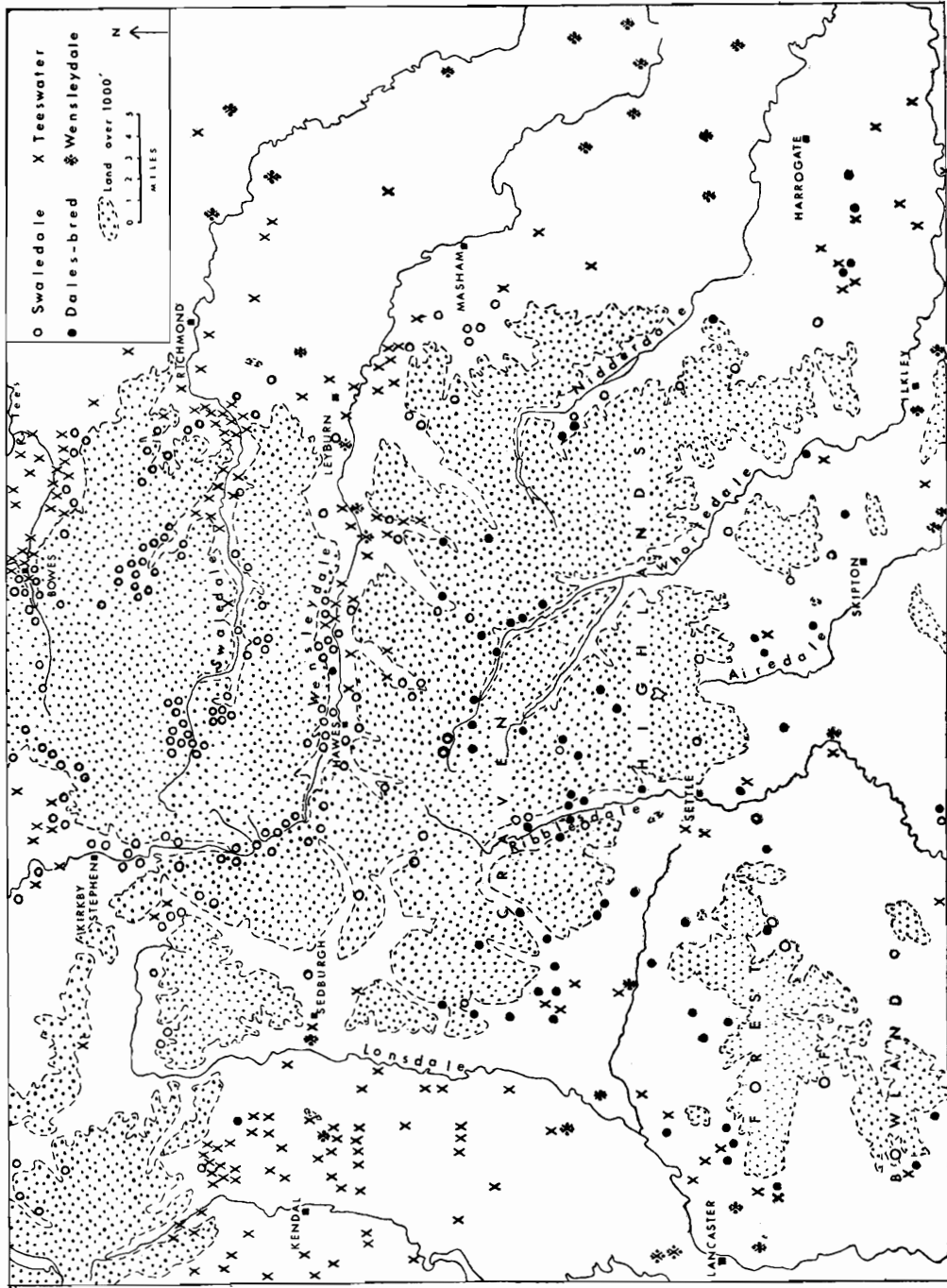
Table 3. *Specified characters of Swaledale and Dales-bred sheep.*

	SWALEDALE	DALES-BRED
HEAD	Broad, deep jaw, tuft of hair on forehead, face dark, lower part grey, short broad teeth. Grows greyer with age.	Broad, deep jaw, large nostrils, face black with distinct white mark on each side of nostrils, grey nose end, short, broad teeth.
HORNS	On rams and ewes, set low and rather round.	Like Swaledale.
EARS	Grey.	Black and white.
LEGS	Grey or mottled, good flat bone, well-shaped hocks.	Black and white, good flat bone, hard hooves.
BODY	Long drawn, broad level back, chest well let down.	Long drawn, good square hind-quarters. Slightly larger than Swaledale.
WOOL	White except at back of head where it is mixed with part black, not coarse, tight bind or undercoat, curly top.	Clear of black; rather deep fleece with a little bind, longer and more purely than Swaledale.
TAIL	Thick, long and woolly.	Long, woolly.

easily observed differences is the presence of the white patches on either side of the nostrils of the Dales-bred. There appears to be little to choose between them for hardiness, and personal preference largely determines which breed is kept. The Swaledale is claimed to be a good thriver, an excellent lambrearer and mutton-producer, the fleece has a good undercoat and the wool is even-textured. Draft ewes produce good half-bred lambs, both the Masham and the Mule. The Swaledale outnumbers all other breeds of hill sheep today. The record price for a shearling ram was £2,400 in 1960.

The Dales-bred sheep are very adaptable to climatic conditions, are prolific breeders and the lambs mature early for a hill breed. They are claimed to be especially suitable for producing half-bred lambs. The fleece is free from black, which increases its commercial value. The record price for a shearling ram was £500 in 1953. The breed appears to be increasing in popularity and draft ewes have fetched higher prices recently. Like the Swaledale, the wool is suitable for carpets and Scottish tweed, being strong and durable.

The distribution of breeds is shown on Map 2 by marking the farms of members of the Associations and this gives an idea of where the maximum concentration of pure breeding occurs. Smallholders with flocks of less than one hundred ewes have been omitted since although they illustrate a greater density they barely alter the distribution. There are, of course, farmers who keep one or other breed but are not members. There appears to be little overlap of the horned breeds and Craven is the stronghold of the Dales-bred. The Swaledale is distinctly more numerous in Wensleydale and Swaledale itself and it is also bred in Teesdale, the Kirkby Stephen district, Weardale and the North York Moors. Swaledale rams are used for crossing with Blackface in Scotland and with Herdwicks in the Lake District.



MAP 2.
 The distribution of the main breeds of sheep in Craven and the surrounding country.

Teeswater and Wensleydale, the long-wool upland breeds, are bred primarily for producing rams to cross with the mountain breeds and Map 2 shows the distribution of farms of members of the respective Associations. Some upland farmers breed their own rams for the production of half-breds, others buy from the breeders, most of whom have from five to at least twenty ewes put to the ram. The map by no means covers the whole range of the Teeswater which is the hardier of the two and is bred much higher up into the hills. The main areas of concentration, round Kendal, Teesdale and Swaledale, are north of Craven but it is a breed that is becoming more popular. Although the Teeswater Sheep Breeders' Association was formed only in 1949 it has increased its membership enormously in the last few years. The headquarters of the Wensleydale breeding is in more lowland country, the edge of the Yorkshire Plain, south of the Lake District, North Lancashire and Wensleydale itself. The Association was formed in 1890 but now membership is falling; one of the reasons given recently for the decline of popularity was that the face is rather too brown. The more distinct markings of the Teeswater, which are transmitted to the half-bred lambs, are in fashion at present. The breeds are similar in appearance, with a purly fleece hanging in pencil-sized ringlets, and often a forelock on the face. The Teeswater's face varies from off-white to dark greyish blue, with dark markings especially towards the nose, whereas the Wensleydale's has more usually a brown or bluish tinge, generally without markings.

In the country round Skipton, as in much of Britain, the ram used for the second cross with the Masham is the Suffolk, a big sheep with short wool and clean black face and ears. The fat lambs resulting from the cross can be seen any Monday in Skipton market from July till December. Occasionally there are crosses with other Down sheep such as Hampshires. Some Craven farmers rear Cheviot crosses, hornless, white-faced and roman-nosed. The Lonk, rather large and horned, is a breed of the western Pennines, for instance in the Bowland Fells and foothills, and Lonk cross lambs appear in the markets of Bentham and Skipton.

Store lamb sales at Skipton reach a peak in August and September when there may be 10,000 through the ring in a day. Buyers come from Thirsk, Pickering and Wetherby in East Yorkshire, Huddersfield and Doncaster, Burnley, Carnforth and the Cheshire Plain, Rutland and Market Harborough in the Midlands, as well as from the nearby Craven Lowlands. The fatstock is bought by butchers, both local and from the industrial centres such as Leeds, Bradford and Preston. Other smaller but important markets for sheep are Hawes, Leyburn, Masham and Kirkby Stephen, near the junction of hills and uplands. Less important, more local markets include Hellifield, Long Preston, Bentham and Gisburn. Settle no longer has a livestock market.

(2) *Cattle*

The cattle also illustrate the close relationship between the hills and uplands and Table 2(b) shows the interchange of stock. The hill-farming lands are not good enough to produce high milk yields or to fatten for beef successfully, and hence the emphasis is on rearing young stock. Farms have a proportion

of stock in each of the age-grades: less than one year, one to two years, and over two years. The two-year olds and over are commonly sold as newly-calved heifers and cows, but sometimes as in-calf heifers and cows, as from farms where there are already enough calves for the available labour. A few of the newly-calved animals will be kept to rear the calves, several calves being reared on the milk of one. The bull calves are usually sold at a few days old but one or two on each farm may be reared to eight months when the calf subsidy is available (see Appendix III), and then sold for fattening in the lower uplands and lowlands. The heifer calves unless of poor quality are kept for rearing, and more may be bought from time to time from dairy farms of the lower uplands if there have been too many bull calves. The aim of the hill farm is to supply the dairy farm with in-milk cows, and so breeds such as Friesian and Shorthorn are commonest in the hills. Black and white cattle are popular at present but many farmers still keep the dales-type Dairy Shorthorn. Ayrshires are not popular in Craven today. Galloways, which can be wintered out, and Aberdeen Angus are beef cattle and are reared on a few farms. However, many of the cattle to be seen on the hills are crosses.

Some of the hill farms have gone in for selling milk since the Milk Marketing Board was established in 1933. It is always a sideline and is closely related to the rearing activities. Yields are low compared with those of true dairy herds, reaching no more than about two and a half gallons per cow per day (see Appendix IV). As milk prices are higher into winter than in summer, cows and heifers are serviced in winter, coming in milk during late autumn and winter and drying off in summer. The dried-off cows can easily be summered on the rough grasslands, whereas the indoor wintering of dried-off cows is an expense for which there is no return. On non-milking hill farms the pattern of autumn calving is the same. It is not so concentrated as lambing time and carries on from July or August till February or March so that the supply of milk for rearing is spread out. Dairying is not the true function of the hill farms and in a country with a milk surplus they should be among the first to cease production.

The livestock-rearing farms have a similar pattern of cattle management, but with a shifted emphasis. Most of them sell milk all the year round though with maximum production in winter. Newly-calved cows and heifers go into the milking herd, if of good quality. Heifer calves are kept to rear, and bull calves are either sold for veal or reared for beef on fattening land. The breeding and in-milk animals are kept longer where there is a concentration on milk production, so that cows predominate over heifers, in contrast to the hill farms. Heifers calving for the first time are calved earliest, from July onwards, and, as there is usually 13 months before the birth of the next calf, calving tends to shift towards winter.

Hill farms with a large amount of summer grazing, particularly those with Fescue-Bent grassland, buy in extra cattle for the summer, or take in those of other farmers for a rent of 3s. per head per week or £3 for the twenty weeks from May to October, in return for which the farmer must see that the animals do not stray and have adequate water. The animals are commonly female stirks and Middle House, for instance, can carry some 200 more in summer.

(3) *Grasslands*

It was mentioned earlier that the predominance of grassland over arable is a reflection of the climate. There is, however, evidence of land having been ploughed in the past. The lynchets in the dales and Craven Lowlands appear to have been constructed to increase the ploughable land by terracing slopes steeper than about 5 degrees, and this is generally regarded as the work of Anglian settlers in the sixth and seventh centuries. In those days every community had to be self-sufficient. The mill on Malham Beck was owned by Fountains Abbey from the thirteenth century till the Dissolution, and farmers brought their corn to be ground there. It was still in use as a corn-mill towards the end of the eighteenth century though corn-growing must always have been a gamble in such a climate. As communications improved, contact with the lowlands to the east became easier and food could be imported from there, and the eighteenth century saw a marked decline of arable in Craven. The opening of the Leeds-Gargrave section of the Leeds-Liverpool Canal in 1777 played a part in this.

Robert Brown writing about Yorkshire in 1799 records 1,938 acres of arable in Long Preston, yielding principally oats with some turnips and a little wheat. About Marton he remarked that the arable had greatly decreased in the last twenty years and in the year of his account there were 7 acres of oats. In Giggleswick he recorded 300 acres of oats and 15 of barley, and in Arncliffe 190 acres of arable. In 1960 there was 1 acre in Arncliffe and 4 on Malham Moor, all of which grew roots or kale, and 19 in Coniston Cold of which 6 were in oats.

There is also evidence of the replacement of much woodland by grass, starting with the burning and felling by Neolithic man (Pigott and Pigott, 1959) and later by the grazing of animals. Even now woody shrubs and trees such as yew, ash and hawthorn grow where grazing is excluded. The grasslands and moorlands at least up to 1,500 feet are semi-natural communities induced by grazing. In the following broad classification (Table 4) of the types of land

Table 4. *Classification of Hill-land and Uplands*

1. LAND WITHOUT VEGETATION. Limestone pavement, cliff and scree.
2. ROUGH GRAZINGS:
 - A. Grasslands:
 - (i) Grassy pavement
 - (ii) *Festuca-Sesleria*
 - (iii) *Festuca-Agrostis* ± *Nardus*
 - (iv) *Nardus* ± *Juncus squarrosus*
 - (v) *Juncus* spp.
 - (vi) *Pteridium*
 - B. Moorlands:
 - (vii) *Eriophorum*
 - (viii) *Calluna* ± *Eriophorum* ± *Sphagnum* spp.
3. IMPROVED LAND:
 - (i) Pasture
 - (ii) Meadow

in the hills and uplands, rough grazings are classified according to the dominance of certain species. It must be remembered that there are always

other species besides the dominants present in the swards. The categories as defined pass gradually from one to another; transitional zones in which a boundary would be drawn are probably larger than the type areas into which they merge. However, it is worth representing a rigid classification in the mapping of individual farms in order to ascertain the proportions of summer and winter grazing and the amount of improvable land. The various types of vegetation, which depend on the soil and on the management, have changing values through the seasons, and the proportion of each on a farm will influence the number and type of stock that can be carried.

(4) *Rough Grazings*

Grassy pavement is more than half covered with vegetation comprised largely of the species of A(ii) (Table 4), but otherwise is bare. Blue Moor Grass (*Sesleria albicans*) is restricted to very lime-rich soils, on which it may be abundant. The cutting of sample grass plots indicated that this species is an earlier starter than other grasses of the rough grazings and that it does not require a mean temperature as high as 42° F.; flower buds appear in the last week of February in some years. It is a fairly bulky and palatable grass. The co-dominant Sheep's Fescue (*Festuca ovina*) is a later starter and does not provide as much bulk, but it is palatable and occurs over a wide range of soils. The associated species include Thyme (*Thymus drucei*) and Carnation Sedge (*Carex flacca*). The *Festuca-Sesleria* grassland provides good grazing especially from late April till October. Like all the rough grazings it lacks the quality necessary for producing milk or fattening but is very suitable for rearing young beasts. The vegetative parts of plants growing on highly calcareous soils usually contain more lime than those on acid soils, and calcium is required for bone formation. But there are some disadvantages in the limestone grasslands, for example they have certain deficiencies causing diseases in sheep (see Appendix II).

On acid soils, such as those on glacial drift, Bent grass (*Agrostis tenuis*) accompanies Sheep's Fescue. Such soils may, however, be deep enough for improvement by ploughing. The *Festuca-Agrostis* grassland grades towards a mixed grassland with some mat-grass (*Nardus stricta*). If this grassland is limed regularly, White Clover (*Trifolium repens*) is encouraged and mat-grass kept to a minimum. Cattle eat *Nardus* very little and sheep even less, though they eat other grasses between the tussocks. *Nardus* has a high proportion of fibre or roughage as opposed to protein and is very poor in minerals such as calcium (Pearsall, 1950). Experiments in progress at 1,500 feet in North Wales on the productivity of mountain grasslands (Nature Conservancy Report, 1962) showed that lambs on *Festuca-Agrostis* for 40 days in May and June grew over three times as much as lambs on *Nardus*. Other experiments are concerned with the effect of grazing on the vegetation. So far it seems that total exclusion of grazing on acidic sites brings about a decrease of *Nardus* and an increase in ericaceous plants. At Great House Experimental Husbandry Farm, 700-1,200 feet up on Millstone Grit in Rossendale, interesting experiments have been done on the improvement of poor upland pastures. By surface dressings of lime, phosphates and nitrogen, and adequate grazing, a 95% *Festuca-Agrostis* sward has been radically altered botanically and the productivity doubled

in two or three years. Ploughing and reseeded with equal amounts of fertilizers and grazing was less successful since the initial profit dropped in a few years. Similar experiments are now in progress on *Nardus* grassland. So far very severe cultivations followed by seeding, the addition of up to 4 tons per acre per year of lime and the application of fertilizers have given the quickest improvement but whether it is economical remains to be seen. Very heavy stocking by cattle in spring when the grass is most vulnerable to grazing and trampling should also achieve some success. *Nardus* communities provide some roughage in winter and *Nardus* itself is useful when snow covers the ground, since the long, ungrazed blades stick through and encourage sheep to scratch down to the turf.

Of the rough grazings, A(i)–(iii) especially have a greater carrying capacity in summer than in winter. In summer, therefore, it has long been the practice for farmers with much limestone pasture either to buy in more cattle or to have gist cattle from smaller upland farms. Heavy summer grazing helps to keep *Nardus* under control.

The moor-rush (*Juncus squarrosus*) is a common plant of wet and base-deficient, peaty soils growing with *Nardus* or cotton-grass (*Eriophorum vaginatum*). It has a rosette of rather bright green, fibrous, spiky leaves the basal parts of which are evergreen and hence useful in winter. Although deficient in nutrients, sheep will eat it in the absence of other herbage. Larger species of rush of the category A(v), such as the Common and Soft Rush (*Juncus effusus* and *J. conglomeratus*) are abundant on the impermeable soils of the Yoredale and Bowland shales, often in grassland of Yorkshire Fog (*Holcus lanatus*) and Bent grass. They produce vast numbers of viable seeds which will invade pastures and meadows if the drainage is poor (Ministry of Agriculture Leaflet 433). Cattle are more effective in controlling rushes than sheep, and there seems some evidence that rushes increase with a decline in the numbers of hill cattle.

Bracken (*Pteridium aquilinum*) invades grasslands on better, deeper soils of well-drained sites. It has spread greatly in the last 100 years and has long been recognized as a major problem in hill areas since it shades out grasses and is of little value to sheep. It is widespread on Rylstone and Flasby Fells, on Millstone Grit and shale slopes. It can grow on steep, boulder-strewn slopes where little can be done with it, as such ground can never be made profitable. But where the soil is deep enough, ploughing and discing is successful in eradicating bracken and this has been done on a farm near Gargrave. The first crop planted was turnips. Later the land was put down to grass and is now a good quality fattening pasture. The 20-acre field has received 250 tons of lime in the ten years since it was ploughed, and the pH has risen considerably. In other areas cutting twice a year has been shown to be successful and also certain chemicals are in use (Ministry of Agriculture Leaflet 190). On Malham Moor there is a little bracken on the sides of Darnbrook Beck and a few farms in Craven use it as bedding for calves wintered indoors, though in general straw is bought from the East Riding.

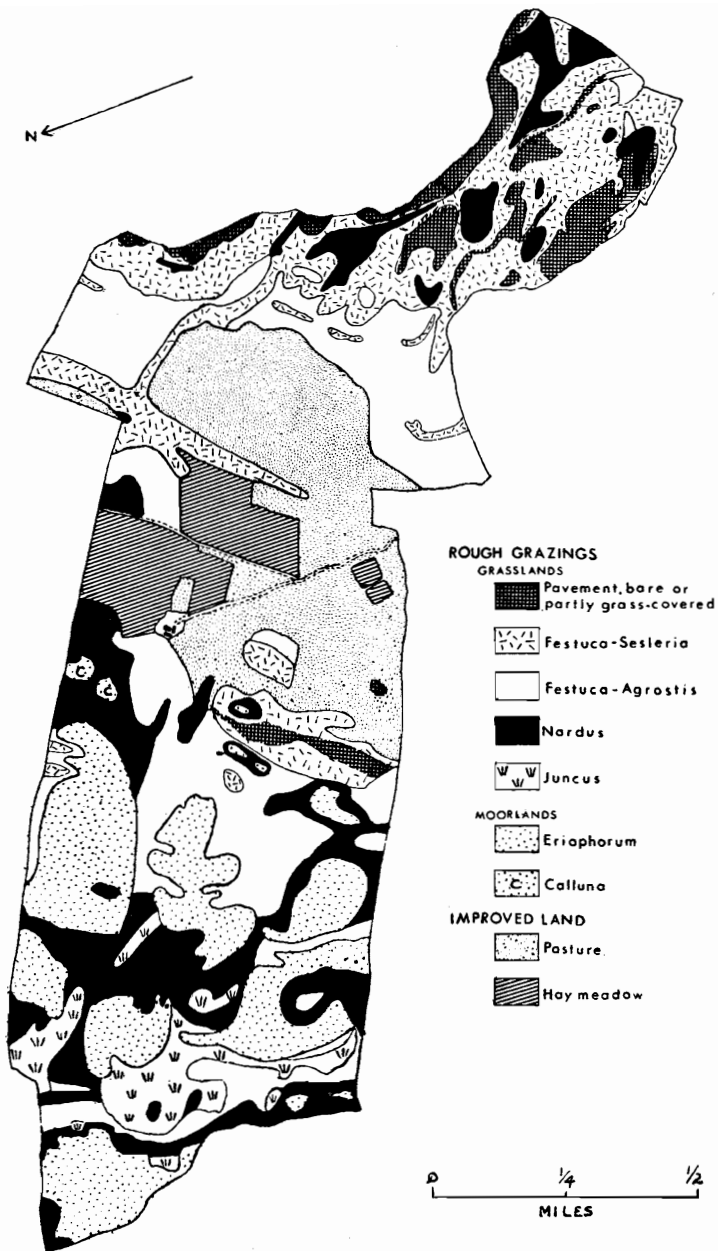
In contrast to the rough grasslands are the moorlands, heather and bilberry moors, sedge moors and mosses, found on rocks other than limestone, mainly Millstone Grit, the Yoredales and glacial drift. Large areas of the Yorkshire

Pennines are dominated by cotton-grass, commonly associated with bog-moss (*Sphagnum* spp.). The moorlands, particularly heather (*Calluna vulgaris*), provide winter feed for sheep, as long as there is not a persistent snow cover. The special value of cotton-grass is in early spring before the grasses have started growing. This is the "hungry gap" when the ewes need nourishment. The peduncles and buds appear in March and provide a useful pre-lambing bite. Monthly analyses of leaves of cotton-grass have demonstrated the phenomenon of mineral retention, particularly potassium and phosphorus. These minerals are accumulated in the plant, and the tussocks are also reservoirs, though to a less extent, of magnesium and sodium (Goodman and Perkins, 1959). It has been shown by analysis that heather and bilberry (*Vaccinium myrtillus*) accumulate calcium (Pearsall, 1950) and, incidentally, heather (otherwise poor in mineral matter) accumulates cobalt. Farmers are well aware of the benefits to sheep to be derived from a change of diet and there is a regular movement of stock from one type of vegetation to another.

Tennant Gill is a hill farm of 900 acres carrying approximately one sheep to two acres. It runs from 1,550 feet in the south-east down to 1,100 feet in Cowside Beck, and up to 2,125 feet on Fountains Fell in the north-west. The vegetation of the farm is shown, somewhat simplified, in Map 3. Eroding blanket bog with cotton-grass covers the fell but the influence of the Yoredale limestones, sandstones and shales which outcrop from 1,500 to 1,900 feet, though partly obscured by drift, is shown by the appearance of strips of grassland and rushes. Millstone Grit caps the fell. All the land above about 1,450 feet on this side is run as one field of approximately 400 acres.

The problem of winter keep, which exists on every hill farm, is apparent on Tennant Gill. About a third is moorland but there is extremely little heather, though it is growing well a little to the north on the next farm. It appears that cattle, which are very destructive of heather, were grazed here in the past and this may be partly responsible for the present lack. However, the introduction of mineral doses including cobalt in the last twenty years has helped to make up for the deficiency in the diet and the quality of the sheep has improved. Good clover hay is bought for sheep in time of snow. There is ample summer grazing on the grasslands and improved pastures of the Great Scar Limestone and neutral or alkaline drift, enough to take in 50 extra cattle. Fifty-two acres of hay meadow provide winter feed for 60-70 cattle including calves being reared on milk.

Improved grasslands differ from the rough grazings in botanical composition and yield. The term pasture is used for permanent grassland not cut for hay and of better quality than the rough grazings. The improvement may have been achieved by reseedling or surface dressing, in either case a more intense treatment than the rough grazings normally receive, or a pasture may be a deteriorated hay meadow and its composition will then obviously depend on its history. Plants such as Crested Dog's Tail (*Cynosurus cristatus*), White Clover and Sweet Vernal Grass (*Anthoxanthum odoratum*) are commonly present in an upgraded rough grazing. The improved pastures are distinguished by the presence of clover and the improvement is usually brought about by liming. The pastures are used for cattle in summer and for ewes when they are brought down from the fells before they are put into the meadows for lambing, and again



MAP 3.
The vegetation of Tennant Gill Farm, Malham Moor.

after lambing. The pastures of upland farms with relatively little rough grazing are used more intensively especially before the meadows are cut.

The meadows of the hill farms vary enormously in botanical composition and Table 5 gives some idea of the relative abundance of the main plants. Several meadows were examined and of these a dozen were chosen from five different farms. They are all on Malham Moor except Field 2 which is a lynchet field in Malham. Of a great variety of grasses encountered, those most commonly found have been listed in an approximate order of agricultural value.

Table 5. *Grasses, clovers and herbs of some hill farm hay meadows.* The percentage of grasses and clovers is a visual estimate of their bulk in the hay crop.

	Fields											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Grasses and Clovers:</i>												
<i>Helictotrichon pubescens</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Trisetum flavescens</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Holcus lanatus</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cynosurus cristatus</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Festuca rubra</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Festuca pratensis</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Poa trivialis</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Dactylis glomerata</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Phleum pratense</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Lolium perenne</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Trifolium repens</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Trifolium pratense</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Percentage grasses and clovers of all plants:</i>												
	70	80	65	60	55	60	70	90	65	50	90	95
<i>Herbs:</i>												
<i>Cirsium heterophyllum</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Geranium sylvaticum</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Galium cruciata</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Alchemilla vulgaris</i> <i>agg.</i>	—	—	—	—	—	—	—	—	—	—	—	—
<i>Leontodon hispidus</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Lathyrus pratensis</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Anthriscus sylvestris</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Conopodium majus</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Rumex acetosa</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Plantago lanceolata</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Rhinanthus minor</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Veronica chamaedrys</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Ranunculus acris</i> , <i>R. repens</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Bellis perennis</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cerastium holosteoides</i> ..	—	—	—	—	—	—	—	—	—	—	—	—
— Abundant — Common - Frequent												

Hairy Oat-grass (*Helictotrichon pubescens*) is quite common on the damper calcareous soils but is of little value. Yellow Oat-grass (*Trisetum flavescens*) is widespread and common on calcareous soils and is palatable. Yorkshire Fog (*Holcus lanatus*) is widespread and is usually regarded as a weed but has some

value when young in the absence of better grasses. Crested Dog's Tail is especially common in old grasslands; it withstands drought and cold and is green in winter, so is useful on poor soils in the uplands. Red and Meadow Fescue (*Festuca rubra* and *F. pratensis*) are both widespread in Britain and valuable for grazing and hay. Rough-Stalked Meadow-grass (*Poa trivialis*) is common; it is palatable, remains green in winter and is useful in seed mixtures for permanent pastures and hay. Cocksfoot (*Dactylis glomerata*), Timothy-grass (*Phleum pratense*) and Perennial Rye-grass (*Lolium perenne*) are all important fodder plants used in seed mixtures. Timothy-grass is very hardy and Rye-grass is highly nutritious but requires a good soil.

There is an obvious break between Fields 1-6 and 7-12, the former containing the poorest grasses and the latter the most valuable. It is very probable that 1-6 have never been reseeded but are meadows produced by improving original grassland, by manuring, liming and, more recently, the application of fertilizers. In meadows 7-12 the most abundant grasses are those commonly used in seed mixtures. This suggests that these have been reseeded at some time. Fields 7, 8 and 9 contain a greater variety of grasses, including the poorer ones, than fields 10, 11 and 12. This suggests that the latter have been reseeded quite recently, probably in the last ten years, whereas the former may have been subject to wartime or post-war ploughing, and have deteriorated more. There is also rather more White Clover and Red Clover (*Trifolium pratense*) in the fields with the better grasses. Red Clover is frequently included in seed mixtures.

In Field 1, 50 different species were found, of which 35 were herbs, and other meadows added yet other species. Fifteen of the commonest are listed in Table 5. Meadow and Creeping Buttercup (*Ranunculus acris* and *R. repens*) occur throughout and Sorrel (*Rumex acetosa*) in eight of the meadows. Apart from these, there is a marked contrast in the meadows which contain mainly the first eight herbs listed, and those with some only of the last seven listed. The first group are also distinguished by having a higher proportion of herbs and a greater variety of abundant herbs, with the exception of Field 2. The distinction again comes between Fields 1 to 6 and Fields 7 to 12. Some of the differences between fields can be explained by variation in habitat: Melancholy Thistle (*Cirsium heterophyllum*) and Wood Cranesbill (*Geranium sylvaticum*) are characteristic of damper soils than for instance Crosswort (*Galium cruciata*). However, in Fields 7 to 12, the characteristic adventive weeds, including Germander Speedwell (*Veronica chamaedrys*) and Common Mouse-ear Chickweed (*Cerastium holosteoides*), and the low proportion of herbs suggest that these fields were reseeded comparatively recently. The variety and abundance of herbs increases with age after reseeding. It is interesting that the only annual in the list, Yellow-Rattle (*Rhinanthus minor*), is most prominent in two of the reseeded fields. Fields 11 and 12 are similar in having a particularly small proportion of herbs (10 and 5%) and few abundant species. Consultation with the farmer establishes the dates of reseeding as 1956 and 1959 respectively. Field 10 is a typical Buttercup meadow with 50% weeds of which the two most abundant are Buttercups and Chickweed, though often Sorrel shares dominance with Buttercups. This suggests a type of field not so recently reseeded and further run down.

These herb-rich meadows of the hills are largely the result of a form of management determined by climate. The meadows are subjected to intensive sheep grazing during the lambing period which is timed so that there is new grass available for the ewes. Grass growth does not normally begin till mid-April, a month later than in the south of England. Lambing continues into May and twins and weak lambs are kept longest on the meadows, till about May 20th. Grass should be cut when the inflorescences reach maturity but because of the spring grazing, there is such a sparse crop of leaves at the time of flowering that the grass is hardly worth cutting. The practice, therefore, is to leave the crop until a growth of aftermath provides some leafy bulk, usually by July. By this time many of the dicotyledonous species have set their seed and thus secured their place in the flora of the meadows. Heavy grazing every spring also reduces the early grasses like *Lolium* and *Dactylis* so that indigenous species such as *Agrostis* and *Cynosurus*, which mature up to four weeks later, are at an advantage. If hay meadows could be left ungrazed until hay-time at least every other year, the yield could be increased and the composition of reseeded meadows better maintained. The crop, if leafy enough and not composed of over-mature flower heads, might be suitable for silage, which would relieve the farmer from so much dependence on the weather. As it is, the relatively dry months of May and June are those when the grass is growing, the haymaking being done during the wetter months of July and August. The management of the hay meadows is beset with problems and, unless grazing is regulated according to the seasonal rates of plant growth and a high degree of soil fertility maintained, a reseeded meadow will lose its quality. Poor soil cannot grow good grass (Crompton, 1953).

In the uplands the picture is slightly different. Lambing is up to two weeks earlier so that the meadows can be ferred that much sooner. The growing season starts earlier. There is usually more meadow land or good quality pasture for a smaller flock of breeding ewes and it is the practice to fust out a number of cattle so that the grazing is unlikely to be so intense. Round Malham there are a number of herb-rich meadows with indigenous grasses but further down in the lower uplands more of the meadows are dominated by the better grasses. It does not, however, necessarily follow that in the hills and upper uplands the reseeded meadows are the best. They have sometimes deteriorated to a state which gives less yield and poorer quality than an ordinary natural grassland which has been upgraded by careful management. Some experiments on the protection from grazing and the manuring of permanent dales meadows have been discussed by the late Mr. Robinson (1954). It was suggested that the elimination of spring grazing could give an increase of 40% of the hay crop and the effect on the floral composition would almost certainly be beneficial. Since protection decreases the quality by increasing the stalk : leaf ratio, there is no need to rest the meadows completely, and even partial protection would mean an earlier hay-time, possibly in better weather.

CONCLUSION

The different systems of farming from the hill-lands to the lowlands are all closely related to the environment and are closely interdependent. There is a

continual movement of stock from one zone to another. The main direction is outwards from the hills; the hills breed the sheep and cattle and the lower zones breed from them, rear, milk or fatten them. Most of the British cross-bred flocks are renewed with draft ewes from mountain breeds. Heifers reared in the hills replenish the dairy herds below. The seasonal movement of stock further demonstrates the complementary nature of hills, uplands and lowlands. Cattle are brought to summer on the hills; mountain hogs are brought down to winter in the uplands; half-bred ewes from the uplands winter in the arable lowlands. Such transhumance increases the number and quality of stock that can be maintained.

There are, of course, competing forms of land use for hill-land the most important of which are grazing, conservation of water, recreation and amenity, afforestation, shooting and the conservation of habitats of scientific interest. With increasing competition for land, it becomes more important that the hill-lands, the mountains and moorlands, which make up a quarter of Britain's land surface, should be well understood and their real potential under different forms of land use assessed. The acid, peaty soils of moorlands are often regarded as immutable, but it is possible to upgrade some of these soils sufficiently to support grass or trees. There are soil profiles in east Lancashire where an old top soil showing root channels and former earthworm activity is overlain by an acid turf with Mat-grass and Wavy Hair-grass (*Deschampsia flexuosa*). Research is proceeding in several hill areas to find out how land can be used for the greatest benefit of the whole community. In every case, long-term management of the land is essential.

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APPENDIX

I. Summary of the main activities through the year on hill farms on Malham Moor.

	SHEEP	CATTLE AND GENERAL
NOVEMBER 10-18	Hoggs to winter grazings. Ewes sorted. Tups put out and ruddled.	Cattle brought in, fed 2-3 times daily and shippons cleaned all through winter. Cattle over two years put to bull.
DECEMBER	Ruddling, some tups withdrawn. Sheep brought down when snow imminent.	More cattle to bull. Kale, if any, used before frost. Muck-spreading on meadows.
JANUARY	Hay if necessary. Dosing against fluke.	Cattle over two years in calf. Muck-spreading, walling.
FEBRUARY	Change of pasture. Dose ewes with copper sulphate solution.	Muck-spreading, walling.
MARCH	Change of pasture, to moss crop.	Flattening mole-hills, muck-spreading and fertilizing meadows. Liming.
APRIL	Ewes to pastures then meadows. Lambing about 15th. Hoggs back. Salt licks out.	In-calf animals drying off.
MAY	Lambing. All sheep off meadows by 20th. Marking, dosing, castrating of lambs and inoculation for pulpy kidney.	Cattle out by 3rd or 4th week. Summering cattle arrive.
JUNE	Clipping tups and hoggs. Dosing for worms.	More summering cattle arrive.
JULY	Clipping ewes. Wool sold.	Hay-time. Fertilize meadows when finished. Heifers calving, bull calves sold, heifer calves reared, newly-calved heifers sold or some kept to rear calves.

	SHEEP	CATTLE AND GENERAL
AUGUST	Lambs weaned and sorted. About 55% of gimmers kept. Shot lambs to good pasture. Lamb sales, wethers first, some as fatstock, mainly stores.	Some cattle on to aftermath. More calves and newly-calved for sale.
SEPTEMBER	Lamb sales.	Calving continues. Mole-catching. Walling.
OCTOBER	Draft ewes, lambs and old tups sold. Shearling tups bought. Hay bought. Autumn dip, some with whale oil added.	Summering cattle go. Straw bought.

II. Diseases due to deficiencies of cobalt and copper sulphate.

Plant nutrient supply varies with alkalinity, minerals being most mobile and available to plants within a certain range of pH. For instance the supply of calcium tends to be low in acid soils following the formation of soluble salts and their loss by leaching. The decrease in availability starts when the pH falls below the neutral point and this applies to magnesium and potassium. Certain minerals, on the other hand, increase in availability when the pH falls below about 6.5, for instance manganese and iron which can reach toxic levels under very acid conditions. Plants on alkaline soils can suffer from deficiencies of these minerals. The trace elements, cobalt and copper, are also deficient on limestone soils and this can cause certain diseases in sheep which graze the limestone pastures. Lack of cobalt results in "pine" or anaemia in ruminants, characterized by loss of weight. Cobalt is contained in vitamin B₁₂, and it seems probable that this vitamin is important in activating the enzyme that combines protoporphyrin, the precursor of haemoglobin, with ferrous iron to form haemoglobin, the iron complex. As it is rumen bacteria which synthesize vitamin B₁₂, doses of cobalt must reach the rumen. Super-seding weekly drenchings, licks and top dressings are cobalt bullets (Wilson, 1962). These are $\frac{3}{4}$ inch long, hard, compressed cylinders made of cobalt trioxide with a filler, and when swallowed they pass into the reticulo-rumen where they are slowly eroded over at least twelve months, releasing just enough cobalt for the daily requirement.

Lack of copper in ewes causes swayback in the newborn lambs, breakdown of certain parts of the brain tissue beginning before birth. The affected lambs may be blind and lose control of the movements of the hindquarters. There is no cure, but if the ewes are drenched with a solution of copper sulphate in late pregnancy, the lambs are born unaffected.

III. Some government subsidies and grants.

(a) For hill farms and livestock-rearing land.

The definition of hill-farming land given in the Hill-Farming Act, 1946 appears earlier in the text. The Livestock Rearing Act, 1951, extended the class of land eligible for grants and subsidies for improvement, and the eligible land, referred to as "livestock-rearing land" was described as "land situated in an area consisting predominantly of mountains, hills or heaths, being land which is, or by improvement could be made, suitable for use for the breeding, rearing and maintenance of sheep or cattle but not for the carrying on, to any material extent, of dairy farming, the production, to any material extent, of fat sheep or fat cattle or the production of crops in quantity materially greater than that necessary to feed the number of sheep or cattle capable of being maintained on the land". Thus a number of upland farms became eligible. Owners and occupiers of this livestock-rearing land can put forward improvement schemes for such things as buildings, water and electricity supplies, fertilizers, land reclamation, reseeding and draining, and can claim one-half of the cost if the scheme is approved.

There is a Hill Sheep Subsidy which can be claimed for ewes in self-maintained flocks of hardy breeds. It was 6s. per ewe for 1961 but varies according to conditions. On farms producing cross-bred lambs there is a reduced subsidy, which was 3s. per ewe in 1961.

The Hill Cow Subsidy applies to breeding cows and in-calf heifers kept all the year on land covered by the 1951 Act. It was £12 a head in 1961. Cows kept wholly or mainly for milk production are not eligible.

(b) For all farms.

The Calf Subsidy is available (1961-1964) for steer calves at £9 5s. and for heifer calves at £7 10s. if they are passed as suitable for rearing for beef at about eight months old. Normally Jersey, Guernsey, Friesian and Ayrshire heifer calves are not eligible, but any calf can be offered for inspection.

The fatstock subsidies apply to both sheep and cattle and are designed to make up to the farmer a guaranteed price which is worked out on the average prices at the markets and varies each week within certain limits. The stock are graded by Ministry of Agriculture officials. In the case of cattle there are two grades according to quality. They are usually weighed live and the subsidy given per live cwt. The guaranteed price in 1961-62 was in the range 140s. to 160s. per live cwt. For instance, if the market price realizes £7 per cwt., the grade 1 subsidy is in the order of 18s. per cwt. making a total of 158s. per cwt. The average weight of fat cattle is about 7½ cwt. Grade 2 subsidy is always 5s. less than grade 1.

Sheep are all one grade. If passed as fat, a pen of sheep is weighed live and the average live-weight per sheep is calculated. The deadweight is estimated at a few pounds less than half the liveweight, depending for instance on the wetness of the fleece. The subsidy is given per pound deadweight and is related to a guaranteed price of about 3s. 2d. per lb. It ranges from nil to about 1s. 2d. so that a horned lamb of 30 lb. deadweight would carry about 30s. headage in the autumn. Lambs are plentiful and cheap in late summer and autumn, when the subsidy is therefore highest.

IV. Prices of stock and other farm commodities in the Craven district.

The average prices per head for the stock sold at Skipton Auction Mart in 1961 and 1962:

	£	s.
Calves (up to one year)	4	9
In-calf cattle	56	0
Dairy cattle (newly-calved cows and heifers) ..	63	13
Bulls	55	11
Geld cattle (stores)	37	13
Fat cattle (excluding subsidy)	47	7
Store sheep (all sheep except fatstock)	4	16
Fat sheep (excluding subsidy)	3	18

Approximate range of prices per head of different types of sheep, typical of Skipton Auction Mart, 1961-1962:

Horned store lambs	£1-£4
Half-bred store lambs	£3-£7
Suffolk-cross store lambs	£4-£8
Horned draft ewes	£3-£7

Average prices per head for Swaledale rams sold at official sales of the Association in 1962:

	£	s.
Aged rams	16	15
Shearling rams	33	12
Ram lambs	11	14

Wool. A Swaledale or Dales-bred fleece averages 4-5 lbs.; this wool fetched about 4s. a lb. in 1961-62, hence the wool crop from a flock of 400 ewes was worth between £330 and £400 a year. Teeswater fleeces average 7 lb.

Milk. The wholesale price of milk in 1961-62 varied from about 2s. 1d. a gallon in summer to 3s. in winter. An upland farm with 20 cows averaging 3 gallons each a day in winter would bring in £270 a month in milk sales. A hill farm with 10 cows averaging 2 gallons each a day would bring in £90 a month. Both the number of in-milk cows and the yield would be greatly reduced in summer.

Hay. £12-£18 per ton. The amount fed to cattle in winter depends on age and weight, etc. Mature store cattle might require 20-28 lb. per head per day, with little or no "proven", while in-milk cattle would require less hay, 14-16 lb. per day, plus concentrates, e.g., 4 lb. of cake per gallon of milk.

Straw. £6 per ton. It is used as bedding for calves: about half a ton per calf per year. Sometimes good quality straw is used to supplement hay.

"Provvén". Cake, dairy nuts £30 per ton, sugar beet £25 per ton.

V. Glossary of Craven farming terms related to the text.

BACK-END	Autumn months.
BIELD	Shelter from cold.
BUCKRAKE	Machine for picking up cut grass for silage.
BULL	Uncastrated male cattle.
BULLOCK	Castrated male stirk.
CALF	Cattle up to one year, male or female.
COW	Female cattle after birth of second calf.
CRIPPLE HOLE	Hole in wall c. 2 feet high for letting sheep through.
CROSS-BRED	Offspring of any crossing.
DEADWEIGHT	(Estimated, of sheep). Half live weight less a few pounds.
DRAFT EWE	4-5 year old ewe taken out of mountain flock for sale to uplands.
EWE	Female sheep after first shearing, or sometimes after first lamb.
FATSTOCK	Animals for slaughter (eligible for subsidy).
FER, to	To free the meadows of stock, e.g., after lambing.
FEST OUT, to	To put stock on to another farmer's land for agreed price.
GELD HEIFER	Female cattle not in calf.
GIMMER	Usually adjective meaning "female", or young female sheep.
GIMMER HOGG	Female sheep from 6 months to first shearing.
GIST	Of stock being fested out, e.g., gist cattle.
GRIP	Open land drain.
HALF-BRED	Offspring of specific crossing policy, e.g., Masham.
HEADAGE	Subsidy per head.
HEIFER	Female cattle from first service to birth of second calf.
HOGG	Sheep from 6 months to first shearing (if female, sometimes till first lamb).
HUB, to	To rake hay into small piles.
KEMP	Undesirable rough wool in fleece.
LAITHE	Barn.
LAMB	Sheep up to 6 months old.
LEAD, to	To bring in the hay from meadow to barn.
LEY	Reseeded grassland left for a certain number of years, or permanently.
MASHAM	Offspring of Swaledale or Dales-bred and Teeswater or Wensleydale.
MEADOW	Field cut for hay.
MOSS-CROP	Cotton-grass land.
MULE	Offspring of Swaledale and Hexham Leicester (an upland breed).
PASTURE	Improved land not cut for hay.
PINE	Anaemic condition in sheep (cobalt deficiency).
"PROVVÉN"	Food for stock, other than hay, e.g. dairy nuts, etc.
PULPY KIDNEY	Disease, especially in lambs, causing sudden death due to toxin-producing bacteria.
PURLY	Of a fleece, curly or in ringlets.
RAM	Uncastrated male sheep.
RIB-GRASS	Ribwort Plantain (<i>Plantago lanceolata</i>).
ROW UP, to	To put hay into lines ready for baler.
RUDDLE, to	To mark rams first one transmissible colour, then later another, to show on ewes the order of servicing.
SALVE, to	To rub grease into the fleece (before dipping was introduced).
SCALER	Machine to turn hay.
SIDE DELIVERY	Machine to row up hay.
SHEARLING, SHEARING	Sheep from time of first shearing to second shearing, i.e., 1-2 years old.
SHIPPON	Barn with tying up space for cattle.
SHOT LAMB	Lamb which has not thrived well.
SINGLE UP, to	To mend a dry stone wall with one line of stones only.

SOUPY	Damp, sour land in contrast to limestone pastures (pronounced "sowpy").
STAGGERS	Metabolic disease due to low level of magnesium in blood.
STEER	Castrated male stirk.
STIRK	Cattle from about 1-2 years, male or female.
STORES	Stock that is not fat.
"SWARDLE"	Swaledale sheep.
SWAYBACK	Brain disease in lambs.
SWELKY	See "soupy".
TREMBLINGS	Metabolic disease in sheep due to low level of calcium in blood (also called Lambing Sickness).
TWO-TOOTH SHEEP	Sheep shorn once, i.e., 1-2 years old (refers to teeth on lower jaw).
TWO-SHEAR	Or four-tooth. Sheep shorn twice, i.e., 2-3 years old.
TUP	Ram.
WETHER	Castrated male sheep.
WHITE BENT	Mat-grass (<i>Nardus stricta</i>).
WUFFLER	Machine for turning hay.